African Elephant Status Report 2016

An update from the African Elephant Database

C.R. Thouless, H.T. Dublin, J.J. Blanc, D.P. Skinner, T.E. Daniel, R.D. Taylor, F. Maisels, H. L. Frederick and P. Bouché

Occasional Paper of the IUCN Species Survival Commission No. 60

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African Elephant Status Report 2016

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Lastly, we wish to thank all the governments of the range states of Africa's elephants. While we have worked with some more closely than others on this report, we are grateful for the continued commitment of all these countries to conserving and managing the African elephant across its range.

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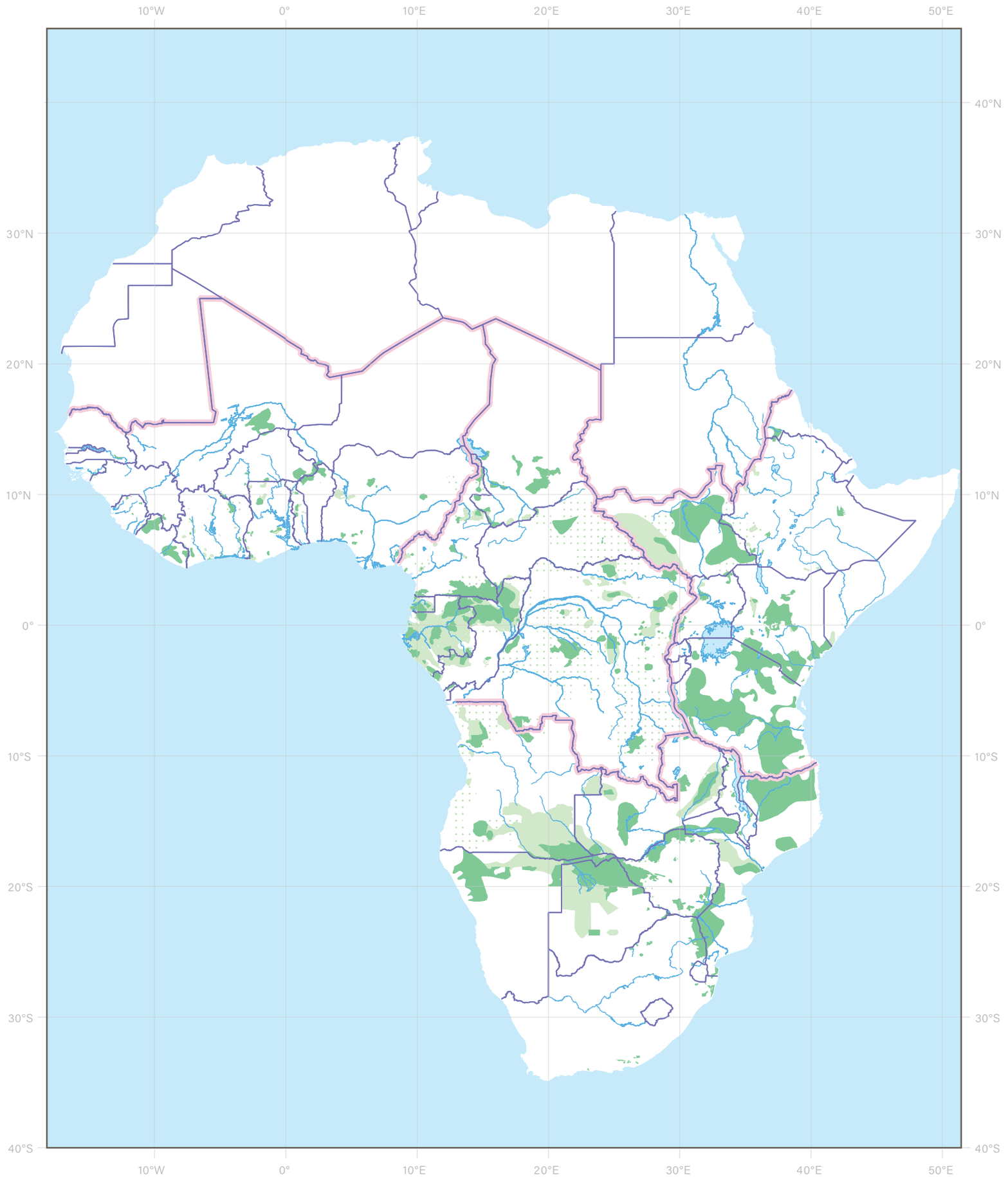

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Executive Summary

This is the fifth printed African Elephant Status Report (AESR) produced by the African Elephant Specialist Group (AfESG) of the IUCN Species Survival Commission (SSC). Like its predecessors, the AESR 2016 is based on data from the African Elephant Database (AED), the most comprehensive database on the status of any species of mammal in the wild. This is the first comparison of continental populations between 2006 and 2015 across the 37 range states of the African elephant. Importantly this report not only provides information on changes in elephant numbers but also, because it is spatial, shows where these changes have taken place.

The AESR 2016 is the most authoritative and up-to-date compilation of information on the numbers and distribution of the African elephant at national, regional and continental levels across all range states in sub-Saharan Africa. The last year of data collected for this report is 2015. The title follows the convention of using the year of publication rather than the last year of data collection. We hope this report contributes to a wider discussion about the value of monitoring to conservation and to addressing the needs of the African Elephant Action Plan (AEAP), ensuring that policy decisions and the assessment of conservation activities and their performance are evidence-based, and that new conservation initiatives budget for support to monitoring programmes including the AED.

Status reports are intended to help address contemporary elephant management and conservation needs and, therefore, a key question is how the estimates and guesses in the AESR 2016 relate to the true number of elephants in Africa at the end of 2015. When populations are declining, any time difference between the date of surveys and the cut-off date for the report will lead to the true number being lower than the recorded figure. This is more of an issue with the guesses than with estimates, since the largest savanna populations have all been surveyed within the last two years. There are also reasons why the AED may under-record the true number of elephants: aerial counts, which make up the majority of the estimates, tend to undercount the true number of elephants; many of the guesses come from areas which are known to contain substantial elephant populations but have just not been surveyed to the standard required for an estimate; and there are areas of elephant range for which there are no estimates or guesses. On balance the true number of elephants are likely greater than the estimates based on surveys alone, though not necessarily greater than the combined estimates and guesses.

The AESR 2016 provides sound scientific evidence, a deep understanding of the context and a strong technical base to support the management and conservation of Africa's elephants across their range.

THE CONTINENTAL OVERVIEW

The desire to conserve and manage elephants is widespread, and even if opinions differ as to how best this goal can be achieved, it is widely agreed that decisions should be informed by the most up-to-date and reliable information available on the numbers and distribution of Africa's elephants.

Since the publication of the AESR 2007, this goal has been furthered among the African elephant range states through their joint development and adoption by consensus of the African Elephant Action Plan (African elephant range states, 2010), which provides objectives, strategies, and activities for the conservation and management of Africa's elephants. The AEAP recognizes the fundamental importance of monitoring progress and performance through constant reassessment of information on the status of the species throughout its range.

The AfESG and its AED occupy a unique and pivotal position with regard to this need, having been designated as the repository for information on the conservation status of the species by the parties to CITES (CITES Conference of the Parties, 2013a).

This report presents more than 275 new or updated estimates for elephant populations across Africa, with over 180 of these arising from systematic surveys. All aerial survey data from the Great Elephant Census, (greatelephantcensus.com), a Paul G. Allen project, and data from dung counts in Central Africa carried out primarily by the Wildlife Conservation Society (WCS) and World Wide Fund for Nature (WWF) were submitted through the AED for inclusion in this report.

In the AESR 2016, the estimated number of elephants in areas surveyed in the last ten years in Africa is 415,428 ± 20,111 at the time of the last survey for each area. There may be an additional 117,127 to 135,384 elephants in areas not systematically surveyed. Together, this estimate and guess apply to 1,932,732 km^2, which is 62% of the estimated known and possible elephant range. There remains an additional 38% of range for which no elephant population estimates are available, although it is likely that average elephant densities in this range are much lower than in the surveyed areas.

This is the first AESR in 25 years that has reported a continental decline in elephant numbers. Between the AESR 2007 and this report, there has been a reduction of approximately 118,000 in estimates for populations where comparable surveys have been carried out. However, some populations have been surveyed for the first time, particularly in Central Africa, and this has led to an increase of approximately 18,000 in the "new population" category. The result is that the total estimated number of elephants from surveys has decreased by a smaller figure of about 93,000 since the AESR 2007. The estimated number of elephants from surveys and guesses combined has decreased since the AESR 2007 by about 104,000-114,000.

The decline is largely caused by the surge in poaching for ivory that began around 2006 (CITES, 2016), the worst that Africa has experienced since the 1970s and 1980s. Losses in Tanzania account for the major share of this decline. Other underlying drivers of population decline, such as loss of habitat and increasing human elephant conflict, are still of critical conservation importance but have been receiving less attention from managers, conservationists and policy-makers due to the immediacy of the poaching crisis.

THE CONTINENTAL OVERVIEW
CONT.

Continuing uncertainties about the number of elephants in Botswana have a substantial potential impact on continental population estimates. Botswana holds the single largest population but national estimates since 2006 have differed by as much as 80,000 elephants. In order to better understand the current status of this critically important population, which is shared with four neighbouring countries, a coordinated survey of the entire cross-border population of Angola, Botswana, Namibia, Zambia and Zimbabwe remains a high priority.

The proportion of elephant range for which elephant estimates are available currently stands at 62%, which has increased from 51% since the previous report. The overall reliability of estimates has increased considerably, with estimates from systematic surveys now accounting for 37% of total range, compared to 29% in the previous report.

Holding over 70% of the estimated elephants in Africa (56% of estimated and guessed elephants) in 42% of the total range area for the species, Southern Africa has by far the largest number of elephants in any of the four regions. Eastern Africa comes second, with 20% of estimated elephants (18% of estimated and guessed elephants) in 28% of the range, while Central Africa is an even more distant third (6%) for estimated elephants in 25% of the range. There remain a high proportion of guesses for Central Africa, giving a total of 23% of estimated and guessed elephants. West Africa continues to hold the smallest regional population with under 3% of both categories in the remaining 5% of range.

Improved knowledge of elephant distribution is reflected by the proportion of range categorised as known, which has increased from 63% to 67%. Significant range expansion has occurred in Botswana and Kenya. The actual distribution of elephants across this range varies considerably across the four regions – from small, fragmented populations in West Africa to large, virtually undisturbed tracts of elephant range in Central and Southern Africa, with a mixture in Eastern Africa.

THE REGIONAL OVERVIEW

CENTRAL AFRICA

Central Africa's elephants have been severely affected by ivory poaching over the past ten years (CITES, 2015b; Maisels, Strindberg et al., 2013b; UNEP et al., 2013; Wittemyer et al., 2014). Evidence from the carcass reports sent to MIKE shows that poaching was already a problem in this region by 2003, long before it became unsustainable in Eastern Africa (CITES Secretariat, 2016).

The estimated number of elephants in areas surveyed in the last ten years in Central Africa is 24,119 ± 2,865 at the time of the last survey for each area. There may be an additional 87,190 to 103,355 elephants in areas not systematically surveyed. Together, this estimate and guess apply to 546,471 km², which is 70% of the estimated known and possible elephant range in the region. The number of elephants estimated from systematic surveys in Central Africa increased by about 10,000 between the AESR 2007 and the present. However, this was largely a consequence of "new populations" being surveyed and in some cases there have been major reductions in these populations in subsequent surveys.

Gabon and Congo still hold Africa's most important forest elephant populations but both have been affected by heavy poaching in recent years. Some populations in Cameroon have also been badly impacted, as has Chad's largest remaining population in Zakouma National Park, which has now stabilized. The savanna populations of the Central African Republic have almost completely disappeared, with the only remaining populations occurring in the forested south-west. There are only small remnant populations in Democratic Republic of Congo and Equatorial Guinea.

Populations recorded as having been lost in the last ten years have included one in Chad and another in the DRC. However, since populations in the extensive Central African forests are much less clearly defined than in other parts of Africa, loss of numbers and range is more likely to be recorded than that of discrete populations.

Substantial changes have been made to the range maps, but these are mostly the result of improved information, rather than real changes in range. There has been a decrease of recorded range from about 975,000 km² to about 780,000 km² with known range decreasing from 82% to 58%.

EASTERN AFRICA

Eastern Africa has been the region most affected by poaching, having experienced an approximately 50% population decline in estimates from surveys since the AESR 2007, largely attributed to a greater than 60% decline in Tanzania's elephant numbers.

The estimated number of elephants in areas surveyed in the last ten years in Eastern Africa is 86,373 ± 10,549 at the time of the last survey for each area. There may be an additional 11,973 to 12,060 elephants in areas not systematically surveyed.

Together, this estimate and guess apply to 548,587 km², which is 62% of the estimated known and possible elephant range in the region, a significant improvement on the 45% of estimated known and possible elephant range assessed in the AESR 2007, that resulted in reported survey estimates of 165,151 ± 27,990 and an additional 10,722 to 12,066 guesses in areas not systematically surveyed.

Between the AESR 2007 and this report, elephant numbers in Eastern Africa have declined by almost 87,000, on the basis of updated estimates for sites where comparable survey techniques were employed. However, some populations have been surveyed for the first time and this has led to an increase of approximately 9,000 in the "new population" category. The result is that the current total number of elephants from surveyed populations represents a smaller estimated reduction of about 79,000 elephants, still close to a 50% loss, during the period from late 2006 to the end of 2015.

Elephant numbers have been stable or increasing since the AESR 2007 in Uganda, Kenya, Rwanda and Ethiopia, although these national level figures include reductions in some of their populations. Significant losses have been recorded in Tanzania. There has been an apparent increase in elephant numbers in South Sudan, because the major populations were surveyed for the first time in 30 years after 2006, and it is suspected that there is no longer a resident elephant population in Somalia.

No populations are recorded as having been lost in Eastern Africa.

While there has been no net increase in range, known range has increased from 57% to 85% of total range in 2015. Range expansion is reported in two areas of Kenya.

SOUTHERN AFRICA

Southern Africa continues to hold by far the largest number of elephants on the continent, and nearly 75% of these elephants form part of a single population in the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), some 520,000 km^2 in extent. Whereas conservation challenges associated with high elephant densities in large protected areas were common in the region a decade ago, contemporary elephant conservation in southern Africa is now also faced with the emergence of a growing poaching threat (UNEP et al., 2013). While overall, poaching has not had the same impact in Southern Africa as in other regions it has severely affected populations in Zimbabwe, Angola, Mozambique and to a lesser extent, Zambia.

The estimated number of elephants in areas surveyed in the last ten years in Southern Africa is 293,447 ± 16,682 at the time of the last survey for each area. There may be an additional 15,157 to 16,672 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 734,824 km^2, which is 55% of the estimated known and possible elephant range in the region.

Between the AESR 2007 and this report, elephant numbers in Southern Africa have declined by almost 30,000, on the basis of updated estimates for sites where comparable survey techniques were employed. However, some populations have been surveyed for the first time and this has led to an increase of approximately 3,000 in the "new population" category. The result is that the current total number of elephants from surveyed populations represents a smaller estimated reduction of about 27,000 elephants. Although there have been real declines in Mozambique and Zimbabwe, the main contributor to this decline is a reduction in the estimate for Botswana, which may be the result of uncounted elephants, range expansion, increased poaching or methodological differences between surveys. Some major populations in Namibia (Zambezi, Etosha NP and Khaudum NP), South Africa (Kruger NP) and Zimbabwe (South-east Lowveld and North-west Matabeleland) are stable or increasing.

Southern Africa has a relatively high reliability and quantity of elephant information, especially for the larger populations. Although overall survey coverage has increased since 2007, largely as a result of the Great Elephant Census carried out in 2014-2015, there is still wide variation amongst countries.

One population is reported as having been lost from Angola.

The current range area for Southern Africa is 1,325,998 km^2, a slight increase from the 1,305,140 km^2 recorded in the AESR 2007, and the percentage of this which is known range has increased from 53% to 60%. There has been no major loss of elephant range, and one notable southern expansion of range in Botswana. Other changes result from improved information, particularly in Angola.

WEST AFRICA

West Africa's elephant populations are mostly small, fragmented and isolated. With increasing human populations and infrastructural development, many countries in West Africa are experiencing increased pressure on natural areas from mining, logging and rapid transformation of land to agriculture.

The AESR 2016 provides more information than previous status reports on countries known to have small, isolated and highly vulnerable populations, with some stark results. Although numbers are small relative to continental levels, West Africa reported losing twelve populations of elephants since the AESR 2007: one each in Côte d'Ivoire, Ghana, Guinea Bissau, Sierra Leone and Togo; two in Guinea and five in Nigeria. It is surprising, however, that there is recent evidence for the continued survival of a number of populations that were already at a very low level 10-20 years ago. The transfrontier "WAP" complex that straddles the border between Benin, Burkina Faso and Niger remains the region's largest population and of great significance as one of West Africa's few populations with potential long-term viability.

The estimated number of elephants in areas surveyed within the last ten years in West Africa is 11,489 ± 2,583 at the time of the last survey for each area. There may be an additional 2,886 to 3,376 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 102,850 km^2, which is 72% of the estimated known and possible elephant range in the region.

The overall numbers of elephants in West Africa appear to have increased since 2006. This is largely due to the apparent growth in the WAP complex population.

At the national level, population estimates for both Benin and Burkina Faso suggest increases in the WAP complex. Estimates for Côte d'Ivoire, Ghana, Guinea Bissau, Senegal, Sierra Leone and Togo have stayed more or less constant with some higher and lower guesses, while estimates for Guinea, Mali and Nigeria have declined since 2006. Guinea's elephants are now reduced to a single small population. Niger's few remaining elephants are thought to still move in and out of the country as part of the WAP complex. Information on Liberia's elephants has been substantially improved in this report, adding a small number to guesses originating from 1989/90.

A substantial update of the West African elephant range has been completed for this report, and this has the effect of reducing the total range (known and possible) from around 176,000 km^2 to approximately 143,000 km^2, but the percentage of known range has increased from 71% to 79%.

THE AED ONLINE

Since the AESR 2007, the AED has moved to an online, web-based platform africanelephantdatabase.org. This online resource, which was launched initially in 2012 and has been substantially redesigned and updated to coincide with the production of this report, not only offers a platform for displaying data between the published status reports, but also provides new ways to view the data from all the status reports and access more detailed information on new surveys than are presented in this report. Readers are encouraged to visit the website to further explore the data.

With the transition to an online platform, the AED has undergone a very significant change. This has been both challenging and rewarding and lessons we have learnt are being used by other groups working on species databases. In the years to come, we hope to demonstrate meaningful advances in the analytical potential of the AED to provide a strong and relevant evidence base for the management and conservation of the African elephant.

Introduction

Background

HISTORY OF THE *AFRICAN ELEPHANT DATABASE* AND STATUS REPORTS

The African Elephant Database (AED) originated from the African Elephant Survey carried out by Iain Douglas-Hamilton in the late 1970s, which led to the first continental estimate for elephant numbers, produced in 1979 (Douglas-Hamilton, 1979). In 1986, Douglas-Hamilton and colleagues started to compile this information into a geographical information system. Using data accumulated from questionnaire replies, surveys and interviews, a database of elephant population estimates and distribution was assembled (Burrill & Douglas-Hamilton, 1987). An updated version was produced in 1992 (Douglas-Hamilton et al., 1992), which included the use of spatial models to estimate populations for the central African forests, as only a very small proportion of this area had been surveyed at that time.

In 1992, the AED became the direct responsibility of the IUCN Species Survival Commission's African Elephant Specialist Group (AfESG). Since that time, the structure and management of the AED has been overseen by a group of technical experts from within the AfESG known as the Data Review Working Group (DRWG), and chaired since mid-2014 by Dr. Chris Thouless. The DRWG oversees the selection and categorisation of data to be included in the AED; agrees on new features, tools and analyses; and reviews the content of the AESR. Decisions made by the DRWG and additional reviewers are coordinated and implemented by AfESG Secretariat staff and contracted consultants. For this report, additional reviewers were added to focus on and strengthen specific areas. The authorship of this report reflects these contributions.

Initially housed at the United Nations Environment Programme (UNEP) headquarters in Nairobi, Kenya, the AED was until April 1998 a collaborative effort of the Global Environment Monitoring System (GEMS), the Global Resource Information Database (GRID) of UNEP and the IUCN/SSC AfESG. In April 1998 the AED was moved from UNEP to its present location in the AfESG offices in Nairobi. Although the AED was transitioned to a web-based platform in 2012 it continues to be managed by the AfESG Secretariat from Nairobi through its website at africanelephantdatabase.org, where data from all earlier AED updates is publicly accessible, and more recent data is provisionally released whenever possible.

Today the AED is the most comprehensive database on the status of any single species of mammal in the wild.

HISTORY OF THE AFRICAN ELEPHANT DATABASE AND STATUS REPORTS
CONT.

The AfESG's preparation of African Elephant Status Reports (AESR) began in the mid-1990s. Status reports are published to provide a complete picture of the status of the species based on the data within the database up to a certain point in time. Prior to the present report, four reports of the AED were published: the African Elephant Database 1995 (Said et al., 1995), the African Elephant Database 1998 (Barnes et al., 1999), the African Elephant Status Report 2002 (Blanc et al., 2003), and the African Elephant Status Report 2007 (Blanc et al., 2007). These reports are freely accessible as well as available for download, in PDF format, on the AED website. Other provisional data were posted on the AED website between the AESR 2007 and the AESR 2016, but this report replaces them.

With the transition to an online platform (www.africanelephantdatabase.org), the AED has undergone its most significant change in over 20 years. This has been both challenging and rewarding, with many lessons we have learned now being used by other groups working on species databases. We hope this report contributes to a wider discussion about the value of monitoring to conservation, ensuring that policy decisions and the assessment of conservation activities are evidence-based whenever possible and that new initiatives plan and budget for support to databases to better enable the monitoring of progress and evaluation of performance.

THE CONTINUING NEED FOR A CONTINENTAL APPROACH

A key issue in African elephant conservation is the variation in the status of the species across the 37 range states in which elephants occur. The desire to conserve and manage elephants is widespread, and even if opinions differ as to how best this goal can be achieved, it is widely agreed that decisions should rely on the best and most recent available information on the status of Africa's elephants.

Since the publication of the African Elephant Status Report 2007, this goal has been furthered among the African elephant range states through their joint development and adoption by consensus of the African Elephant Action Plan (African elephant range states, 2010a), which provides objectives, strategies, and activities for the conservation and management of Africa's elephants. The AEAP recognizes the fundamental importance of monitoring progress and performance through constant reassessment of information on the status of the species throughout its range.

IUCN SSC's African Elephant Specialist Group (AfESG) and its African Elephant Database (AED) occupy a unique and pivotal position with regard to this need, having been designated as the repository for information on the conservation status of the species by the parties to CITES (CITES Conference of the Parties, 2013b). The AfESG has had a specific mandate since CITES CoP15 in 2010 to provide the CITES Standing Committee "any new and relevant information on the conservation status of elephants" (CITES Conference of the Parties, 2013a) along with information and analyses from the CITES MIKE and ETIS monitoring programmes. This reporting, completed for four meetings of the CITES Standing Committee to date, draws heavily on the AED and has been proposed to CITES CoP17 in September 2016 to be adopted as a permanent reporting mandate. The AEAP also recognizes the vital contribution of the AED in one of its component activities to "maintain and update databases on elephant populations for management purposes".

CONTINUING NEED FOR A CONTINENTAL APPROACH CONT.

Such management information is required not only at the site and national level, but also regionally and continentally. Many elephant populations occur across international borders and a policy or management decision made in one country can affect elephant populations elsewhere. Changing land-use patterns or different approaches to tourism, such as trophy hunting in border areas, may have impacts beyond national boundaries. Likewise, the impact of policies concerned with ivory management and trade may affect elephants elsewhere. Civil instability and wars in Africa have sometimes led to a shift in populations across national boundaries. A regional and continental perspective is critical to identify and understand these ongoing dynamics and to support international and regional decision-making, including management of transfrontier conservation areas (TFCAs).

These issues become all the more important as African elephants have faced a devastating new wave of illegal killing over the last decade (CITES Secretariat, 2016). Despite the intense pressures of illegal killing, with some results detailed later in this report, African elephants continue to live outside protected areas and the majority of elephant range may still be found in unprotected areas. This poses additional challenges for wildlife authorities and wildlife managers, as levels of human-elephant conflict continue to be high, increasing and politically charged in many parts of the continent, and especially where human and agricultural expansion moves into new areas already occupied by African elephants. Many lessons have been learned regarding the challenges in mitigating this conflict (Hoare, 2000, 2015), the importance of broader landscape level land-use planning and what will be required in the future if elephants are to persist in the long term.

All these issues highlight the need to census and manage elephants across borders and the need to keep this information up to date and available in the AED in support of conservation action across the continent. The demand for and continued use of publications like the AESR and other analyses enabled by the AED demonstrate the ongoing need for this type of data even after the current pressures from illegal wildlife trafficking have been reduced. Conservation efforts, including implementation and monitoring of national, regional and continental strategies and action plans, should be informed by up-to-date and reliable data on elephant numbers and distribution. The AED and AESRs can also provide invaluable insights into the effectiveness of conservation responses.

About this Report

THE AFRICAN ELEPHANT STATUS REPORT 2016

The AESR 2016 is the fifth printed AESR produced by the AfESG. Like its predecessors, it aims to provide the most authoritative, comprehensive and up-to-date information on the numbers and distribution and of the African elephant at national, regional and continental levels. The last year of admissible data collected for this report was 2015. The title refers to the year of publication rather than the last year of data included. This is the first status report since the AESR 2007 and some modifications have been implemented since that publication.

In preparing the AESR 2016, the AfESG has enjoyed a close collaboration with the technical staff of Vulcan Inc to ensure that data from the Great Elephant Census (greatelephantcensus.com), sponsored by Paul G. Allen, were captured and presented in this report. Vulcan colleagues have also helped with the further development of the database, its web-based platform and in particular streamlining the system for adding new data. All elephant survey data from the GEC were submitted through the AED for inclusion in this report.

Status reports are intended to help address contemporary elephant management and conservation needs and, therefore, a key question is how the estimates and guesses in the AESR 2016 relate to the true number of elephants in Africa at the end of 2015. When populations are declining, any time difference between the date of surveys and the cut-off date for the report will lead to the true number being lower than the recorded figure. This is more of an issue with the guesses than with the estimates in this report since the largest savanna populations have all been surveyed within the last two years. There are also reasons why the AED may under-record the true number of elephants: aerial counts, which make up the majority of the estimates, tend to undercount the true number of elephants; many of the guesses come from areas which are known to contain substantial elephant populations but have not been surveyed to the standard required for an estimate; and there are areas of elephant range for which there are no estimates or guesses. On balance the true number of elephants are likely greater than the estimates based on surveys alone, though not necessarily greater than the combined estimates and guesses. It is the continuing need to improve the accuracy and coverage of these numbers and ensure that they are as up to date as possible that make survey efforts such as the Great Elephant Census and periodic national surveys so important.

CHANGES SINCE THE AESR 2007

Since the fourth report, the AESR 2007, the AED has moved to a web-based platform. Provisional, online-only updates have filled the gaps between the AESR 2007 and this report, and have been published on the AED website. Launched in 2012, the website is a platform for displaying new information incorporated into the database between full status reports, and also provides new ways to access the data from all the status reports as well as more detailed information on new surveys than is available in the AESR 2016. Readers are encouraged to visit the website to further explore the database.

A system for categorising and tracking changes in numbers was first introduced in the AESR 2007, resulting in the display of a "Cause of Change" for each area and an Interpretation of Changes table for each country and region as well as the continent. ("Cause of Change" has been renamed "Reason for Change" in this report; see below.) This system is intended to distinguish between real changes in numbers and changes in survey techniques or area of survey coverage, thus limiting inappropriate extrapolations about trends over time.

The Definite, Probable, Possible, and Speculative (DPPS) system, in use since 1995, was designed to describe uncertainty and data quality. However the calculations underpinning it are complex and its display of population numbers difficult to understand and interpret. Although the AESR 2007 emphasizes that "comparing guesses to derive population trends is a meaningless exercise," the four-category "DPPS" itself does not explicitly articulate the proportion of elephant numbers that are guesses (i.e. population figures that do not meet the criteria required to qualify as population estimates).

To simplify the presentation of elephant numbers and clearly demonstrate the calculations leading to the totals at the national, regional, and continental levels, the DPPS has been replaced in this report by the Alternative Data Display (ADD), which classifies numbers either as estimates or guesses, and distinguishes what kinds of surveys have provided the figures. In contrast to the DPPS, the estimates derived from surveys in the AESR 2016 are additive, so that the rows, listed by survey types, total to the country totals and the country level totals add to the regional totals, and so forth. Very small differences in the totals in the tables may occur due to rounding of decimal places. Guesses are not completely additive because they include upper and lower confidence limits from certain types of survey. Columns involving confidence limits (CL) remain the necessary exception, as adding CLs requires the pooling of variances to derive a new CL appropriate for the sum total. Furthermore, population estimates are now aligned with the range area (km^2) they cover in the same table. While the printed AESR 2016 only uses the ADD, the DPPS has been retained on the online platform for comparative purposes.

DATA TYPES AND CATEGORISATION

The AED contains both spatial and non-spatial (attribute) data, managed using GIS software and a relational database management system. Spatial and relational data are both maintained in a PostgreSQL database with the PostGIS extension. These data sets are combined with base map data derived from the Digital Chart of the World (ESRI, Inc., 1992) a widely available global geographical dataset, the World Database of Protected Areas (UNEP-WCMC & IUCN, n.d.), the World Resource Institute's protected area data set (WRI, 2016) and a variety of other sources. Each of these background datasets is used as appropriate for the production of this report and none are considered authoritative datasets produced by the AfESG.

Data in a variety of formats are collected and received into the AED. Survey reports are obtained from wildlife management agencies and other organizations, and non survey-report data are shared in many formats by individuals and organizations with expert knowledge of an area. Preliminary range maps are shared with relevant experts to aid in modifying and revising.

Data regarding an estimate or a guess are entered into the database using a submission form specific to the type of survey. Every estimate or guess is linked to spatial data, which is digitized and geo-referenced if not supplied by the data provider. Each submission consists of spatial data accompanied by appropriate attribute data manually extracted from the source material, such as transect length, flight speed, or dung decay rate. The source material (survey report, map, email, etc.) is then uploaded and linked to the submission.

Area measurements in the tables are calculated using geodetic coordinates on the WGS84 spheroid, for consistency across the African continent without projection-related errors. The surface areas of input zones, protected areas and elephant range are tallied at national, regional and continental levels. The overlay capabilities of GIS are used to determine percentages of both protected and surveyed elephant range.

The AED stores data on two basic variables reflecting the conservation status of African elephants, namely, numbers (abundance) and distribution (range). There are specific challenges associated with these kinds of data, related to their reliability and the availability and timing of new surveys. The ways that these issues are handled in this report are described in the following sections.

ELEPHANT NUMBERS

Although there are many different ways to count elephants, no single method is perfect. Possible sources of bias include the choice of survey technique, surveyor skill, quality and availability of adequate equipment, financial constraints, climatic conditions and vegetation cover. Ideally, data on elephants in any country should be collected by a wildlife management authority using qualified staff and standardized methods for collecting, recording and analysing data (Craig, 2012c; Hedges & Lawson, 2006). In reality very few countries have the means, either financial or in the form of expertise, to conduct systematic surveys on a regular basis and political strife in many range states sometimes makes survey work impossible.

As a result, elephant population data is collected by a variety of agencies and individuals, often without any direct linkage to one another and using a variety of different techniques. It is sometimes necessary to combine data from different types of surveys and different habitats to calculate a national estimate. Seasonal and cross-border movements of elephants are additional factors that can lead to inaccurate national estimates. Few cross-border surveys are conducted simultaneously to accurately estimate the size of such populations. Instead, they are generally treated as separate populations on either side of the border, which may occasionally result in either under- or over-counting. The end result is a collection of data of variable quality for most countries, and no data from formal surveys for many populations.

METHODS OF ESTIMATING ELEPHANT NUMBERS

While there is no single or ideal method for counting elephants, each method has its advantages and disadvantages under different conditions. The brief description of some of the most important methods below is not intended to be detailed or exhaustive. For more details, the reader is referred to the specialized treatments of these subjects (Barnes, 1993; Craig, 1993, 2004, 2012c; Douglas-Hamilton, 1996; Hedges et al., 2013; Hedges & Lawson, 2006; Kangwana, 1996; Norton-Griffiths, 1978).

Methods for establishing elephant numbers fall into three broad categories: estimates from total counts, estimates from sample counts, and guesses.

Total Counts aim to see and record all the elephants in a defined area, either from the air or from the ground. Aerial total counts are conducted from fixed-wing aircraft or helicopters. The speed at which the aircraft is flown influences the accuracy of the count, with high speeds usually leading to undercounts (Norton-Griffiths, 1978). Aerial total counts are commonly used in open, savanna habitats, where elephants are unlikely to be hidden by forest or thick bush, especially but not exclusively in Eastern and Southern Africa.

Total counts of a limited area can also be conducted at ground level by teams in vehicles or on foot. These are uncommon in Africa, but in a handful of places, total ground counts have been accomplished by attempting to identify every individual in the population. This is only possible for intensively studied populations where animals can be observed readily. For such individual recognition studies to provide high quality data for the AED, every individual in the population must be registered. Many ongoing studies have so far covered only a fraction of these focal populations, and cannot therefore provide reliable estimates of entire populations. If elephants are being identified in a place where they concentrate for a specific resource (such as the Amboseli swamps in Kenya and Dzanga Bai in the Central African Republic), it may be difficult to work out how large an area is covered by the identified elephants, and the estimate will be affected by the timescale over which elephants have been enumerated (if too short it will not include occasionally seen individuals, if too long it may include ones that have already died).

Sample Counts, in which only a sample of the area is counted (usually between 3% and 20%), are generally conducted along transects which may be randomly distributed or systematically placed across the study area. The resulting data are used to calculate a population estimate with

confidence limits. In contrast with total counts, which tend to produce underestimates of the true population, sample counts have in principle an equal chance of underestimating or overestimating the true population, provided that sampling error is the main source of error. In practice, however, factors such as high aircraft speed or dense vegetation cover lead to undercounts.

Direct Sample Counts are most commonly made from the air, but may also be conducted on the ground, either on foot or from vehicles. Aerial sample counts require considerable technical expertise and coordination, as well as the use of expensive additional equipment such as radar altimeters. Aerial sample counts are the most commonly employed survey technique in Eastern and Southern Africa.

Indirect Sample Counts are also referred to as dung counts. In low-visibility tropical forests, elephant abundance estimates typically use elephant dung density as a proxy for elephant density. Distance sampling (Buckland et al., 2001, 2015) along line transects estimates dung density and CLs within the area of interest (Hedges, 2012a; Strindberg, 2012). DISTANCE software (Thomas et al., 2010) is used for both survey design and analysis. Careful field protocol ensures accurate and precise estimates (Hedges et al., 2012a; Hedges & Lawson, 2006). Dung density is converted to elephant abundance using estimates of the rates of elephant defecation and dung decay and the surface area of the area surveyed. Dung decay rates can vary considerably across space and time: site and time-specific estimates of decay rates greatly improve accuracy in elephant abundance estimates (Hedges et al., 2012b; Laing et al., 2003). Estimates from well-conducted dung counts can be as accurate as those from direct methods, and more precise than those of aerial sample counts (Barnes, 2001, 2002).

At sites < 5,000km^2 and where elephant numbers are between a few tens and a few thousand, DNA-based capture-recapture methods have been used (Eggert et al., 2003; Gray et al., 2014; Hedges, 2012b; Hedges et al., 2013; Karanth et al., 2012b; Karanth et al., 2012c). Elephant DNA is extracted from as many dung piles as possible within the area of interest, and genetic fingerprinting is used to identify the number of unique genotypes (individuals) in the samples. The rates of repeat samples obtained can then be used to estimate the population size (Karanth et al., 2012a).

Often, it is not possible to carry out a systematic survey and the only type of information available for many areas is either an informed or other guess.

Survey Reliability

Population estimate data entered into the AED varies in quality from the identification of individual animals to plain guesswork. The addition of population numbers of varying quality into national, regional and continental totals is, from a statistical viewpoint, invalid and produces misleading results. On the other hand, discarding low-quality numbers can produce equally misleading estimates, as high-quality survey estimates are not available for many areas in which elephants are found.

In order to solve this problem, the AED incorporates a system to accommodate all types of numbers by classifying them according to their type and designating them as estimates and guesses.

As with the previous data aggregation system, which separated numbers into Definite, Probable,

METHODS OF ESTIMATING ELEPHANT NUMBERS
CONT.

Possible, and Speculative, the new ADD system uses a scale of survey reliability, ranging from A (highest) to E (lowest). Survey reliability gives an indication of the level of certainty that can be placed on a given number, as determined by the method employed and how it was carried out.

Tables 1 and 2 show the different types of surveys with the range of reliabilities that could be assigned to them and how each number contributes to the columns of estimates and guesses depending on its reliability and other criteria. How the columns are then summed to create country, regional, and continental totals is detailed in the next section, "Integration and Presentation of Data."

The unit of analysis for assigning these categories is the "input zone" and these are listed in each country table. An input zone has only one source of information and may align with a protected area or other land unit, or simply with an area for which there was previous information, better enabling comparison to previous AESRs. Each input zone is assigned a reliability category, and the figure associated with that input zone contributes to the estimates and guesses as shown in Table 2.

Carcass Ratios

The carcass ratio, a measure often calculated in aerial total and sample counts, is the estimated number of dead elephants divided by the sum of estimated dead plus live elephants. Carcass ratios can provide supporting information to changes in numbers in successive surveys and thus are included in the narrative text alongside survey estimates where available and appropriate. Douglas-Hamilton and Burrill (1991) showed that carcass ratios in excess of 8% for sample counts or 3.3% for total counts were indicative of declining populations.

ELEPHANT DISTRIBUTION

African elephants occur in a wide variety of habitats, from tropical swamp forests to deserts. They often move extensively in search of food, water and minerals or in response to disturbance, and the extent to which they move may depend on a large number of factors. In certain areas, seasonal movements are predictable, while in others, movement patterns are far more difficult to decipher. These factors, together with the scarcity of animals at the edges of their distribution, make elephant range a difficult concept to articulate and map. For these reasons, elephant range is broadly defined by the AfESG as the entire area where the species occurs in the wild at any time.

Collecting precise distribution information on such a wide-ranging species as the African elephant presents a number of practical problems, often related to the inaccessibility of some of the habitats in which elephants are found. As a result, the quality of information varies considerably from one area to another and its mapping heavily relies on expert opinion. The range map for a particular country is often updated by a single individual, and thus has a subjective element. Trying to draw a precise range boundary on maps of varying quality and scale is an inexact exercise. Neat, rounded lines may be indicative of scanty knowledge in comparison to the fragmented, more detailed pictures which emerge from countries where more precise information is available. Elephant range often appears to coincide directly with the boundaries of protected areas, because that is where most population surveys are carried out, and elephant movements in and out of protected areas are often unknown or unaccounted for.

TABLE 1. CATEGORISATION OF ELEPHANT ABUNDANCE DATA IN THE AED

SURVEY TYPE	RELIABILITY	CATEGORISATION
Aerial Total Count	A	Reliability A if well-designed and implemented*; downgraded to an informed guess of reliability D if there are concerns about whether the count was well designed or implemented or if a range of estimates is provided
Ground Total Count		
Individual Registration	A	Reliability A; downgraded to an informed guess of reliability D if a range of estimates is given, or other information suggesting the individual registration estimate does not include the entire population
Aerial Sample Count	B	Reliability B if 95% confidence intervals or other measures of precision are provided; otherwise, or if there are other concerns about survey design or implementation*, the estimate is downgraded to an informed guess of reliability D
Ground Sample Count		
Reliable Dung Count	B	Reliability B; as "reliable" dung counts are defined by having 95% confidence limits and a dung decay rate obtained on site
Other Dung Count	C	Reliability C; as "other" dung counts are defined by having 95% confidence limits but no on-site measurement of dung decay rate
Informed Guess	D	Reliability D; includes aerial sample counts, ground sample counts, and dung counts without 95% confidence limits or other methodological details or information and guesses that are based on a clearly explained logic for extrapolating from observations
Other Guess	E	Reliability E; any guess that does not fulfill the requirements for an Informed Guess
Degraded Data	E	Reliability E; any estimate or guess that is at least ten years old. For this report this includes any estimates from 2005 or earlier
Modeled Extrapolations	E	Reliability E; guesses derived from models that do not rely on elephant survey data at a site level but use instead other data such as habitat type, land use or human population density to extrapolate from elephant densities measured in other areas.

** The AfESG's Data Review Working Group (DRWG) reviews all surveys to ensure that key standards have been met and parameters included in the report to allow determination of the quality of survey design and implementation. The AfESG and its DRWG make every effort to engage with data providers to secure any essential missing information.*

TABLE 2. CATEGORISATION OF ELEPHANT NUMBERS BY SURVEY TYPE & CONTRIBUTION TO ESTIMATES AND GUESSES

SURVEY TYPE	RELIABILITY	# OF ELEPHANTS		GUESSES	
		ESTIMATE	± 95 % CL	FROM	TO
Aerial Total Counts*	A	Estimate	—	—	—
Ground Total Counts*					
Individual Registrations*					
Aerial Sample Counts*	B	Estimate, if given; or else, number seen	95% confidence interval divided by two	—	—
Ground Sample Counts*					
Reliable Dung Counts					
Other Dung Counts	C	Number Seen	—	Lower confidence limit minus number seen	Upper confidence limit minus number seen
Informed Guesses	D	Number Seen	—	Lower limit of guess minus number seen	Upper limit of guess minus number seen
Other Guesses	E	—	—	Lower limit of guess	Upper limit of guess
Degraded Data				Estimate	Estimate
Modeled Extrapolations				Modeled Estimate	Modeled Estimate

** These survey types may be downgraded to lower reliabilities and thus treated as informed or other guesses. See the criteria in Table 1.*

ELEPHANT DISTRIBUTION
CONT.

Frequently, the depiction of range is also delimited by a natural boundary such as a river or a mountain range for convenience rather than accuracy. When range information in one country extends to a national border, it does not always match the adjacent range in the neighbouring country. While this is sometimes due to different human population densities or land uses across a border, more often lack of reliable information is the cause of what appear to be hard boundaries.

In order to address some of these difficulties, the AED classifies and maps elephant range information into four levels of certainty, as described in Table 3. In addition, range information in the AED is documented and referenced to original sources of data wherever possible to allow some evaluation of the reliability of range information and the reasons why range has either increased or decreased. In some cases these are real changes, while in others they are the result of improved knowledge. Where possible these distinctions have been mentioned in the text.

INTEGRATION AND PRESENTATION OF DATA

DERIVATION OF NATIONAL, REGIONAL AND CONTINENTAL TOTALS

The categorisation system described on the previous page is implemented in the AED through a series of algorithms applied to input zones, or each area for which an individual number is listed in the country tables displaying Elephant Estimates. When executed, these algorithms categorise each input zone in terms of survey type and reliability. The categorised records are then used to produce national, regional and continental totals.

It is important to note that the totals presented for each country and region are minimum numbers, based on the areas that have been surveyed or for which guesses are available. It should also be noted, however, that the totals can include relatively old estimates and if the population is declining, this will yield an overestimate, while it will understate the true number of elephants in an increasing population. In many countries, and in all regions, there are large areas of elephant range where neither surveys nor guesses are available. In the case of Gabon, a modeled extrapolation has been used to generate a guess for unsurveyed areas of the country. This is because there is a large proportion of known range in Gabon that has not been surveyed, but the factors affecting elephant numbers are well known. As the available estimates generally represent only a proportion of the elephant range in a country, they cannot be considered total estimates of the national population. Likewise, the estimates given for the regions and for the continent cannot be interpreted as total regional and continental estimates either.

CHANGES IN ELEPHANT NUMBERS AND DISTRIBUTION OVER TIME

A key question for African elephant conservation and management is whether elephant populations are increasing, decreasing or stable. Comparing estimates from different AESRs to derive continental trends is often attempted but can be invalid and potentially misleading for a number of reasons.

Many of the continent's elephant populations have never been systematically surveyed. Thus any differences reported between the AESRs refer to a subset of all elephant populations, and may

therefore not reflect overall changes, including those in unsurveyed populations. While it is likely that elephant densities in unsurveyed range are lower on average than in surveyed areas, there still may be significant numbers of elephants in areas for which there are no currently estimates or guesses.

Populations surveyed for the first time or populations newly added to the AED (i.e. "new populations" in Table 4) contribute to an apparent overall increase in numbers, even though these do not reflect a true increase in elephants, but rather an improvement in knowledge. Repeated surveys of the same area may use different techniques or cover different areas, so the results are not directly comparable between different time periods. Where new surveys have not been carried out recently, old estimates will be retained and, over time, degraded to guesses. Retention of these numbers for a significant proportion of the population can lead to a situation where the extent of real change is not reflected in the AESR totals.

In order to disentangle these confounding factors from real changes in elephant numbers, the AED relies on a system that links figures contained in the current version of the AED to the corresponding figures in the previous report, and assigns a "reason for change" to each pair, as described in Table 4. The AESR then displays the numbers associated with these reasons for change at the national, regional and continental levels.

Where the more recent surveys in methodologically comparable survey pairs account for a large proportion of the estimate column for a given region, a statistical comparison of elephant numbers over time for those populations can be performed (see Blanc et al., 2005 for details). A list of methodologically comparable surveys featured in this and the previous report is provided in Appendix I.

This report refers to the reason for change "population lost", or PL, more than it did in the AESR 2007 because of a focus on more deeply investigating the current status of small, isolated populations. The authors recognize the significance of this label and apply it only where there is reliable evidence regarding the loss of a population that is distinct and isolated from other populations.

OVERALL QUALITY OF INFORMATION AND SURVEY PRIORITIES

The state of knowledge on elephant numbers and distribution varies widely across the continent. Some populations have never been surveyed, or are only surveyed rarely, while others are counted more frequently. The objectives of the AED include promoting the use of standardized, reliable survey techniques, as well as facilitating the task of donors, wildlife authorities and decision-makers in prioritizing their efforts to monitor elephant populations.

In order to assist in meeting these objectives, a simple index measures the quality of elephant population data available at the national, regional and continental levels. Based on this index, a system to identify and prioritize the areas where systematic surveys are most needed has been developed. These measures, both of which are calculated from data contained in the AED, are described below.

OVERALL QUALITY OF INFORMATION AND SURVEY PRIORITIES CONT.

The **Information Quality Index (IQI)** is an unbiased, normalized and scalable index of the overall quality of information on elephant population estimates and guesses. The IQI ranges from zero (no reliable information) to one (full range coverage using good-quality estimates) and is the product of two key variables: a measure of the quality of available data and a measure of the completeness of estimate coverage. The data quality measure is based on the ratio of good quality population data (estimates) to total population data (estimates + guesses); the data completeness measure is based on the ratio of assessed range to total known and possible range.

The **Priority for Future Surveys (PFS)** index is designed as an unbiased system for setting priorities for future surveys in order to improve the accuracy of the continental estimate. For a truly accurate continental picture of elephant abundance to emerge, reliable estimates would have to be available for all elephant range. Countries accounting for a larger proportion of total continental range should therefore be prioritized more highly.

PFS is therefore based on the IQI (as described above) together with a measure of continental range coverage represented by each country. When calculated for each country, the PFS provides a measure, ranging from one (highest priority) to five (lowest priority), of the countries where population surveys are needed. At the input zone level, the PFS is based on the proportion of national range accounted for by each area. All areas of elephant range that have never been surveyed, i.e. those for which estimates are currently unavailable, are automatically assigned a priority of one. Systematic surveys should be conducted in areas of unsurveyed known range. In areas of doubtful range and unsurveyed possible range, elephant presence/absence should be established prior to conducting systematic population surveys.

It is important to stress that neither the IQI nor the PFS are measures of the health of elephant populations, or of overall elephant conservation priorities, but rather of the quality of elephant population data and of the need to conduct systematic surveys in the future. For instance, range loss in a country will often result in a decline in the proportion of unassessed range, thus causing the IQI to increase and the priority ranking to decline. A list of all African elephant range states with their IQI and PFS scores is shown in Appendix II.

While it is hoped that the PFS system will prove useful for prioritizing populations needing to be surveyed, the system is not intended to be prescriptive. Individual range states may have good reasons to use different criteria and different systems for prioritizing elephant population surveys.

Further details on how the IQI and PFS are calculated are available in the "Data Types and Categories" section of the AESR 2007.

TABLE 3. CATEGORISATION OF ELEPHANT RANGE DATA IN THE AED

RANGE CATEGORY	DEFINITION
Known	Areas in suitable habitat, which, if searched with reasonable intensity, are likely to yield signs of elephant presence. If no information is obtained confirming presence of elephants for a 10-year period, known range is downgraded to possible range (below).
Possible	Areas within previous elephant range, including former areas of known range where the source information is more than 10 years old where there is no confirmation that elephants still occur, but no evidence that they have been lost. Areas of possible range are considered to be a priority for studies to establish the presence or absence of elephants.
Doubtful	Areas where there are reasons to believe that elephants are no longer present, but for which there is no recent positive or negative information. Areas of doubtful range are also a priority for presence/absence studies.
Non-Range	Areas that are believed to hold no elephants. A change to non-range ideally requires a clear statement from a knowledgeable person who has actually visited the area, though sometimes range is classified this way as a result of known habitat transformation or high human population densities.
Point Records	Sightings of elephants or evidence of their occasional presence outside of known elephant range, shown as crosses on the map.

TABLE 4. CODES & DESCRIPTIONS OF REASONS FOR CHANGE AS IMPLEMENTED IN THE AED

CODE	REASON FOR CHANGE	DEFINITION
RS	**Repeat Survey**	Both surveys were conducted using comparable methodologies and covering the same area
NP	**New Population**	A new entry into the AED; i.e. no previous survey or guess to compare with
DT	**Different Technique**	The most recent survey uses a different survey methodology, or replaces a guess
DA	**Different Area**	Both surveys were conducted using the same methodology, but the extent of the areas covered differed by 10% or more*
NG	**New Guess**	A guess replaces an older guess or a survey estimate that was degraded data
PL	**Population Lost**	A distinct population is known to have disappeared from an area, be it through translocation or local extinction
DD	**Data Degraded**	The estimate or guess has been degraded after 10 years
—	**No Change**	The estimate or guess has been retained unchanged from the previous report

** The 10% difference is a guideline; at times, differences in areas deemed to be non-significant by reviewers in terms of capturing elephant populations (e.g. in the case of other recent surveys showing no elephants in the omitted area), may result in the assignation of other causes of change.*

How this Report is Organised

→

Information in this report is presented at three levels—continental, regional and national. The continental section is followed by the regional sections, Central, Eastern, Southern and West. Each of these contains the relevant individual country sections. All sections follow the format described below.

NARRATIVE OVERVIEW

Each continental, regional, and national section begins with a brief narrative overview intended to supplement the information provided by the maps and tables that follow. The overviews are not intended to provide the reader with exhaustive information on each country, but simply to describe the current situation and to highlight any factors that may have contributed to it or notable changes in these factors since the AESR 2007.

The overview contains the three following sub-sections:

General Statistics. This section provides summary statistics of country area, area of elephant range, proportion of elephant range in protected areas, and the amount of range which has been surveyed or has elephant population estimates, IQI, CITES Appendix and year of that listing for each range state.

Current Issues. This section covers any issues that may, directly or indirectly, affect elephant populations and their conservation and management. These may include poaching, political stability, land use changes, large infrastructure developments or relevant new wildlife policies or management arrangements.

Numbers and Distribution. This section starts by describing the total population estimates and guesses before discussing individual areas that have been surveyed, the methods employed, and how the data and information were interpreted to result in changes to the tables and maps since the last report. The former sub-sections on "Range Data," "Population Data" and "Cross-border movements" from the AESR 2007 have been integrated under this heading.

TABLES

Summary Totals. These tables (see Table 5) present numbers at the national, regional and continental levels, separated into estimates and guesses. These tables depict the contribution of each survey type to the total area (in km^2) for which estimates and guesses are available. In addition, areas of unassessed known and possible range are also shown.

Total numbers from the previous report are also displayed in the table; the AESR 2007 data was

converted into the AED's new data display format for direct comparability, after first correcting AESR 2007 errata. For further explorations of the AESR 2007 dataset, and for comparisons between the former and the new data display approaches visit the AED website (www.africanelephantdatabase.org).

The Interpretation of Changes in Elephant Estimates from the Previous Report. These tables show the breakdown and net changes in the estimates and guesses, grouped by the categorised reason for change described in Table 4.

Elephant Estimates. These tables display the detailed inputs for each country that contribute to the summary totals and interpretation of changes tables. At the national level the table shows results for individual input zones. The centroid of each input zone is provided in decimal geographic coordinates to assist the reader in locating the areas on the accompanying maps. In addition, these input zone tables within each country present details on estimates, their reliability and other metadata, as described in Table 6. Input zones are, as a general rule, listed alphabetically. Where there are many input zones distributed across many parts of a country, sets of geographically adjoining input zones that indicate contiguous elephant populations or other geographically defined subsets are grouped into populations for ease of review and interpretation.

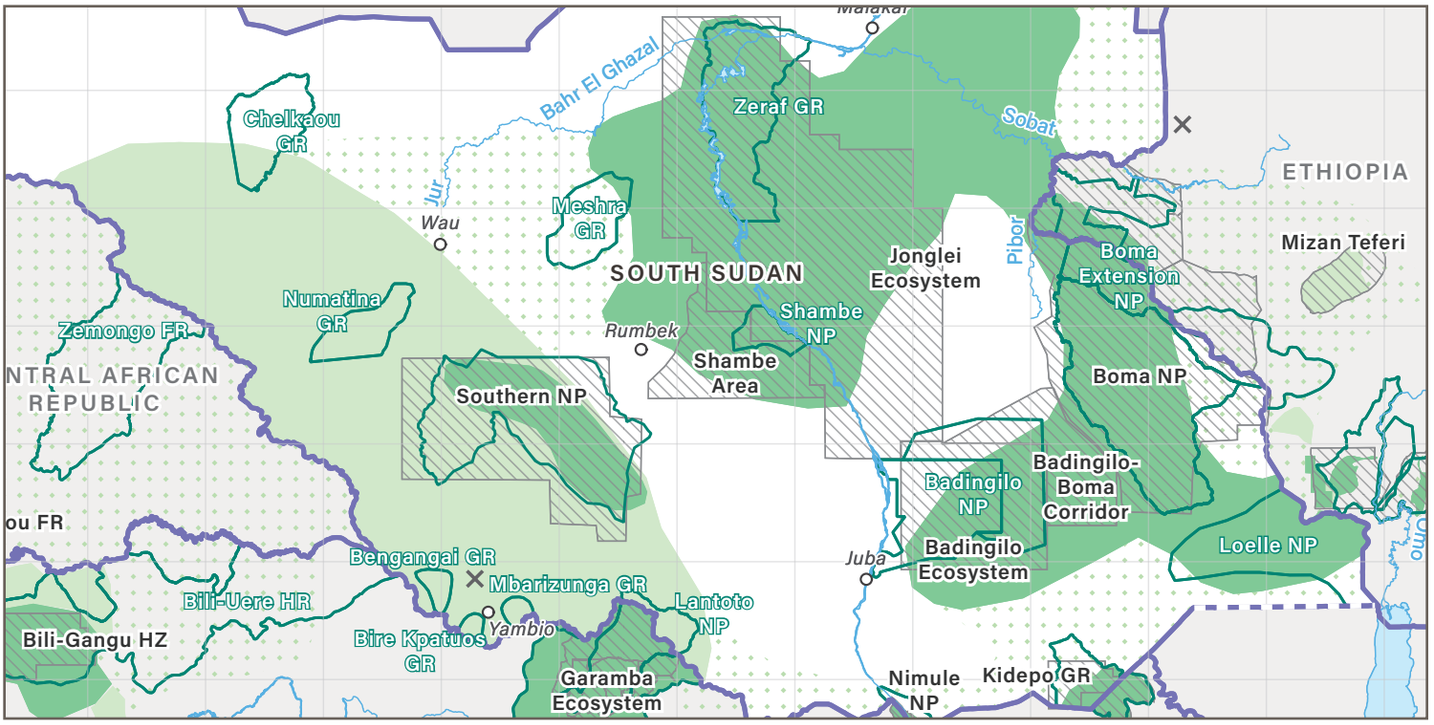
TABLE 5. DETAILS SHOWN IN REGIONAL & CONTINENTAL TABLES OF ESTIMATES IN THIS REPORT

COLUMN	DESCRIPTION
Country/Region	Name of the country or region
Elephant Numbers	Elephant numbers in terms of estimates and guesses
Range Area (km^2)	Estimate total range area (known plus possible range) in the country or region
% of Regional Range	Percentage of the regional/continental range accounted for by the country/region in question, rounded to the nearest integer
% of Range Assessed	Percentage of elephant range in the country or region for which estimates and guesses are available
Information Quality Index (IQI)	Number from zero (lowest) to one (highest) that gives an index of the overall quality of information on elephant population estimates and guesses (as described in the Overall Quality of Information and Survey Priorities section)
Priority for Future Surveys (PFS)	Number from one (highest) to five (lowest) indicating urgency and need for future systematic surveys, based on the precision of estimates and the proportion of regional/continental range accounted for by the region's/continent's estimates and guesses

TABLE 6. DETAILS & SURVEY PARAMETERS PROVIDED IN NATIONAL TABLES OF ESTIMATES AND GUESSES

COLUMN	DESCRIPTION
Populations	A grouping of adjacent input zones to indicate contiguous elephant populations or other geographically defined subsets. These designations have been made for some countries only, particularly those with many input zones
Input Zone	Name of the input zone
Reliability	Category (A, B, C, D, and E) to which the estimate or guess is assigned; dependent on survey type and additional criteria (as described in the Data Types and Categorisation section, Table 1)
Survey Type	Type of survey conducted (as described in the Data Types and Categorisation section, Table 2)
Reason for Change	Attributed reason for change with respect to the previous report (as described in the Integration and Presentation of Data section, Table 4)
Survey Year	Year in which the survey was conducted or to which the guess applies
Number of Elephants	Elephant population estimate or guess
95 % C.L.	Where available, the 95% confidence limit for the estimate (in the case of asymmetric confidence intervals, the difference between the lower and upper confidence interval divided by two). For informed guesses, the upper range of the guess, marked with an asterisk
Source	Author and year of the source material (full citations given in the list of references)
Priority for Future Surveys (PFS)	Number from one (highest) to five (lowest) indicating urgency and need for future systematic surveys, based on the precision of estimates and the proportion of national range accounted for by the input zone
Area	Size of the input zone in square kilometers (km^2); when available, the area given is that reported in the source material; if unreported, the area is calculated from the spatial data for the input zone
Map Location	Longitude and latitude of the centroid of the input zone, given in decimal degrees

EXAMPLE MAP



Section of country map shown for visual reference in context to the map legend.

MAPS

A map is shown for the continent, each region and each country, showing elephant distribution, input zones, protected areas within elephant range, national and/or regional boundaries, major towns, rivers and lakes. Countries of adjacent regions are shown to highlight important transfrontier populations, as well as the spatial relationships between elephant populations in neighbouring countries.

MAP LEGEND

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

EDITORIAL CONVENTIONS AND REFERENCING

In these overviews, several conventions have been adopted for ease of reading. Survey types are marked in bold when referring to the data included in this report, aligning with the tables. Range categories are also marked in bold in reference to the current range, not the category assigned in 2007. Estimates from sample counts are given with 95% confidence limits in the form xx ± yy. Asymmetrical confidence limits are shown in parentheses following the survey estimate. Abbreviations are used for protected areas after they are first named as a "National Park," (NP), "Forest Reserve," (FR) or other conservation area.

The AED relies on a huge number of discrete pieces of information, in the form of maps, survey reports, management plans, emails, phone calls, and news reports, among others. In addition to their inclusion in this report, these references are all eventually housed in the African Elephant Library, an invaluable and growing archive of over 7,500 references on the African elephant.

Africa

Continental Overview

ESTIMATED TOTAL ELEPHANTS

415,428 ± 20,111

GUESSES

117,127 - 135,384

GENERAL STATISTICS

Total Area	20,731,202 km²
Range Area	3,132,238 km² (15%)
Protected Range	30 %
Information Quality Index (IQI)	0.45

CURRENT ISSUES

This is the first African Elephant Status Report in 25 years which has reported a continental decline in elephant numbers. The decline is largely caused by the surge in poaching for ivory that began around 2006 (CITES, 2016), the worst that Africa has experienced since the 1970s and 1980s. Underlying conservation issues, particularly loss of habitat and increasing human elephant conflict, are still of critical significance but are receiving less attention because of the poaching crisis.

Systematic information on elephant poaching comes from the programme for Monitoring the Illegal Killing of Elephants (MIKE). This was established at the 10th Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Harare in 1997 and subsequently modified in accordance with the provisions in Resolution 10.10 (Rev. CoP16) on Trade in elephant specimens (CITES Secretariat, 2013). MIKE covers sites in 30 of the 37 African elephant range states, and 13 Asian elephant range states. In Africa, 60 MIKE sites together hold an estimated 30 to 40% of the African elephant population (CITES Secretariat, 2016). MIKE relies on ranger-based monitoring of elephant carcasses. When an elephant carcass is located, rangers record, if possible, the cause of death, allowing the calculation of the Proportion of Illegally Killed Elephants (PIKE). The dataset used for the 2016 analysis of MIKE data consisted of 14,606 records of elephant carcasses found in 54 MIKE sites in 29 African elephant range states from 2003 to 2015 (CITES Secretariat, 2016). PIKE levels above 0.5 (i.e. where half of dead elephants found are deemed to have been illegally killed) are considered to be unsustainable. Continental poaching levels have remained above this sustainability threshold since 2010 (Figure A). Further details are provided in the regional summaries.

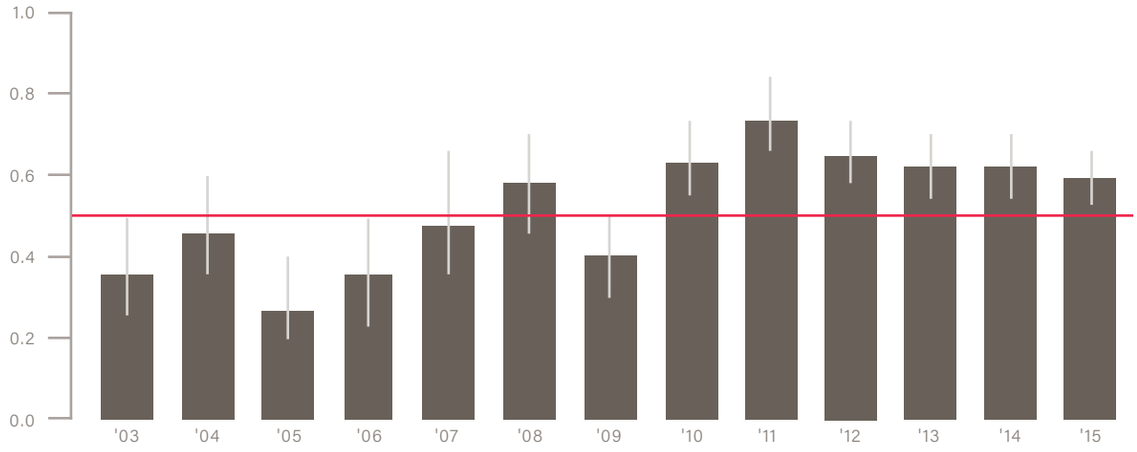


FIGURE A: *PIKE trends in Africa from 2003 - 2015 with 95% confidence intervals (CITES Secretariart, 2016)*

There has been much discussion as to whether one or two species of elephant should be recognized, with the forest elephant being acknowledged as a distinct species from the savanna elephant. The general opinion of taxonomists, particularly those with genetic expertise, is that two species should be recognized. However, this is complicated by lack of exact knowledge about where each species occurs and the presence of an unknown number of hybrid populations in areas around the fringe of the Congo Basin forests, including in Uganda (Mondol et al., 2015). Because of these uncertainties the African elephant is treated as a single species in this report. The use of the terms savanna and forest elephant is relevant at national and site level, and the terms are used in this report. Savanna elephants are found predominantly in Eastern and Southern Africa, while forest elephants occur primarily in the Congo Basin of Central Africa. In West Africa elephants live in both forest and savanna habitats; it is believed, however, that they are genetically forest elephants (Roca et al., 2015).

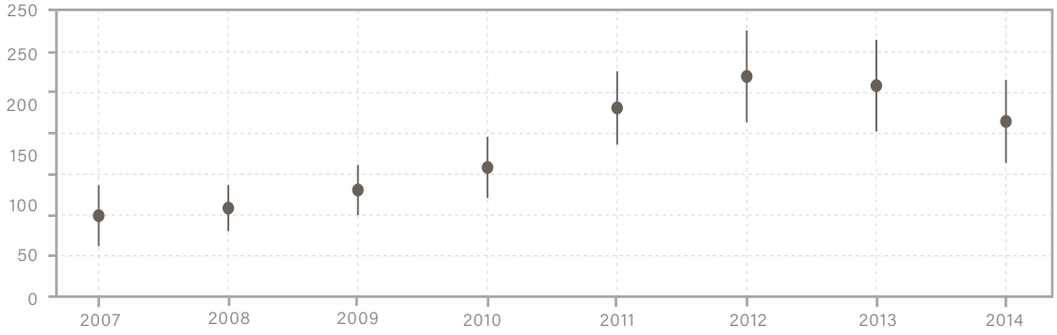


FIGURE B: *The overall trend of illegal ivory trade activity globally where all ivory types and weight classes are consolidated with mean (bold dot) and 90% confidence intervals, 2007-2014. (Milliken et al., 2016)*

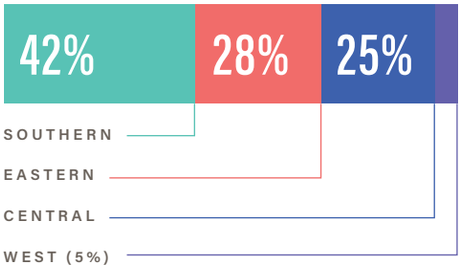
The African Elephant Action Plan (AEAP) was developed to respond to the needs of African elephant range states for the conservation and management of Africa's elephants. It was adopted in March 2010 at the 15th meeting of the Conference of the Parties to CITES (African elephant range states, 2010). The AEAP was developed over two years through a consultative process, facilitated by the IUCN SSC African Elephant Specialist Group and the CITES Secretariat, and is a consensus document fully owned and managed by the African elephant range states. It is intended to provide an overarching framework and a clear statement of shared objectives, to be achieved through activities implemented by the range states and their partners. The African Elephant Fund and the African Elephant Fund Steering Committee were established in accordance with CITES Decision 14.79 (Rev. CoP15) in 2010 to support and facilitate implementation of the action plan. As a follow

on to the AEAP development, national and regional level planning exercises are meant to highlight those actions urgently in need of funding if Africa's elephants are to be protected from the threats they face. The development of regional and national level plans, including those developed under the Elephant Protection Initiative, is described in the regional and national summaries.

All African elephant range states, except for South Sudan, are parties to CITES. Most range states have been parties to CITES for well over 20 years, except Angola, which joined the Convention in 2013. The elephant populations of four countries are in Appendix II of CITES: Botswana, Namibia, South Africa and Zimbabwe (CITES, 2015a). International trade in elephants and elephant specimens is allowed from these four countries under restricted conditions that differ slightly between the four countries, and there is currently a moratorium on international ivory sales until 2017. Elephant populations from the other range states are listed in Appendix I of CITES, and the trade in elephants and elephant specimens regulated accordingly.

In addition to the listing of the African elephant in the CITES Appendices, there is a CITES resolution governing trade in elephant specimens. Resolution Conf. 10.10 (Rev. CoP16) outlines a number of important provisions and regulations regarding trade in elephants and elephant specimens, as well as important reporting and monitoring responsibilities, such as the submission of data to the CITES monitoring systems MIKE and the Elephant Trade Information System (ETIS) (CITES Conference of the Parties, 2013b). CITES Decision 14.78 (Rev. CoP16) calls on the IUCN SSC's African and Asian Elephant Specialist Groups, MIKE, ETIS and the United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC) to prepare a joint analysis on the conservation

FIGURE C. ELEPHANT RANGE PER REGION



Southern Africa has the largest extent of elephant range of any region, and accounts for 42% of the species' total range area. Eastern and Central Africa follow with 28% and 25% of the continental total respectively, while West Africa accounts for only 5%.

status and management of live elephants, illegal killing, ivory trafficking and trade. The CITES Standing Committee has recommended that this decision be enshrined in Resolution Conf. 10.10 (Rev CoP16) at the CoP17 in September 2016 (CITES, 2016).

ETIS measures and records the levels and trends of illegal trade in ivory and other elephant specimens. The most recent analysis, produced for the 66th meeting of the CITES Standing Committee, demonstrates a trend in illegal ivory trade activity (Figure B) that parallels the illegal killing of elephants reported by MIKE since 2008, with a possible leveling and even a decline in recent years (CITES Secretariat, 2016; Milliken et al., 2016).

Recent analyses of ivory seizure data prepared by ETIS for CITES have identified those countries of most concern in relation to the illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013,

2016). A number of countries were tasked by the CITES Standing Committee to prepare, implement and report on National Ivory Action Plans, a set of specific, time bound activities related to the control of poaching and the illegal ivory trade and compliance with Resolution Conf. 10.10 (Rev. CoP16). The CITES Secretariat has established a website devoted to tracking progress on National Ivory Action Plans, available at cites.org/niaps (CITES, n.d.-a).

TABLE 1: *Hunting quotas submitted to CITES (2007 – 2015), converted here to equivalent numbers of animals.*
** No quota reported, therefore a zero quota was automatically allocated*

EXPORT QUOTAS FOR ELEPHANT HUNTING TROPHIES									
COUNTRY	2007	2008	2009	2010	2011	2012	2013	2014	2015
Botswana	300	330	400	400	400	400	400	400	0
Cameroon	80	80	80	80	80	80	80	80	0*
Gabon	50	50	0*	0*	0*	0*	0*	0*	0*
Mozambique	40	40	60	100	100	100	100	100	100
Nambia	90	90	90	90	90	90	90	90	90
South Africa	100	100	150	150	150	150	150	150	150
Tanzania	200	200	200	200	200	200	200	100	100
Zambia	20	20	20	20	80	80	0	0	80
Zimbabwe	500	500	500	500	500	500	500	500	500

TABLE 2. IVORY STOCKPILE DESTRUCTION

YEAR	COUNTRY	ESTIMATED WEIGHT (TONNES)	REFERENCE
2011	Kenya*	5.0	BBC News, 2011
2012	Gabon*	4.8	Jones, 2012
2013	Phillipines	4.2	Press, 2013
2013	USA	5.4	Goldenberg, 2013
2014	Belgium	1.7	Reuters, 2014
2014	Chad*	1.1	Godard, 2014
2014	China	6.2	Vaughan, 2014
2014	France	3.1	Willsher, 2014
2014	Hong Kong SAR	28.0	AFP, 2014
2015	Congo*	4.7	Smith, 2015
2015	China	0.7	Mathiesen, 2015
2015	Ethiopia*	6.1	BBC News, 2015b
2015	Kenya*	15.0	BBC News, 2015a
2015	Mozambique*	2.4	Vaughan, 2015
2015	Thailand	2.1	Reuters, 2015
2015	United Ared Emirates	10.0	Scanlon, 2015
2015	USA	1.2	Keim & Howard, 2015
2016	Malawi*	2.6	Reuters, 2016
2016	Sri Lanka	1.5	AFP, 2016
2016	Kenya*	105.0	CITES, 2016
Total		210.8	

Reported ivory stockpile destructions (2011 - August 2016.) ** African elephant range states*

Since 2007, there have been a number of destructions of ivory stockpiles, either by burning or crushing (Table 2). Three additional countries were known to have carried out stock destructions, Japan (2.8 tonnes in 2008) and unknown amounts in India and Portugal in 2014.

The nine range states listed above have submitted elephant hunting trophy quotas to CITES and these are shown below as the equivalent number of animals taken on quota derived from tusks and other trophies. In 2015 the United States imposed a suspension on permits for the import of African elephant trophies from Zimbabwe and Tanzania (USFWS, 2015a, 2015b) and the European Union imposed a suspension on the permits for the import of African elephant trophies from Mozambique (EU, 2015).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Africa is 415,428 ± 20,111 at the time of the last survey for each area. There may be an additional 117,127 to 135,384 elephants in areas not systematically surveyed. Together, this estimate and guess apply to 1,932,732 km^2, which is 62% of the estimated known and possible elephant range, an increase from 51% in the previous report. There remains an additional 38% of range for which no elephant population estimates are available, although it is likely that average elephant densities are much lower than in the surveyed areas. The overall reliability of estimates has increased considerably, with estimates from systematic surveys now accounting for 37% of total range, versus 29% in the previous report. The overall quality of information, as measured by the Information Quality Index (IQI), has not changed.

This report presents more than 275 new or updated estimates for elephant populations across Africa, with over 180 of these arising from systematic surveys. All aerial survey data from the Great Elephant Census, a Paul G. Allen project, and data from dung counts in Central Africa carried out primarily by the Wildlife Conservation Society (WCS) and World Wide Fund for Nature (WWF) were submitted through the AED for inclusion in this report.

Holding over 70% of the estimated elephants in Africa (56% of estimated and guessed elephants), Southern Africa has by far the largest number of elephants in any of the four regions. Botswana continues to have the largest national population. Eastern Africa comes second, with 20% of estimated elephants (18% of estimated and guessed elephants), while Central Africa is an even more distant third (6%) for estimated elephants. There is a high proportion of guesses for Central Africa, giving a total of 23% of estimated and guessed elephants. This is because most Central African surveys are dung counts, and many of these are recorded as guesses, since dung decay studies have not been done on site. West Africa continues to hold the smallest regional population with under 3% of both categories.

Between the AESR 2007 and this report, there has been a reduction of 118,000 in estimates for populations across Africa where comparable surveys have been carried out. However some populations have been surveyed for the first time, particularly in Central Africa, and this has led to an increase of approximately 18,000 in the 'new population' category. The result is that the current total estimated number of elephants from surveys has decreased by a smaller figure of about 93,000 since the AESR 2007. Continued uncertainties about the number of elephants in Botswana have

a substantial potential impact on the continental population, because Botswana holds the single largest population but national estimates since 2006 have differed greatly, by as much as 80,000 elephants. In order to better understand the current status of this critically important population, which extends into neighbouring countries, a well-coordinated survey of the entire cross-border population of Angola, Botswana, Namibia, Zambia and Zimbabwe remains a very high priority.

The estimated number of elephants from surveys and guesses has decreased since the AESR 2007 by 104,000 to 114,000.

Elephants are found in 37 range states in sub-Saharan Africa. There has been one change since the AESR 2007, as South Sudan became independent from Sudan and all of former Sudan's confirmed elephant populations occurred in the south. It is still possible that small numbers of elephants either visit seasonally or reside in Dinder National Park in Sudan (Mohammad, pers. comm., 2016). There have been no national level extinctions since the AESR 2007, although the populations in Guinea Bissau and Senegal are so small that they are in imminent danger of extinction. It was widely reported in 2009 that elephants had gone extinct in Sierra Leone as a result of a single poaching incident (AFP, 2009) but this was not correct and there are still at least four small populations surviving in the country.

The distribution of elephants varies considerably across the four regions from small, fragmented populations in West Africa to large, virtually undisturbed tracts of elephant range in Central and Southern Africa, with a mixture in Eastern Africa. Detailed knowledge of the status of elephant distribution is scanty in many parts of the continent, particularly in Central Africa and in countries that are emerging from armed conflict, such as Angola, Sudan and Sierra Leone.

The total area of known and possible elephant range at the continental level is currently estimated at slightly over 3.1 million km^2. This is hardly changed since the previous report. This is because most of the changes since the AESR 2007 were minor modifications rather than large scale changes. Improved knowledge of elephant distribution is reflected by the proportion of range categorized as known, which has increased from 63% to 67%. Significant range expansion has occurred in Botswana and Kenya.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	58,005	—	—	—	6 %	198,431
Ground Total Counts	133	—	—	—	0 %	136
Individual Registrations	1,695	—	—	—	0 %	3,576
Aerial Sample Counts	330,748	19,902	—	—	27 %	847,236
Ground Sample Counts	893	507	—	—	0 %	990
Reliable Dung Counts	20,555	2,854	—	—	3 %	96,670
Other Dung Counts	1	—	37,837	46,507	3 %	88,271
Informed Guesses	3,398	—	19,274	26,926	8 %	245,870
Other Guesses	—	—	10,145	12,080	7 %	218,187
Degraded Data	—	—	17,494	17,494	2 %	69,735
Modeled Extrapolation	—	—	32,378	32,378	5 %	163,629
Totals 2015	**415,428**	**20,111**	**117,127**	**135,384**		
Totals 2006	**508,325**	**36,563**	**138,651**	**146,700**		
Assessed Range					62 %	1,932,732
Unassessed Range					38 %	1,199,506
Total Range					100 %	3,132,238

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-118,477	±40,682	-8,691	-2,896	23 %	714,065
New Population	+17,992	±6,858	+13,975	+15,235	11 %	335,754
Different Technique	+11,369	±5,180	-22,998	-26,192	5 %	145,318
Different Area	+4,165	±3,449	-16,248	-14,565	5 %	170,682
New Guess	-4,482	±333	+12,958	+19,389	15 %	483,766
Population Lost	-129	±167	-998	-1,138	0 %	837
Data Degraded	-3,335	±642	+3,335	+1,708	0 %	0
No Change	0	±76	0	0	3 %	82,310
Totals	-92,897	±41,729	-18,667	-8,459	62 %	1,932,732

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	197,060	5,083	202,143
Direct Sample and Reliable Dung	841,678	103,218	944,896
Informed Guesses	230,720	178,779	409,499
Other Dung Counts	84,265	4,007	88,271
Other Guesses	229,086	54,266	283,353
Unassessed Range	515,413	682,070	1,198,197
Totals	2,098,222	1,027,424	3,126,359

REGIONAL ELEPHANT ESTIMATES

REGION	# OF ELEPHANTS		GUESSES		RANGE		
	ESTIMATE	± 95% CL	MIN	MAX	AREA (km²)	% REGIONAL	% ASSESSED
Central Africa	24,119	2,865	87,190	103,355	783,085	25 %	70 %
Eastern Africa	86,373	10,549	11,973	12,060	880,648	28 %	62 %
Southern Africa	293,447	16,683	15,157	16,672	1,325,998	42 %	55 %
West Africa	11,489	2,584	2,887	3,377	142,500	5 %	72 %
Total	415,428	20,112	117,128	135,385	3,132,238	100 %	62 %

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Africa

037

0 500 1500 2000 2500 km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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Central

REGION

Central Africa

ESTIMATED TOTAL ELEPHANTS

24,119 ± 2,865

GUESSES

87,190 - 103,355

GENERAL STATISTICS

Region Area	5,365,550 km²
Range Area	783,085 km² (15%)
Protected Range	30 %
Information Quality Index (IQI)	0.13

CURRENT ISSUES

Central Africa's elephants have been substantially affected by ivory poaching over the past ten years (CITES, 2016; Maisels, Strindberg et al., 2013b; UNEP et al., 2013; Wittemyer et al., 2014). Evidence from the systematic carcass reports sent to MIKE shows that significant Central African poaching was already occurring in 2003, long before it became unsustainable in Eastern Africa (CITES Secretariat, 2016). Because elephant distribution and abundance in Central Africa is driven primarily by poaching and not by habitat availability, elephant strong-holds are the areas with least human impact. They are generally areas with effective anti-poaching protection and are also usually remote from roads, settlements, navigable rivers, or even hunting trails (Blake et al., 2008; Laurance et al., 2006; Maisels, Strindberg et al., 2013b; Yackulic et al., 2011). New development corridors being created throughout the region are likely to have a negative impact on elephant populations (Laurance et al., 2015). Political insecurity and lack of government control over remote areas continues to have a negative impact on elephant conservation, particularly in the Central African Republic and the Democratic Republic of Congo (DRC).

Central Africa has 16 MIKE sites. Two sites, Monte Alén National Park in Equatorial Guinea and Kahuzi-Biega National Park in DRC, have not submitted any carcass data since the MIKE programme began in 2002. While reporting rates vary, the remaining 14 sites submitted carcass data between 2007 and 2015, though eight of these sites did not submit any carcass data in 2015. Estimated PIKE levels in 2015 sustained the pattern of being above the 0.5 level in Central Africa (Figure 1, on the following page) (CITES Secretariat, 2016).

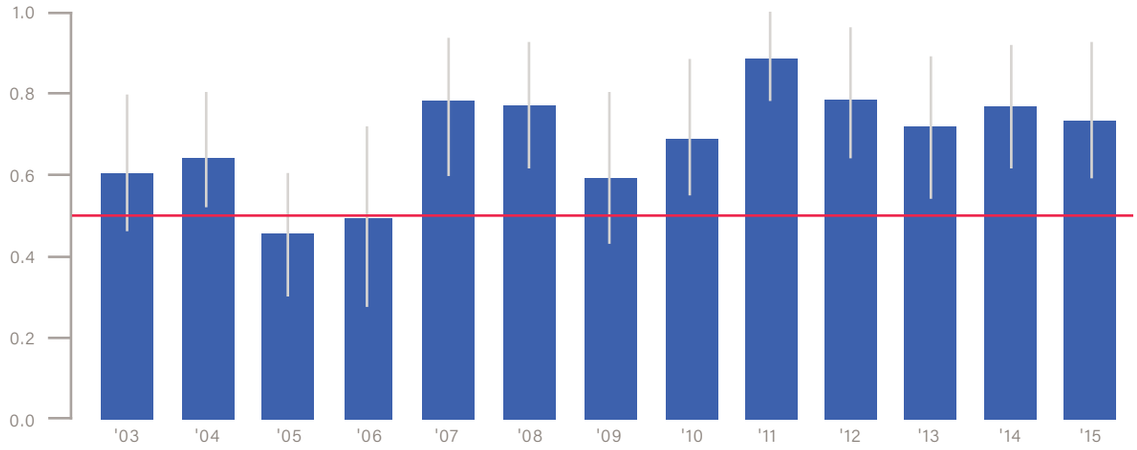


FIGURE 1: *Central African PIKE trends with 95% confidence intervals (CITES Secretariart, 2016)*

The Strategy for the Conservation of Elephants in Central Africa 2005-2015 was adopted by all Central African range states in 2005 (African Elephant Specialist Group, 2005a). The volume of seized ivory and illegal killings have greatly increased over the ten-year period in contrast to the 80% decrease projected (CITES, 2016). As a result, in 2013, the seven Central African range states adopted a Plan of Extreme Urgency to Combat Poaching (PEXULAB) (ECCAS, 2013).

In recent analyses of seizure data in ETIS, prepared for the CITES Standing Committee and Conference of the Parties, a number of countries within Central Africa were identified as having a worrying involvement in illegal ivory trade. Cameroon, Congo, DRC and Gabon have been requested to prepare and implement National Ivory Action Plans (CITES Secretariat, 2012; Milliken et al., 2013).

ETIS measures and records the levels and trends of illegal trade in ivory and other elephant specimens. The most recent analysis, produced for the 66th meeting of the CITES Standing Committee, demonstrates a trend in illegal ivory trade activity (Figure B) that parallels the illegal killing of elephants reported by MIKE since 2008, with a possible leveling and even a decline in recent years (CITES Secretariat, 2016; Milliken et al., 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Central Africa is 24,119 ± 2,865 at the time of the last survey for each area. There may be an additional 87,190 to 103,355 elephants in areas not systematically surveyed. Together, this estimate and guess apply to 546,471 km^2, which is 70% of the estimated known and possible elephant range. There remains an additional 30% of range for which no elephant population estimates are available.

The number of elephants estimated from systematic surveys in Central Africa increased by about 10,000 between the AESR 2007 and the present. However, this was largely a consequence of new populations being surveyed. In a number of cases, the first survey for an area took place after the publication of the AESR 2007 and a subsequent survey showed a decline – which does not show up in the comparisons between the present report and the AESR 2007. The number of elephants recorded as guesses declined between 14,000 and 26,000. Models for the entire region derived from the surveyed populations indicated that Central African elephants declined by over 60% between 2002 and 2011 (Maisels, Strindberg et al., 2013b) and the decline continued at least to 2014 at a rate of about 9% per year (Maisels, Strindberg et al., 2014b).

NUMBERS AND DISTRIBUTION
CONT.

The proportion of elephant range for which elephant estimates are available currently stands at 70%, an increase from 52% in the previous report. The overall quality of information, as measured by the IQI, has decreased from 0.22 to 0.13.

Historically, elephants were distributed fairly evenly throughout the forests of the region but they are now concentrated in the small country of Gabon, which contains 12% of the total African tropical moist forest area (Verhegghen et al., 2012), and roughly half of Africa's forest elephants. By contrast, the DRC contains 60% of the region's forest and less than 10% of its forest elephants.

A number of Central African countries have experienced dramatic losses in some of their elephant populations in the last ten years. These include the loss of between 16,000 and 20,000 forest elephants, representing 60 to 80% of the population, in Minkébé National Park in Gabon (ANPN, 2013), the loss of approximately 3,000 elephants, representing 50% of the population, in the Ndoki landscape in Congo (Maisels et al., 2012), the loss of several thousand elephants in the Cameroon section of the TRIDOM and the loss of more than 50% from a number of smaller populations in Cameroon and the DRC.

There has been a major decline in elephant numbers in Chad, with the major population in Zakouma National Park declining by an order of magnitude between 2005 and 2011, although it has since stabilized. The savanna populations of the Central African Republic have almost completely disappeared, with the only remaining populations occurring in the forested south-west.

Eighty percent of elephant range in Gabon has not been surveyed in the past five years, and some of it has never been surveyed, but there are plans to rectify this in 2017-2018. The main elephant populations of Cameroon were surveyed between 2014 and 2016. In Congo, the Ndoki Likouala area has not been surveyed since 2010-2011 (surveys are ongoing in 2016) and Odzala National Park has not been surveyed since 2012. In DRC, two important populations, Salonga National Park and adjacent areas and the Okapi Faunal Reserve, have not been completely surveyed since 2004 and 2011, respectively, although about 40% of Salonga NP was resurveyed in late 2015.

Populations recorded as having been lost in the last ten years include those of the Siniaka-Minia FR in Chad and Bushimae in the DRC. However, since populations in the extensive Central African forests are much less clearly defined than in other parts of Africa, loss of numbers and range is more likely to be recorded than the loss of discrete populations.

Substantial changes have been made to the range maps, but these are mostly the result of improved information, rather than real changes in range, except in the case of the Central African Republic, where almost all of the range in the north and east of the country has been lost. There has been a decrease of recorded range from about 975,000 km^2 to about 780,000 km^2 with known range decreasing from 82% to 58%.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	2,707	—	—	—	2 %	13,838
Aerial Sample Counts	192	314	—	—	5 %	37,793
Reliable Dung Counts	19,531	2,848	—	—	12 %	91,312
Other Dung Counts	1	—	37,677	46,223	11 %	86,378
Informed Guesses	1,688	—	6,901	13,790	9 %	74,143
Other Guesses	—	—	3,325	4,055	5 %	42,291
Degraded Data	—	—	6,910	6,910	5 %	37,086
Modeled Extrapolation	—	—	32,378	32,378	21 %	163,629
Totals 2015	**24,119**	**2,865**	**87,190**	**103,355**		
Totals 2006	**14,622**	**4,259**	**113,540**	**117,881**		
Assessed Range					70 %	546,471
Unassessed Range					30 %	236,615
Total Range					100 %	783,085

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-1,296	±2,395	-8,130	-2,185	5 %	36,337
New Population	+6,349	±1,182	+12,871	+14,113	16 %	123,521
Different Technique	+2,342	±4,250	-15,157	-16,632	7 %	53,577
Different Area	+558	±1,077	-15,412	-13,842	8 %	64,559
New Guess	+1,544	0	+2,942	+8,084	28 %	223,348
Population Lost	0	0	-620	-720	0 %	837
Data Degraded	0	0	0	-500	0 %	0
No Change	0	0	0	0	6 %	44,292
Totals	+9,497	±5,134	-23,506	-11,682	70 %	546,471

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	13,781	58	13,838
Direct Sample and Reliable Dung	101,390	27,715	129,105
Informed Guesses	82,322	155,451	237,772
Other Dung Counts	82,430	3,948	86,378
Other Guesses	67,697	11,680	79,377
Unassessed Range	105,833	130,781	236,615
Totals	453,452	329,633	783,085

ELEPHANT ESTIMATES

COUNTRY	# OF ELEPHANTS		GUESSES		RANGE			PFS	IQI
	ESTIMATE	± 95% CL	MIN	MAX	AREA (km²)	% REGIONAL	% ASSESSED		
Cameroon	6,830	944	1,985	2,134	89,718	11 %	68 %	2	0.47
Central African Republic	702	245	699	826	24,619	3 %	89 %	2	0.35
Chad	794	0	273	353	61,490	8 %	46 %	2	0.32
Congo	6,057	1,222	20,924	26,942	150,937	19 %	57 %	1	0.1
Democratic Republic of Congo	1,794	53	7,803	9,557	223,248	29 %	51 %	1	0.08
Equatorial Guinea	884	676	0	0	19,701	3 %	100 %	2	0.57
Gabon	7,058	2,303	59,057	67,094	213,373	27 %	101 %	1	0.09
Totals	24,119	2,865	87,191	103,356	783,085	100 %	70 %	1	0.13

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

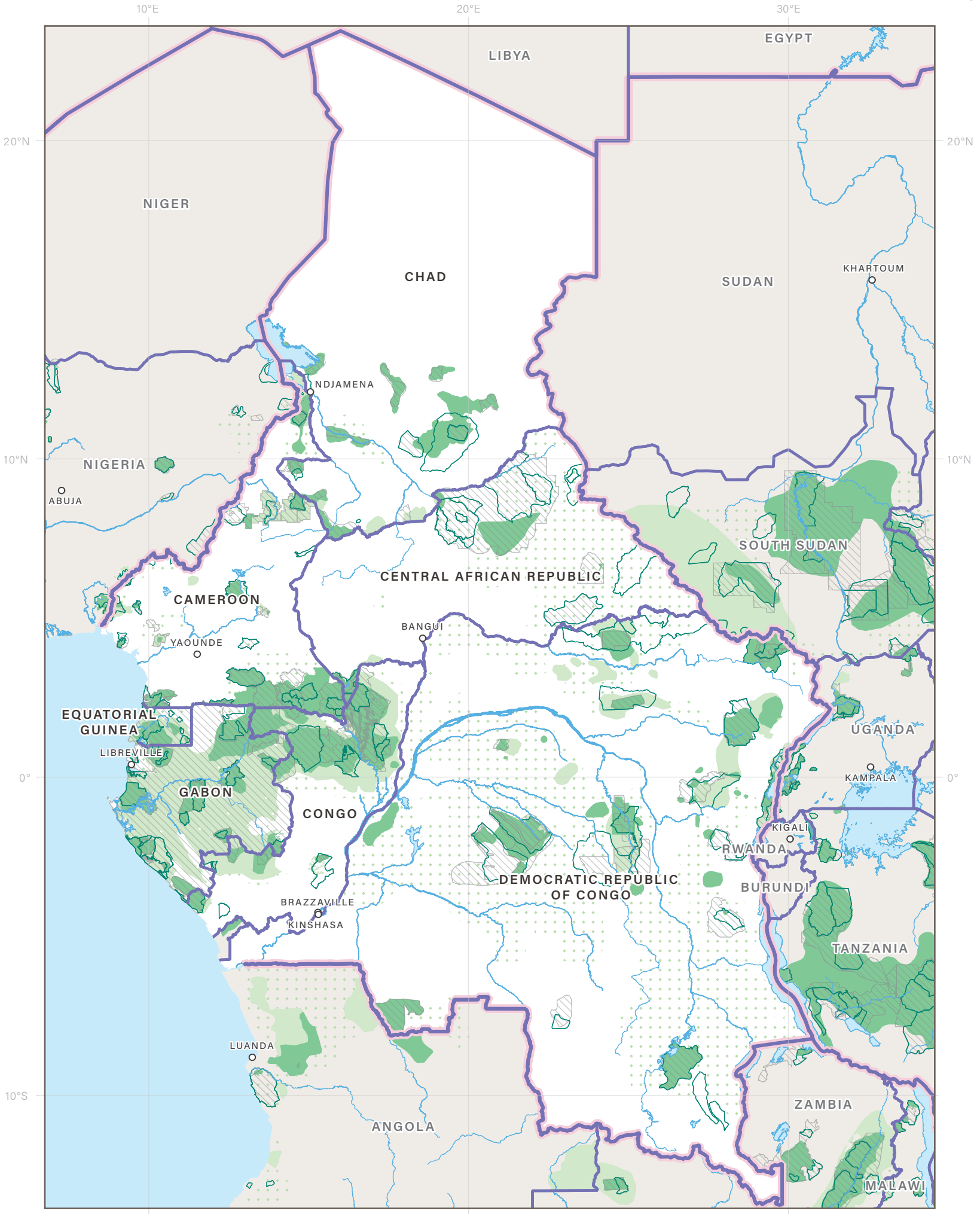
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Central Africa



0 190 380 570 760 950 1140km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Cameroon

ESTIMATED TOTAL ELEPHANTS

6,830 ± 943

GUESSES

1,985 - 2,134

GENERAL STATISTICS

Country Area	475,440 km²
Range Area	89,718 km² (19%)
Protected Range	27 %
Information Quality Index (IQI)	0.47
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Elephants in Cameroon occur in three distinct bio-geographical regions. Savanna elephants are found in the northern Sahelian and Sudanian regions, while forest elephants occur in the southern forested area (Roca et al., 2015; Tchamba et al., 1997). Northern Cameroon used to hold some of the most important elephant populations in the Central African savanna. However, heavy poaching was reported in 2012 and it appears that the majority of these elephants have been lost.

A new protected area, the Mt Cameroon National Park, was declared in 2009.

In 2010 Cameroon adopted a new Strategy and Management Plan for Elephants covering the period 2011 to 2020 (Ministère des Forêts et de la Faune, 2010).

In recent analyses of seizure data in ETIS, prepared for CITES, Cameroon has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Cameroon was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan, which it did in February 2015 (CITES, n.d.-a).

Cameroon declared an export quota of 160 tusks (as hunting trophies from 80 animals) for each year from 2007 to 2014. In 2015 and 2016, Cameroon did not submit a quota for elephant hunting trophies, resulting in an assumed zero quota (CITES, n.d.-b).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Cameroon is 6,830 ± 943 at the time of the last survey for each area. There may be an additional 1,985 to 2,134 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 61,186 km², which is 68% of the estimated known and possible elephant range. There remains an additional 32% of the estimated range for which no elephant population estimates are available.

A number of elephant populations have been surveyed using dung counts of a higher standard than before, which has resulted in an increase of about 6,500 in the estimated number of elephants since the AESR 2007, but a decline of more than 12,000 in the guesses category.

An **aerial total count** of Waza National Park in the north of Cameroon was carried out in 2007 (Foguekem et al., 2010) and 246 elephants were counted inside the park, with another 250 seen during the course of a reconnaissance flight further north in the Zgague area (Omondi et al., 2007). This replaces an informed guess of 475 to 1,500 elephants from a ground survey in 2002 (Saleh et al., 2002). Anti-poaching patrols stopped in 2014 because of the presence of the Boko Haram insurgents but were restarted in 2016; there is no information on the current status of elephants (Bechem, pers. comm., 2016).

In 2015 an **aerial sample count** of the Sudanian area, including the national parks of Bénoué, Bouba Ndjidah and Faro and the surrounding hunting blocks, was carried out as part of the Great Elephant Census, giving an estimate of 89 ± 288 (Elkan et al., 2016). In Bouba Ndjidah NP four live elephants were seen outside the counting strips; none were seen in Bénoué NP or Faro NP and 98 elephants were counted in the hunting blocks. By contrast 253 carcasses were seen. The range map has been modified using the results from this survey. These figures replace an estimate of 1,620 from 1991 (Direction de la Faune et des Parcs Nationaux, 1991). In addition an aerial total count was carried out in 2008 (Omondi et al., 2008) with 535 elephants reported in Bouba Ndjidah NP and the hunting areas, with none seen in the other two national parks. In early 2012 it was reported that 250-300 elephants had been killed by poachers in Bouba Ndjidah NP and it appears that there has been a substantial reduction in elephant numbers in this region (Elkan et al., 2016).

Mbam et Djerem National Park, in the savanna-forest ecotone in the centre of the country, is Cameroon's second largest protected area. The first **dung count** of Mbam et Djerem in 2009 produced an estimate of 901 (593-1369) elephants, which has been treated as an **informed guess** because of the lack of an on-site dung decay study (Maisels et al., 2009). A reconnaissance survey in 2014 confirmed the continued presence of elephants (Maisels, 2014).

Deng Deng National Park and the nearby logging concession were surveyed in 2012 (Maisels et al., 2013a). Only one dung pile and a few footprints and feeding signs were observed, so an **informed guess** of one elephant has been recorded. It is entered as a **new population**.

An old guess of 60 elephants in the vicinity of the town of Yoko to the south-west of Mbam-Djerem has been replaced with an i**nformed guess** of zero elephants (Maisels, 2014). There is an even older guess of 100 elephants in the Abong-Mbang Forest Reserve to the south of Mbam-Djerem (Ekobo, pers. comm., 1994), but two surveys north and west of this reserve in 2001 (Fotso et al.,

2002) recorded no elephant signs, so a zero estimate has been entered.

There are several small elephant populations in the south-west of Cameroon, close to the Nigerian border. These include Mt Cameroon, for which an **informed guess** of 118 from 2013 (The Ministry of Forestry and Wildlife, 2014) replaces a 2003 estimate of 178 elephants (Ekobo, 2003).

A 2002 guess of 63 from the Yabassi area (the proposed Ebo National Park) has been updated to 5-30 (Morgan, pers. comm., 2016) and the area of **known range** reduced. There was an old estimate of 425 for Korup National Park on the Nigerian border from 1993 (Powell, pers. comm., 1993) but a survey in 2009 showed few signs, all concentrated in a very small area in the north of the park and to the south in an adjacent logging concession (Ekobo, 2009). A new **guess** of 10-20 for 2011 based on modelling has been entered (Maisels, Strindberg, et al., 2013b).

A **dung count** was carried out in the Banyang-Mbo Wildlife Sanctuary in 2007, resulting in an **informed guess** of 153 to 256 elephants (Greengrass & Maisels, 2007), which replaces an older estimate of 457 elephants in 2011 (Bechem & Nchanji, 2001). Elephants were still present in the north of the sanctuary in late 2015 (Greengrass, pers. comm., 2016).

There are some areas in the south-west which were marked as 'possible range' in 2007. A reconnaissance survey carried out in 2013 in the Takamanda National Park found some signs and gave an **informed guess** of 20 elephants (Ikfuingei & Kuchambi, 2013) so this has been changed to **known range**. These elephants are believed to cross into Cross River NP in Nigeria (Ikfuingei & Kuchambi, 2013).

A **dung count** was conducted in 2014 in the Campo-Ma'an area, giving an estimate of 539 (215-446) (WWF Cameroon, 2016a), of which just over half were estimated to be in the Campo-Ma'an National Park. This replaces estimates of 548 ± 255 from 2003, for a smaller area covering part of the park (Bekhuis & Prins, 2003), and 4-14 for the remaining Ma'an Region (Matthews & Matthews, 2000).

The largest remaining elephant populations are in the forested region in south-eastern Cameroon and these are described in the following section.

A **dung count** of Dja Faunal Reserve was carried out in 2015 (MINFOF/UICN, 2015) giving an estimate of 420 (313-563) elephants, compared to a guess of 1,500-2,000 in 1995 (Tchamba, pers. comm., 1995).

The Ngoyla-Mintom Forest, an area of logging concessions between Dja FR and Nki National Park, was surveyed in 2011 for the first time with an estimate of 1,735 (1,431-2,103) (Nzooh Dongmo et al., 2012). Another survey in 2015 gave an estimate of 395 (243-642) and four neighbouring logging concessions were also surveyed, resulting in two additional estimates of 82 (47-143) and 22 (8-56) (WWF Cameroon, 2016b). This total estimate of 499 is recorded as a **new population**.

Nki NP was surveyed in 2015 by **dung count** (WWF Cameroon, 2016b) giving an estimate of 565 (355-898), which replaces an earlier estimate of 2,178 from 1998 (Ekobo, pers. comm., 1998). A 2005 estimate of 2,577 was not captured in the AESR 2007 (Nzooh Dongmo et al., 2006).

NUMBERS AND DISTRIBUTION
CONT.

A **dung count** was carried out in Boumba-Bek National Park in 2015 (WWF Cameroon, 2016b) giving an estimate of 143 (85-242) elephants. This replaces a guess of 318 from 2004 (Blake, 2005). Another dung count in 2012 gave an estimate of 2,062 (1,545-2,752) (Maisels et al., 2014a).

There was an estimate of 185 ± 86 for the forest concessions north of Nki in 2015 (these areas had not been previously surveyed) and 547 ± 242 for Mongokele Forest Reserve (WWF Cameroon, 2016c), which replaces an estimate of 773 from 1991 (Ekobo, 1993).

A guess of 1,354 for the Mengame Wildlife Sanctuary (to the west of Ngoyla-Mintom Forest) from 2003 (Halford et al., 2003) has been replaced by a **guess** of 10 (Maisels, Strindberg et al., 2013b).

Lobéké National Park is surrounded by logging and hunting concessions. Together they form the Cameroonian part of the 'Trinational de la Sangha' transfrontier protected area. A **dung count** of this area was carried out in 2015 (WWF Cameroon, 2016d). For Lobéké NP the estimate of 1,029 (670-1582) replaces one of 3,719 ± 2125 from 1993 (Ekobo, 2003). Another dung count in 2009 gave an estimate of 1,426 (Blake et al., 2012). There was also an estimate of 2,737 ± 603 for the previously unsurveyed areas around Lobéké NP (WWF Cameroon, 2016).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	246	—	—	—	2 %	2,007
Aerial Sample Counts	89	288	—	—	18 %	16,385
Reliable Dung Counts	6,244	899	—	—	32 %	29,028
Other Dung Counts	1	—	1,831	1,935	10 %	8,854
Informed Guesses	250	—	134	169	3 %	2,589
Other Guesses	—	—	20	30	3 %	2,322
Degraded Data	—	—	0	0	0 %	0
Totals 2015	**6,830**	**943**	**1,985**	**2,134**		
Totals 2006	**179**	**0**	**13,887**	**15,207**		
Assessed Range					68 %	61,186
Unassessed Range					32 %	28,532
Total Range					100 %	89,718

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+1	0	-357	-253	0 %	331
New Population	+3,671	±644	+912	+922	22 %	19,516
Different Technique	+2,444	±678	-9,988	-11,013	36 %	32,527
Different Area	+535	±132	-548	-558	5 %	4,516
New Guess	0	0	-2,037	-2,287	5 %	4,295
Totals	+6,651	±944	-12,018	-13,189	68 %	61,186

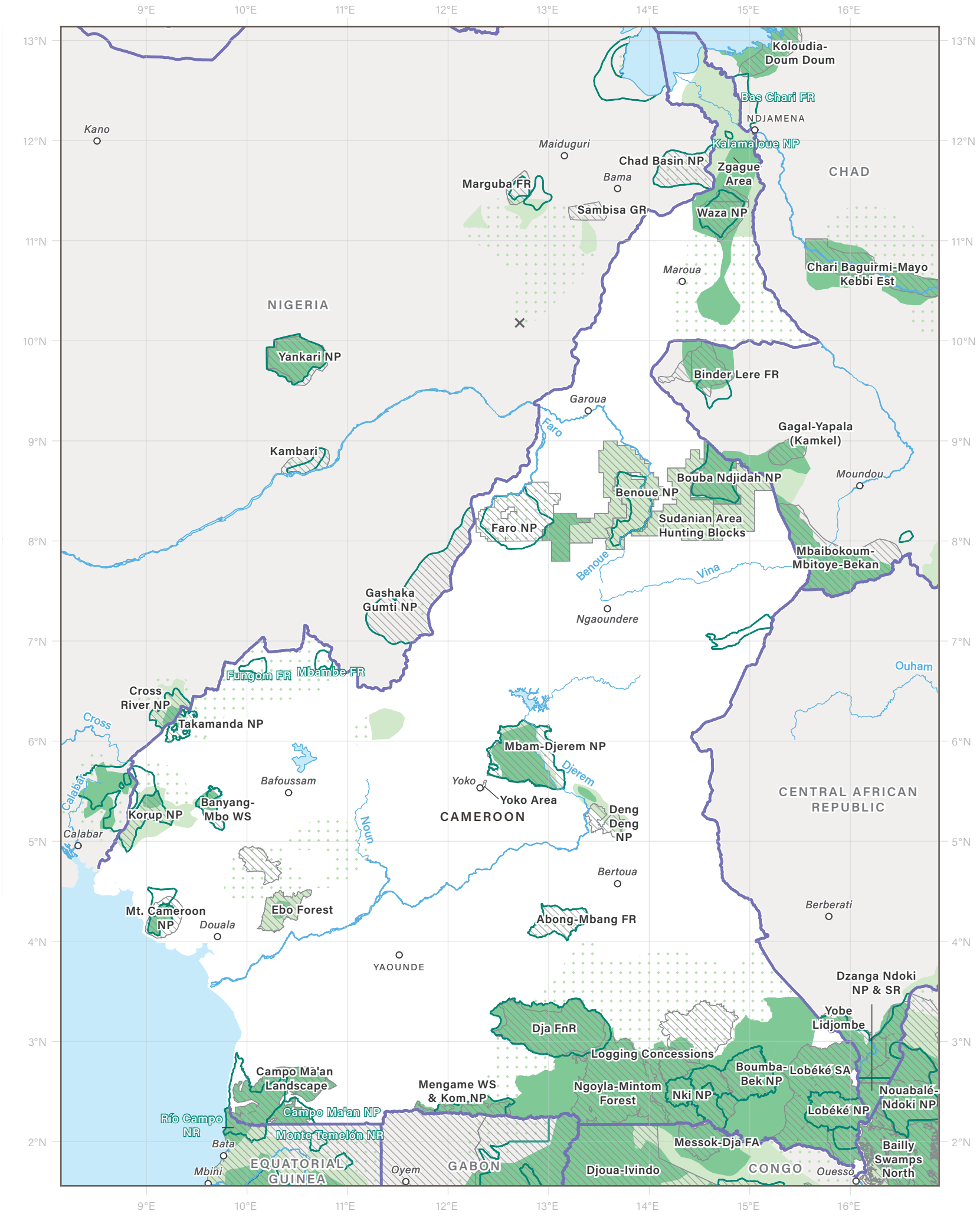
AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	1,950	58	2,007
Direct Sample or Reliable Dung	32,646	12,767	45,413
Informed Guesses	985	1,604	2,589
Other Dung Counts	8,447	407	8,854
Other Guesses	1,190	1,133	2,322
Unassessed Range	19,843	8,689	28,532
Totals	65,060	24,658	89,718

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Abong-Mbang Forest Reserve	NG	O	E	2001	0		Fotso et al., 2002	2	1,597	13.1˚E	4.2˚N
Banyang-Mbo Wildlife Sanctuary	RS	DC	C	2007	153	52	Greengrass & Maisels, 2007	2	667	9.7˚E	5.3˚N
Campo Ma'an Landscape	DA	DC	B	2014	539	132	WWF Cameroon, 2016a	2	4,608	10.3˚E	2.5˚N
Deng Deng National Park and its Environs	NP	DC	D	2012	1		Maisels et al., 2013a	2	884	13.6˚E	5.2˚N
Korup National Park	NG	O	E	2011	10	10*	Maisels, Strindberg et al., 2013b	2	1,259	9.0˚E	5.3˚N
Mbam et Djerem National Park	NP	DC	C	2009	901	388	Maisels et al., 2009	2	1,433	12.7˚E	5.8˚N
Mengame Wildlife Sanctuary and Kom National Park	NG	O	E	2011	10		Maisels, Strindberg et al., 2013b	2		12.2˚E	2.3˚N
Mt. Cameroon National Park	NG	O	D	2013	118		Ministry of Forestry & Wildlife, 2014	2	676	9.2˚E	4.2˚N
South-eastern forests											
Boumba-Bek National Park	DT	DC	B	2015	143	78	WWF Cameroon, 2016c	2	2,499	14.5˚E	2.6˚N
Dja Faunal Reserve	DT	DC	C	2015	420	125	MINFOF/UICN, 2015	1	5,260	13.0˚E	3.1˚N
Lobéké National Park	DT	DC	B	2015	1,029	456	WWF Cameroon, 2016d	2	2,173	15.7˚E	2.4˚N
Lobéké Surrounding Area	NP	DC	B	2015	2,737	603	WWF Cameroon, 2016d	1	6,006	15.7˚E	2.4˚N
Logging Concessions 10-021, 022, 023, 029, and 030	NP	DC	B	2015	185	86	WWF Cameroon, 2016c	2	3,678	14.5˚E	2.6˚N
Mongokele Forest Reserve	DT	DC	B	2015	547	242	WWF Cameroon, 2016b	2	1,159	15.7˚E	2.4˚N
Ngoyla-Mintom Forest	NP	DC	B	2015	499	207	WWF Cameroon, 2016c	1	9,242	14.5˚E	2.6˚N
Nki National Park	DT	DC	B	2015	565	322	WWF Cameroon, 2016c	2	3,094	14.5˚E	2.6˚N
Sudanian											
Bénoué National Park	DT	AS	B	2015	0		Elkan et al., 2016	2	2,444	13.8˚E	8.3˚N
Bouba Ndjidah National Park	DT	AS	B	2015	0		Elkan et al., 2016	2	2,347	13.8˚E	8.3˚N
Faro National Park	DT	AS	B	2015	0		Elkan et al., 2016	2	4,087	13.8˚E	8.3˚N
Sudanian Area Hunting Blocks	DT	AS	B	2015	89	288	Elkan et al., 2016	1	11,720	13.8˚E	8.3˚N
Takamanda National Park	NP	O	D	2013	10	10*	Ikfuingei & Kuchambi, 2013	2	633	9.3˚E	6.2˚N
Waza											
Waza National Park	DT	AT	A	2007	246		Foguekem et al., 2010	2	1,970	14.7˚E	11.2˚N
Zgague Area	NP	O	D	2007	250		Omondi et al., 2007	5	10	14.8˚E	11.8˚N
Yabassi Area	NG	O	D	2012	5	25*	Morgan, pers. comm., 2016	2		10.3˚E	4.5˚N
Yoko Area	NG	O	D	2011	0		Maisels, 2014	4	25	12.4˚E	5.6˚N

Cameroon



0 60 120 180 240 300 360km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Central African Republic

ESTIMATED TOTAL ELEPHANTS

702 ± 245

GUESSES

699 - 826

GENERAL STATISTICS

Country Area	622,980 km²
Range Area	24,619 km² (4%)
Protected Range	21 %
Information Quality Index (IQI)	0.35
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Elephant populations in the Central African Republic (CAR) occur in the savannas of the north and in forest areas, particularly in the south-west. Elephants, along with many other wildlife species, have almost disappeared from the north of the country, despite a very low human population. The main reasons are thought to be the increase in cattle transhumance, civil disorder, the increase in weapons and commercial poachers from other countries. Protected areas have been ineffective, since elephant densities were lower there than in nearby hunting areas (Bouché et al., 2010).

Conservation efforts have been hampered by a lack of stability. The country was plunged into turmoil in 2013 when the Seleka rebel group seized power and was then countered by the Anti-Balakas. A transitional government took over in 2014 but violence continued despite the presence of peace-keeping forces.

The African Parks Network began working in Chinko in 2015 and was given a mandate to manage the area for 50 years by the Ministry of Forestry, the Environment and Tourism (Walley, 2014).

CAR published an elephant conservation action plan in 1992, although this is now out of date (Ministère des Eaux, des Forets, 1992).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Central African Republic is 702 ± 245 at the time of the last survey for each area. There may be an additional 699 to 826 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 21,812 km², which is 89% of the estimated known and possible elephant range. There remains an additional 11% of the estimated range for which no elephant population estimates are available.

There has been a reduction in both estimates and guesses since the AESR 2007, but the differences in the estimates from the main population in the south-western forest block are not significant.

The northern savanna elephant population occurs in an area that includes the Bamingui-Bangoran National Park and Manovo Gounda-St. Floris National Park. A 2010 **aerial sample count** (Bouché et al., 2011) gave an estimate of 68 ± 113 elephants for the northern savanna landscape. This replaces an estimate of 929 ± 950 elephants from an aerial sample count of a smaller area in 2005 (Renaud et al., 2005). The carcass ratio was 30% in 2005 and 53% in 2010, indicating a very high level of poaching (Bouché, 2010).

There is very little recent information on the status of elephants in the Bangassou Forest in the south-east region of the country. The last estimate was of 500-1,000 elephants in 2004 (Blake, 2005) and a guess of 500 has been retained from the AESR 2007, although it is very unlikely that this number of elephants still survives in the area. During a reconnaissance survey in 2009, Luhunu and Bechem (Luhunu & Bechem, 2009) only found signs of elephants in an area to the west of Bangassou, which had not been surveyed in 2004, and none in Bangassou Forest itself. The range has been changed to **doubtful** with a point record in the western area.

In the AESR 2007, the area to the north of Bangassou Forest was classified as doubtful range. However, African Parks Network staff report that there are at least 50, and perhaps as many as 150 elephants (believed to be forest elephants) in the Chinko area, just over 30 kilometres to the north of Bangassou Forest (Aebischer, pers. comm., 2016) so this is recorded as a **new population** with a small amount of **known range**.

The Dzanga Sangha landscape in the extreme south-west is the only remaining elephant stronghold in the country, and is contiguous with the Nouabalé-Ndoki landscape in Congo. Elephants in Dzanga-Sangha are part of a single population that extends across the border with Congo into the Nouabalé-Ndoki National Park, as shown by satellite collaring of elephants in the area and by individual recognition of 68 individual elephants moving between the two countries (Blake et al., 2008). A **dung count** carried out in 2011-12 gave an estimate of 631 ± 218 individuals (Princée, 2013) (excluding Yobe-Lidjombe, which has been treated separately for comparative purposes). In the same year 1,150 individuals were individually identified in Dzanga Bai, suggesting that this may have been an underestimate (Princée, 2013). The 2011-12 estimate replaces one of 869 ± 214 from a 2003 to 2004 dung count (Blake, 2005) indicating that no significant change took place over this time. The 2011-12 guess for the reconnaissance survey of Yobe-Lidjombe was 152-179. This area was not covered in the 2003-2004 survey so is recorded as a **new population**. The widely reported killing of at least 26 elephants in May 2013 at Dzanga Bai post-dates the 2011 survey, but

the prompt response to this incident probably limited the impact on the overall population (Canby, 2015).

The south of N'gotto Classified Forest still held elephants in 2000 (Dethier & Ghiurghi, 2000), but in a 2002 survey by Hicks, no elephant dung was found in over 150 kilometres walked (Maisels, Strindberg et al., 2013b) indicating that elephants may have been eliminated in the area or were only seasonally present (Brugière et al., 2005). This has been changed to **possible range**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	68	113	—	—	69 %	17,034
Reliable Dung Counts	631	218	—	—	15 %	3,606
Informed Guesses	3	—	199	326	5 %	1,172
Degraded Data	—	—	500	500	0 %	0
Totals 2015	**702**	**245**	**699**	**826**		
Totals 2006	**929**	**820**	**1,585**	**2,085**		
Assessed Range					89 %	21,812
Unassessed Range					11 %	2,807
Total Range					100 %	24,619

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	+3	0	+47	-147	2 %	416
Different Technique	+631	±218	-869	-869	15 %	3,606
Different Area	-861	±828	0	0	69 %	17,034
New Guess	0	0	+152	+179	3 %	756
Data Degraded	0	0	0	-500	0 %	0
Totals	-227	±856	-670	-1,043	89 %	21,812

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	20,640	0	20,640
Informed Guesses	1,172	0	1,172
Unassessed Range	872	1,935	2,807
Totals	22,684	1,935	24,619

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bangassou Forest Reserve	-	O	E	2004	500	500*	Blake, 2005	1	12,011	23.3˚E	5.2˚N
Chinko Drainage Basin	NP	O	D	2015	50	100*	Aebischer, pers. comm., 2016	1	19,000	23.9˚E	6.5˚N
Dzangha Ndoki National Park and Special Reserve	DT	DC	B	2012	631	218	Princée, 2013	1	3,861	16.2˚E	2.8˚N
Northern Landscape	DA	AS	B	2010	68	113	Bouché, 2011	1 2	94,962	20.8˚E	8.2˚N
Yobe-Lidjombe	NG	O	D	2012	152	27*	Princée, 2013		756	16.3˚E	2.7˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

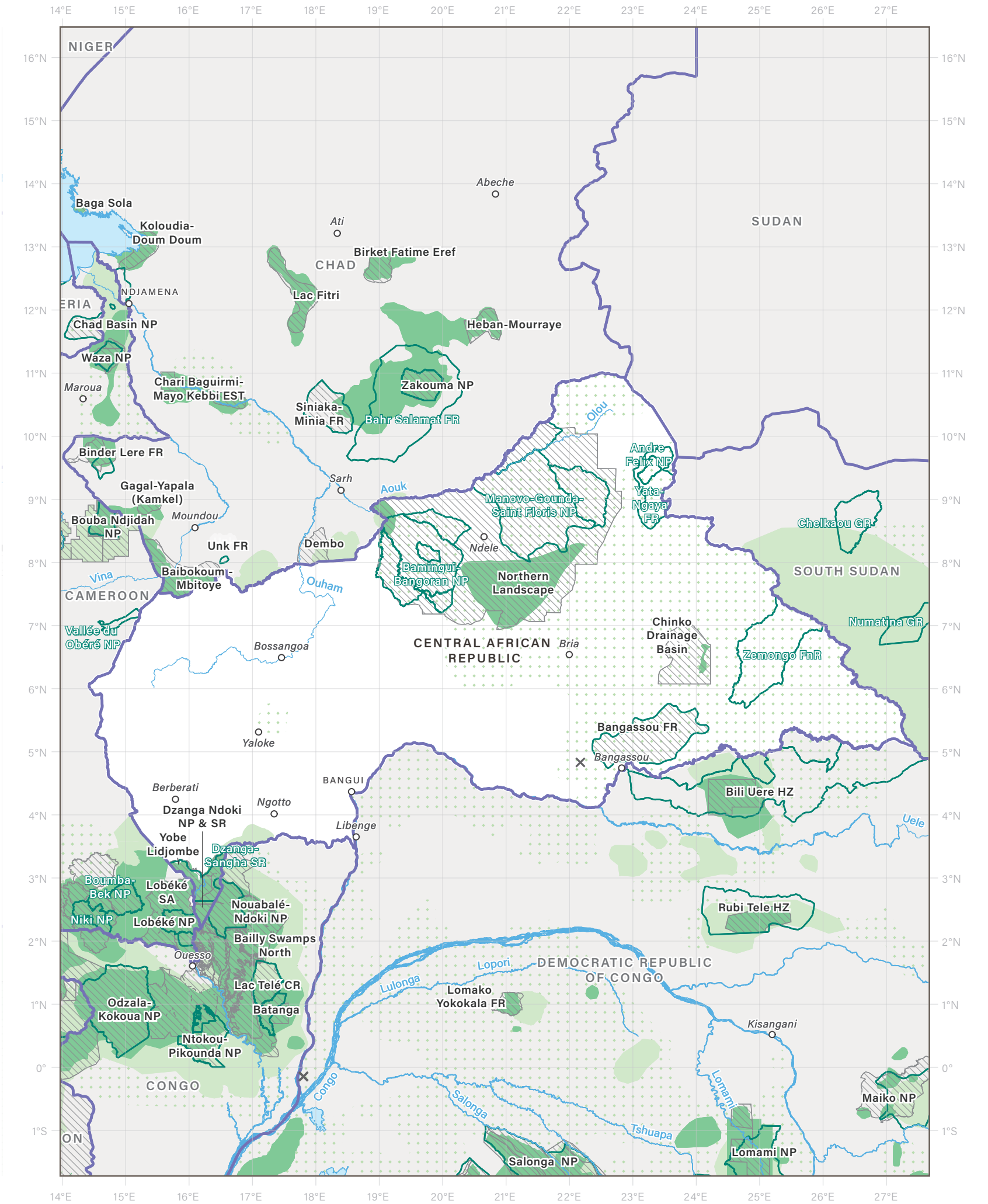
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Central African Republic



0 90 180 270 360 450 540km

Int'l Boundaries	
Rivers & Lakes	
Towns	
Protected Areas	
Input Zones	

ELEPHANT RANGE

Known	
Possible	
Doubtful	
Sighting	×

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Chad

ESTIMATED TOTAL ELEPHANTS

794 ± 0

GUESSES

273 - 353

GENERAL STATISTICS

Country Area	1,284,000 km²
Range Area	61,490 km² (5%)
Protected Range	23 %
Information Quality Index (IQI)	0.32
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

The northern part of Chad is desert, and elephants are confined to the south, particularly in the Sudanian zone in the far south. Conservation efforts have been affected by a difficult security situation, including coup attempts in 2006 and 2008, and the presence of Boko Haram in the west of the country. Substantial areas of elephant range are being lost due to exp-anded settlement and conversion of rangeland to agriculture. However, there are also some areas of increased elephant range, apparently a result of elephants moving to safer areas from Cameroon and Central African Republic (Antonínová et al., 2015).

Zakouma National Park, which holds Chad's largest elephant population, lost over 3,000 to poaching between 2005 and 2010; the reproductive rate appeared to reduce substantially and the elephants aggregated into a single herd. In 2010 the government of Chad signed a long-term private public partnership agreement with the African Parks Foundation (APF) for the management of Zakouma NP and its periphery. Law enforcement has improved, poaching has reduced and the reproductive rate has increased (Antonínová et al., 2015).

A National Elephant Action Plan has been written and covers the period 2016-2025 (Antonínová et al., 2015). The National Elephant Protection Centre (NEPC) was established in 2013 with a control room and database on elephant issues. Two toll-free telephone numbers enable people to report information about elephants.

CURRENT ISSUES
CONT.

In 2008 Chad introduced the first legislation governing forests, wildlife and fishery resources since independence in 1960. This legislation provides for the creation of Community Wildlife Areas and co-management of natural resources.

Chad is a major ivory transit area, with ivory from within the country and from other countries in the region being smuggled mainly via Sudan, Cameroon and Nigeria (UNEP et al., 2013).

In February 2014, Chad destroyed 1.1 tonnes of stock-piled ivory (Godard, 2014b).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Chad is 794 at the time of the last survey for each area. There may be an additional 273 to 353 elephants in areas not systematically surveyed. These guesses probably represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 28,561 km^2, which is 46% of the estimated known and possible elephant range. There remains an additional 54% of the estimated range for which no elephant population estimates are available.

Both estimates and guesses have declined substantially since the AESR 2007. The range map has been substantially modified following data collection for the National Elephant Action Plan, with major changes including the reduction of known range to the west of Zakouma NP and around Lake Fitri.

Zakouma NP holds the largest remaining elephant population in Chad, although the numbers have declined by an order of magnitude in the last ten years due to poaching, which was heaviest between 2005 and 2009 (Poilecot, 2010); the situation has more or less stabilised since 2010. An **aerial total count** was conducted in 2014 as part of the Great Elephant Census which gave a count of 443 elephants (Antonínová et al., 2014a) replacing one of 3,885 from 2005 (Fay et al., 2005). A sample count in 2008 gave an estimate of 2,285 carcasses and 939 live elephants. Total counts in 2009, 2010, 2011 and 2012 showed a small decline in live elephant estimates from 617 to 542 to 454 to 444 (Antonínová et al., 2014a). Carcass ratios decreased from 71% in 2008 to 19% in 2014, indicating a reduction in poaching pressure. There has been a steady reduction in poaching events; from 125 elephants killed in 2008, to 41 in 2009, 32 in 2010, 7 in 2011, 7 in 2012, 0 in 2013 and 0 in 2014 (Antonínová et al., 2014a).

Approximately 500-600 elephants were believed to occur in the Siniaka-Minia Faunal Reserve to the west of Zakouma NP (Malachie & Lassou, 2002) but they are no longer resident in the area, and survivors may have moved into Zakouma NP during the period of intense poaching. This has therefore been recorded as a **lost population**.

The Heban-Mourraye area to the north-east of Zakouma NP has a small population of elephants that may overlap with the Zakouma NP population during the rainy season. After nine elephants were killed in 2012, there were six individuals remaining (Antonínová et al., 2014a). There was no previous estimate for this area and it is thus recorded as a **new population**.

During an aerial survey carried out in the Birket Fatime-Eref area north of Zakouma in 2013, a herd of seven individuals was observed, but there may be up to 25 individuals in three herds (Antonínová et al., 2015). There was no previous estimate for this area so it is recorded as a **new population**.

Seventy three elephants were observed in the Lake Fitri area north-west of Zakouma NP in 2014 (Antonínová et al., 2015). This **informed guess** replaces a guess of 200-300 from 2002 (Malachie & Lassou, 2002).

There are two elephant populations in the vicinity of Lake Chad. There are thought to be 60 in the Doum Doum area at the south end of the lake (Antonínová et al., 2015). This **guess** replaces one of 50-100 for the Koloudia-Doum-Doum area from 2002 (Malachie & Lassou, 2002). The second population lives further north near Baga Sola town and six elephants were seen in 2013, but there may be up to 20 (Antonínová et al., 2015). This has been recorded as a **new population**.

An **aerial total count** was conducted in the Chari Baguirimi and Mayo Kebbi Est regions in 2014 as part of the Great Elephant Census, during which 168 elephants were observed (Antonínová et al., 2014c). This elephant population was heavily affected by poaching in 2012 when about 65 elephants were killed (Antonínová et al., 2014c). This area has a high human population and there is much human-elephant conflict. There was no previous estimate so it is recorded as a **new population** and the range changed from doubtful to **known range**. There was guess of 150-200 in the AESR 2007 for the nearby Massenya-Mandjafa area (Malachie & Lassou, 2002), which is not currently considered to be elephant range.

Elephants were not known to inhabit the Binder Léré ecosystem, which includes the Binder Léré Faunal Reserve, prior to 2007. In 2010, 236 elephants were seen in this area during the course of a ground survey, and it is thought that they had moved in from Waza National Park in Cameroon. About 90 elephants were killed in a single poaching incident in January 2013. During an **aerial total count** conducted in 2014 as part of the Great Elephant Census 132 elephants were observed (Antonínová et al., 2014b). This is recorded as a **new population**.

There are a further two small elephant populations on the Cameroon border, adjoining Bouba Ndjidah NP in Cameroon, which has been heavily impacted by poaching. One is in the Gagal-Yapala-Beinamar area where there may be up to 50 elephants, but only 18 have been confirmed (Antonínová et al., 2015). This **guess** replaces one of 400-500 for the Gagal-Yapala area from 2002 (Malachie & Lassou, 2002). There also may be 50 elephants in the Larmanaye area further south (Antonínová et al., 2015). This **guess** replaces one of 100-150 from 2002 (Malachie & Lassou, 2002).

There are believed to be four elephant populations living close to the southern border of Chad with Central African Republic (CAR). According to local communities, elephants started to return to Chad from CAR in the past few years, probably as a result of a safer environment on the Chadian side of the border, but it is not clear if these are resident populations. There are **guesses** of 30 elephants, with 14 confirmed, in the Mbaibokoum-Mbitoye-Bekan area, 50 in Baké - Yamodo - Goré , and perhaps 20 each in the Ngourou - Gondeï (Aouk) area and the Dembo-Djéké Djéké- Sido area (Antonínová et al., 2015). The AESR 2007 gave one guess of 600-700 elephants for the Dembo area, so the other areas are recorded as **new populations** for this report.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	743	—	—	—	13 %	8,092
Informed Guesses	51	—	133	213	24 %	14,984
Other Guesses	—	—	140	140	9 %	5,485
Totals 2015	**794**	**0**	**273**	**353**		
Totals 2006	**3,885**	**0**	**2,000**	**2,550**		
Assessed Range					46 %	28,561
Unassessed Range					54 %	32,929
Total Range					100 %	61,490

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-3,442	0	0	0	5 %	3,153
New Population	+165	0	+70	+118	20 %	12,033
New Guess	+186	0	-1,297	-1,715	20 %	12,539
Population Lost	0	0	-500	-600	1 %	837
Totals	-3,091	0	-1,727	-2,197	46 %	28,561

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	8,092	0	8,092
Informed Guesses	14,984	0	14,984
Other Guesses	4,711	774	5,485
Unassessed Range	25,591	7,337	32,929
Totals	53,378	8,112	61,490

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Baké - Yamodo - Goré Area	NP	O	E	2015	50		Antonínová et al., 2015	1	3,500	16.0˚E	7.7˚N
Binder Léré Wildlife Reserve Ecosystem	NP	AT	A	2014	132		Antonínová et al., 2014b	2	1,840	14.5˚E	9.7˚N
Birket Fatime - Eref Area	NP	O	D	2013	7	18*	Antonínová et al., 2015	2	1,884	19.0˚E	12.6˚N
Chari Baguirmi-Mayo Kebbi Est	NG	AT	A	2014	168		Antonínová et al., 2014c	2	3,312	16.2˚E	10.7˚N
Dembo - Djéké Djéké - Sido Area	NG	O	E	2015	20		Antonínová et al., 2015	1	2,409	18.0˚E	8.2˚N
Gagal - Yapala - Beinamar Area	NG	O	D	2015	18	32*	Antonínová et al., 2015	2	4,640	15.4˚E	8.9˚N
Heban-Mourraye area	NP	O	D	2013	6		Antonínová et al., 2014a	2	4,591	20.6˚E	11.8˚N
Lake Chad - Baga Sola Area	NP	O	D	2015	6	14*	Antonínová et al., 2015	2	963	14.2˚E	13.6˚N
Lake Chad - Doum Doum Area	NG	O	D	2015	60		Antonínová et al., 2015	1	2,363	15.2˚E	13.0˚N
Lake Fitri Area	NG	O	D	2015	73		Antonínová et al., 2015	1	4,167	17.7˚E	12.3˚N
Larmanaye	NG	O	E	2015	50		Antonínová et al., 2015	1	2,180	15.5˚E	8.1˚N
Mbaibokoum-Mbitoye-Bekan Area	NP	O	D	2015	14	16*	Antonínová et al., 2015	1	3,872	16.0˚E	7.7˚N
Ngourou - Gondeï (Aouk) Area	NP	O	E	2015	20		Antonínová et al., 2015	2	300	14.3˚E	9.7˚N
Siniaka-Minia Faunal Reserve	PL	O	D	2015	0		Antonínová et al., 2015	1	4,740	18.2˚E	10.4˚N
Zakouma National Park	RS	AT	A	2014	443		Antonínová et al., 2014a	2	3,201	19.7˚E	10.8˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Chad

063

13°E 14°E 15°E 16°E 17°E 18°E 19°E 20°E 21°E 22°E 23°E 24°E

23°N 22°N 21°N 20°N 19°N 18°N 17°N 16°N 15°N 14°N 13°N 12°N 11°N 10°N 9°N 8°N

LIBYA
NIGER
CHAD
SUDAN
SOUTH SUDAN
CAMEROON
NIGERIA
CENTRAL AFRICAN REPUBLIC

Abeche
Ati
Maiduguri
Bama
Garoua
Maroua
Moundou
Sarh
Ndele
NDJAMENA

Baga Sola
Chad
Koloudia-Doum Doum
Bas Chari FnR
Kalamaloue NP
Chad Basin NP
Waza NP
Marguba FR
Sambisa GR
Chari Baguirmi-Mayo Kebbi Est
Binder-Lere FnR
Ngourou-Gondeï (Aouk) Area
Gagal-Yapala (Kamkel)
Bouba Ndjidah NP
Benoue NP
Faro NP
Sudanian Area Hunting Blocks
Larmanaye
Baké-Yamodo-Goré Area
Baibokoum-Mbitoye Area
Vina
Benoue
Faro
Ouham
Dembo
Lac Fitri
Birket Fatime Eref
Heban-Mourraye
Zakouma NP
Siniaka-Minia FnR
Bahr Salamat FnR
Aouk
Olou
Manovo-Gounda-Saint Floris NP
Bamingui-Bangoran NP
Northern Landscape
Andre Felix NP
Yata-Ngaya FR

0 80 160 240 320 400 480km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

COUNTRY

Congo

ESTIMATED TOTAL ELEPHANTS

6,057 ± 1,222

GUESSES

20,924 - 26,942

GENERAL STATISTICS

Country Area	342,000 km²
Range Area	150,937 km² (44%)
Protected Range	21 %
Information Quality Index (IQI)	0.10
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Congo probably still holds Central Africa's second largest number of forest elephants, although they are increasingly threatened by poaching and human encroachment. Almost all of Congo's elephants occur in forest areas in the north of the country, with smaller numbers on the Atlantic coast, and along the Gabonese border to the west. Elephants have been almost totally eliminated from the savanna-forest mosaic of the rest of the country.

The construction and upgrading of access roads for national transport and logging purposes, particularly the surfacing of the road linking Ouesso and Brazzaville in 2013, which runs through core elephant range, is likely to have a negative impact on elephant populations. This is because forest elephants, which tend to avoid roads, get compressed into smaller and smaller tracts of relatively remote forests (Blake et al., 2001, 2007, 2008). Some logging concessions have received Forest Stewardship Council (FSC) certification for adopting conservation-friendly measures (Morgan et al., 2013) and in contrast to other parts of Central Africa, some of these forest concessions in Congo hold significant numbers of elephants.

The government of Congo signed co-management agreements with the Wildlife Conservation Society for Nouabalé-Ndoki National Park in 2014 (WCS, 2014) and with African Parks Network for Odzala-Kokoua National Park in 2010 (African Parks, n.d.-a).

In recent analyses of seizure data in ETIS, prepared for CITES, the Republic of Congo has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). The Republic of Congo was requested by the CITES Standing Committee,

at its 65th meeting, to prepare a National Ivory Action Plan. Congo submitted its National Ivory Action Plan to CITES in 2015, which is now in the process of being implemented (CITES, n.d.-a). In April 2015, Congo destroyed its entire national ivory stockpile of 4.7 tonnes (Smith, 2015).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Congo is 6,057 ± 1,222 at the time of the last survey for each area. There may be an additional 20,924 to 26,942 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 85,698 km², which is 57% of the estimated known and possible elephant range. There remains an additional 43% of the estimated range for which no elephant population estimates are available.

Since the AESR 2007 there has been a substantial apparent increase in both estimates and guesses. However, this is largely as a result of many new areas having been surveyed.

A **dung count** of Nouabalé Ndoki NP was conducted in 2011 giving an estimate of 2,324 ± 544 (Maisels et al., 2012) and this replaces the estimate of 3,032 ± 755 from 2003 (Blake, 2005). The 2003 survey only covered the park and a small buffer zone to the east, while the 2011 survey included a far larger area of neighbouring logging concessions; the estimate for the entire area was 8,792 (6,651-11,622) (Maisels et al., 2012). A previous survey in 2006 was not included in the AESR 2007, but provided an estimate of 11,076 elephants (8,223-14,920) for the larger area (Stokes et al., 2010).

The estimate of 380 (239-602) (Blake, 2005) from 2003 for the Mokabi logging concession to the north of Nouabalé Ndoki NP has been retained but degraded due to age. A 2006 estimate published in 2010 indicated only 59 elephants, but this data could not be included in this report because of its late receipt.

The Bailly Swamp North and Nouabalé Ndoki peripheral zones are recorded as **new populations** with estimates of 827 ± 656, and 5,345 ± 2,133 respectively from the 2011 count (Maisels et al., 2012). The range map has been modified, with a new area of **known range** to the south-west and south-east of Lac Télé, and some areas of **possible range** in the east.

The 2011 survey gave an estimate of 296 (92-948) for the Lac Télé Community Reserve (Maisels et al., 2012) which replaces an estimate of 316 from 2004 (Iyenguet et al., 2007).

A **dung count** conducted in the Batanga area just to the east of Lac Télé Community Reserve in 2012 (Iyenguet et al., 2012) gave an estimate of 104 (32-338) compared to an earlier estimate of 73 elephants (20-268) (Malanda et al., 2008). In the AESR 2007 this area was recorded as **possible range** and is now **known range**. There was no estimate for this area in the AESR 2007 so this is recorded as a **new population**.

A **dung count** of Odzala-Kokoua NP conducted in 2012 gave an estimate of 9,292 (7,468 - 12,357) (Maisels et al., 2013b) of which approximately 65% were in the southern sector. This replaces a 2005 estimate of 13,545 ± 3,252 (Hart, 2006a). However a reanalysis of the 2005 results gave an

estimate of 7,460 (5,738-9,705) and there was no significant change between 2005 and 2012. The area of **known range** to the south of Odzala has been reduced (Maisels, pers. comm., 2016a).

Elephants also occur in the Ngombe Forestry Concession and the Ntokou-Pikounda National Park to the east of Odzala-Kokoua, which were first surveyed in 2007. Based on a **dung count** which was carried out in the Ngombe landscape in 2014 (Maisels et al., 2014b), the elephant population is estimated at 4,143 (2,994-5,731). In 2007 the estimate was 4,992 (3,192-7,802) (Maisels et al., 2014). This has been recorded as a **new population** and the area of **known range** extended accordingly.

On the basis of a **dung count** from 2006 (Bassouama et al., 2006), which was not recorded in the AESR 2007, it has been suggested (Maisels, pers. comm., 2016d) that there might be approximately 490 elephants in the Lossi-Kelle area to the south-west of Odzala-Kokoua NP and this is also recorded as a **new population**.

A **dung count** was carried out in 2013 in the Messok-Dja area to the north of Odzala-Kokoua NP which gave an estimate of 346 (202-604) (Mantsila et al., 2013) as a **new population**. Most elephant signs were observed in the extreme north-east of the area. Part of this area has been changed from known to **possible range**.

The first **dung count** of Djoua-Ivindo area was carried out in 2015, and gave an estimate of 1,311 (778-2209) elephants (Allam et al., 2016). This is recorded as a **new population** and the range changed from mostly doubtful to **known**.

There is also a population of elephants on the Batéké Plateau in the area straddling the Congo-Gabon border, referred to as Ogooue-Leketi. Transect surveys in 2010 gave an estimate of 200 (116-345) (Maisels, pers. comm., 2016b), while individual observations in clearings suggest that there are least 285 elephants (Inkamba-Nkulu et al., 2015). There is a **guess** of 36 elephants from 2012 from the neighbouring MPD iron mine concession area. Neither of these areas had estimates in the AESR 2007 so are entered as **new populations**.

There are new **guesses** for populations in the south-west close to the Gabon border which had not previously been included in the AED. These include Mayoko for which there is a **guess** of 340 from 2005 based on a reconnaissance survey (Inkamba-Nkulu, 2007), and the Mount Fouari complex for which there is a **guess** of 200 from 2005 (Maisels, pers. comm., 2016c).

A **dung count** was carried out in Conkouati-Douli National Park in 2013 giving an estimate of 947 ± 180 (Vanleeuwe, 2014), which replaces an estimate of 772 ± 370 from 2005 (Vanleeuwe, 2006).

An area that was formerly recorded as possible range to the south-east of Conkouati, adjoining the Cabinda enclave in DRC has been changed to **non-range** since it is mostly savanna and has been heavily affected by hunting (Maisels, pers. comm., 2016d).

While much of the southern part of Congo consists of savanna, there are gallery forests along the watercourses in the Lefini Forest Reserve north of Brazzaville, and it is known that there are at least six elephants in this area (Inkamba-Nkulu & Tsoumou, 2008). This has been changed from doubtful range to **known range**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Reliable Dung Counts	6,051	1,222	—	—	20 %	30,660
Other Dung Counts	0	—	19,478	25,496	29 %	43,944
Informed Guesses	6	—	526	526	4 %	6,506
Degraded Data	—	—	920	920	3 %	4,588
Totals 2015	**6,057**	**1,222**	**20,924**	**26,942**		
Totals 2006	**772**	**370**	**20,237**	**20,237**		
Assessed Range					57 %	85,698
Unassessed Range					43 %	65,239
Total Range					100 %	150,937

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+471	±594	-7,578	-1,560	16 %	23,811
New Population	+2,490	±991	+10,858	+10,858	37 %	55,803
Different Technique	+2,324	±544	-2,652	-2,652	3 %	4,118
Data Degraded	0	0	0	0	0 %	0
Totals	+5,285	±1,277	+628	+6,646	56 %	85,698

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	26,853	3,807	30,660
Informed Guesses	5,059	1,447	6,506
Other Dung Counts	40,773	3,171	43,944
Other Guesses	1,488	3,099	4,588
Unassessed Range	14,552	50,687	65,239
Totals	88,726	62,211	150,937

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Conkouati-Douli National Park	RS	DC	B	2013	947	180	Vanleeuwe, 2014	2	3,850	11.5˚E	3.9˚S
Lefini	NP	O	D	2007	6		Inkamba-Nkulu & Tsoumou, 2008	3	445	15.4˚E	2.5˚S
Mayoko	NP	O	E	2005	340		Inkamba-Nkulu, 2007	2	2,290	12.6˚E	2.3˚S
Mount Fouari/ Mavoumbou/ Nyanga complex	NP	DC	E	2005	200		Maisels, pers. comm., 2016c	2	1,017	11.9˚E	2.8˚S
MPD area	NP	DC	D	2012	36		Maisels, pers. comm., 2016b	2	1,139	13.6˚E	2.6˚S
Ndoki-Likouala Landscape											
Bailly Swamps North	NP	DC	B	2011	827	656	Maisels et al., 2012	2	4,210	16.8˚E	1.8˚N
Batanga	NP	DC	C	2012	104	153	Iyenguet et al., 2012	3	1,029	17.4˚E	0.8˚N
Lac Télé Community Reserve	RS	DC	B	2011	296	428	Maisels et al., 2012	2	6,054	16.8˚E	1.8˚N
Mokabi Logging Concession	-	DC	E	2003	380	182	Blake, 2005	2	2,669	16.7˚E	2.7˚N
Nouabalé Ndoki National Park	DT	DC	B	2011	2,324	544	Maisels et al., 2012	2	3,962	16.8˚E	1.8˚N
Nouabale Ndoki Peripheral Zone	NP	DC	C	2011	5,345	2,133	Maisels et al., 2012	1	13,016	16.8˚E	1.8˚N
North-west											
Djoua-Ivindo	NP	DC	B	2015	1,311	716	Allam et al., 2016	1	11,415	13.8˚E	1.7˚N
Lossi-Kelle	NP	O	D	2006	490		Bassouama et al., 2006	1	5,051	14.2˚E	0.2˚N
Messok-Dja Forest Area	NP	DC	B	2013	346	202	Mantsila et al., 2013	2	1,457	14.5˚E	2.0˚N
Ngombe-Pikounda-Ntokou area	NP	DC	C	2014	4,143	1,459	Maisels et al., 2014b	1	16,186	15.9˚E	0.9˚N
Odzala Kokoua National Park	RS	DC	C	2012	9,292	2,206	Maisels et al., 2013	1	13,525	15.0˚E	0.9˚N
Ogooue-Leketi	NP	DC	C	2009	200	114	Maisels, pers. comm., 2016b	2	1,025	13.8˚E	2.4˚S

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

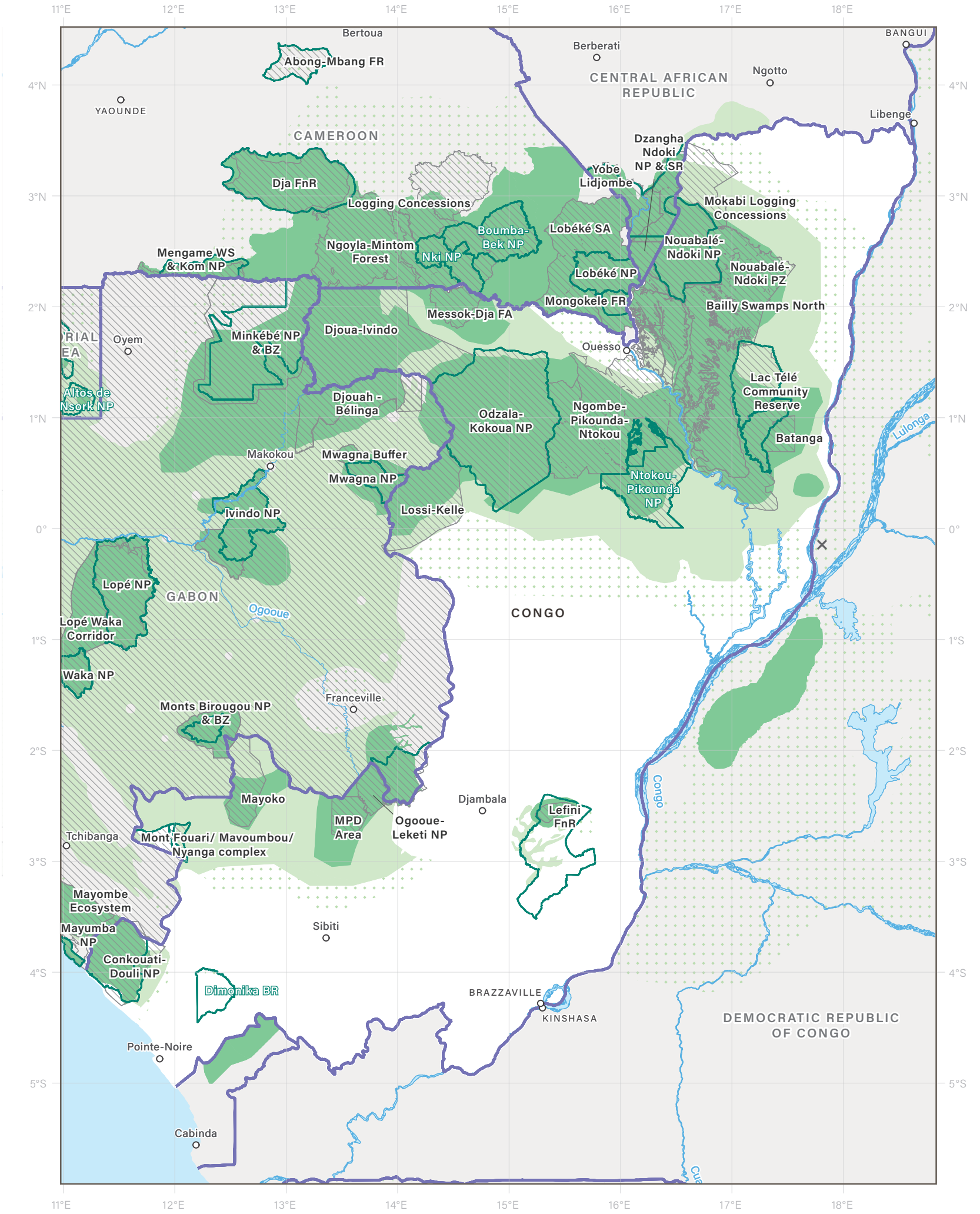
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Congo



0 50 100 150 200 250 300km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

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COUNTRY

Democratic Republic of Congo

ESTIMATED TOTAL ELEPHANTS

1,794 ± 52

GUESSES

7,803 - 9,557

GENERAL STATISTICS

Country Area	2,345,410 km²
Range Area	223,248 km² (10%)
Protected Range	54 %
Information Quality Index (IQI)	0.08
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

The Democratic Republic of Congo (DRC) has the largest expanse of tropical forest of all the Central African countries, comprising around 61% of the total (Verhegghen et al., 2012). A civil war from 1996 to 2003 resulted in high levels of poaching as militias, refugees and military personnel occupied protected areas, and the Institut Congolais pour la Conservation de la Nature (ICCN) was forced to cease normal operations, in some cases abandoning entire protected areas, while many staff members were killed. Elephant meat and ivory was used to provision and fund insurgents and the military (Beyers et al., 2011). Even after the end of the civil war, there have been continuing impacts from the displacement of human populations, ready availability of weapons, the activities of remaining rebel groups and rogue elements of the army, as well as growing threats such as new road developments, growing human populations and immigration (Beyers et al., 2011; Nackoney et al., 2014). The consequence of this is that elephant populations, even in major protected areas, have been reduced to extremely low densities, and substantial areas of range appear to have been lost. Despite this, the only population recorded as having been completely lost is that of the Bushimae Reserve and Hunting Area, and there have probably not been elephants there for many years.

Most elephants in DRC are believed to be forest elephants. There are known to be forest-savanna hybrids in Garamba National Park and at other sites at the northern and eastern limits of the forest zone (Mondol et al., 2015; Roca et al., 2015).

There are a number of collaborative management partnerships in place. African Parks Network (African Parks, n.d.-b) has been managing Garamba NP since 2005, in 2015 WWF received a

3-year management agreement for Salonga National Park and the Virunga Foundation signed an agreement to manage Virunga National Park until 2021 ("Virunga National Park - Who we are," n.d.).

DRC published an elephant conservation plan in 1991, although this is now out of date (Institut Zairois pour la Conservation de la Nature, 1991).

In recent analyses of seizure data in ETIS, prepared for CITES, DRC has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). DRC was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan. This was submitted in April 2015 and progress on this plan was reported on in September 2015 (CITES, n.d.-a) Although none of the 27 planned activities had been completed, 15 of them were considered to be in progress.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in DRC is 1,794 ± 52 at the time of the last survey for each area. There may be an additional 7,803 to 9,557 elephants in areas not systematically surveyed. These guesses probably represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 114,733 km^2, which is 51% of the estimated known and possible range. There remains an additional 49 % of the estimated range for which no population estimates are available.

There has been an approximately 70% reduction in elephant estimates for DRC since the AESR 2007 and a 50% reduction in the guesses.

The elephant population in Garamba NP in the north-east of the country has continued to decline in the last ten years as a result of intense poaching pressure from different groups, including the Lord's Resistance Army, which raided the park headquarters in 2009 (Agger & Hutson, 2013). An **aerial total count** in 2014 gave an estimate of 1,718 elephants from the total count in the southern portion of the park plus 206 from an **aerial sample count** in the northern part of the park and the neighbouring hunting areas (Mònico, 2014). This replaces the 2004 estimate of 6,354 ± 4,081 from an aerial sample count (Hillman Smith et al., 2006) and a guess of 1,000 to 1,450 for the neigbouring Gangala-na-Bodio hunting area. Aerial total counts were also carried out in 2007 and in April and May of 2012, giving estimates of 3,696, 1,847 and 1,708 respectively (Bolaños, 2012). The northern part of Garamba NP was shown as **non-range** in the AESR 2007, but radio-tracking data shows that elephants use the entire park (Mararv, pers. comm., 2016).

Large areas to the west of Garamba are now settled by people, and residents reported that elephants have not occurred here for decades (Hart, 2014) so these areas are shown as **non-range**.

The eastern savanna sector of the Bili-Uere complex has been overrun by hundreds of Fulani pastoralists with their cattle, and by 2010 most of the elephants in this area were gone; it has been changed to **doubtful range** (Hart, 2014). A 2011 **dung count** of the Bili Gangu sector gave an estimate of 365–799 elephants (Hart, 2014), which is recorded as a **new population** since it had not previously been surveyed.

South of Bili-Gangu, elephant range in north-central DRC is now limited to five areas of **possible range** where elephant signs or information on their presence was recorded between 2006 and 2009 (C.T. Hicks, unpublished data, in Hart, 2014).

Between five and 25 elephants may remain in the central Rubi Tele Hunting Zone, based on reconnaissance surveys in 2007 and 2011 (Hart, 2014). Previously this was recorded as possible range with no estimate, so this is recorded as a **new population**.

A survey of the western part of the Lomako Faunal Reserve on the south bank of the Congo River in 2014 indicated that there were still small numbers of elephants present, with an estimate of 105 to 185 (Maputla, 2015) so this is recorded as a **new population** and an area of **known range** added to the map. An additional two small areas south of Lomako had elephant signs (Maputla, 2015). The Okapi Faunal Reserve in the north-east of DRC used to form part of a continuous elephant population including Maiko National Park, although numbers and range have been greatly reduced in this area. The presence of illegal miners and militias severely affected the conservation status of the reserve, but the situation has improved since 2012 (Okapi Conservation Project, 2014). A **dung count** was carried out from December 2010 to January 2011 (Vosper et al., 2012), which gave an estimate of 1,701 (1,031-2,831). This replaces an estimate of 2,688 ± 1,348 from 2006 (Grossman et al., 2006). The 2006 survey covered less than half the area of the 2011 study. However, almost the whole area was surveyed in 2007 giving an estimate of 2,698 (1892-3836) elephants (Vosper et al., 2012). Just to the east of the Okapi is an area known as Mai Tatu. Surveys in 2008 and 2015 here show elephants are still present but very rare.

A guess of 3,000 elephants for Maiko National Park from 2006 (Hart, 2006a) has been replaced by a **guess** of 100-750 (Nixon & Plumptre, pers. comm., 2016). Most of the Park has been reclassified from known to **possible range** apart from some small areas on the periphery, where elephant presence was confirmed during surveys and patrols between 2013 and 2015 (Plumptre et al., 2015).

Virunga National Park has elephants both in savanna and forest areas (Owiunji et al., 2004; Wanyama et al., 2014a). The park has come under sustained assault from poachers and displaced people seeking sanctuary over many years of civil unrest (Virunga National Park, 2016). An **aerial sample count** of the Virunga National Park savanna sector in 2014 gave an estimate of 35 ± 60 (Wanyama et al., 2014b), which replaces an estimate of 348 ± 177 from 2006 (Kujirakwinja et al., 2006). Elephants move back and forth across the border into Queen Elizabeth National Park in Uganda (Douglas-Hamilton, pers. comm., 2016) so changes in numbers may reflect movements as much as mortality. Older guesses for the forest populations of Virunga NP have been retained – 75 for the southern section (Mubalama, pers. comm., 2003) and 43 for the Mikeno section (Gray, pers. comm., 2005).

There is a new **guess** of 20 elephants for the upland section of Kahuzi-Biega National Park (Plumptre, pers. comm., 2010), which replaces one of 20 to 50 from 2005 (Hart, 2006b). Also, there is a new **guess** of 50 to 100 for the lowland section (Plumptre, pers. comm., 2010) which is recorded as a **new population**, although in 2002 there was an estimate of 1,125, which was not recorded in the AESR 2007 (Hart, pers. comm., 2003).

The western section of the Sankuru Natural Reserve was surveyed in 2008, and it seems that no elephants remain at this site (Liengola et al., 2009).

A major, previously undocumented population of elephants was discovered in the centre of the country in the newly-designated Lomami National Park and its surrounding area, the Tshuapa Lomami landscape. A **dung count** carried out in 2008 gave an estimate for the core zone of 551 elephants (353-860) with an additional estimate of 265 elephants (120–700) in the adjoining peripheral zone (Hart, pers. comm., 2016), resulting in an **informed guess** of 500-1000 from the survey author (Hart, 2009). Subsequently, a 2012 dung count of the core zone gave an estimate of 462 elephants (261-813) (Hart, pers. comm., 2016). In late 2014, patrols reported small numbers of elephants (estimated at 10-15 animals) in the south of the park in an area that had not been occupied by elephants since 2007 (Hart, pers. comm., 2016). There was no previous estimate for the Tshuapa Lomami landscape, which is treated as a **new population** although it was recognized as known range in the AESR 2007.

In 2015 and 2016 the existence of several additional areas of elephant range in Central Congo were documented through arrests and seizures of ivory (Hart, n.d.) and these are marked as new areas of **known range** to the west and south of Tshuapa Lomami.

Salonga National Park has experienced poaching for decades, although anti-poaching operations starting in 2011 appear to have improved the situation (Dianzenza, 2015). Surveys have been carried out of different parts of the park. Partial surveys give an estimate of about 400 elephants in about 24% of the park (Reinartz, 2016; WCS, 2015a). Surveys outside the park in 2006 showed that only a few pockets of this vast landscape were occupied by elephants (Steel, 2007). Since the recent surveys did not cover the entire area, the estimates of 1,186 ± 692 inside the park in 2004 (Blake, 2005) and 2,800 outside the park in 2006 (Hart, 2006b) have been retained. There was no significant difference in dung density in the Lokofa area between 2006 and 2015 (WCS, 2015a).

A new **guess** from the Luama Hunting Zone of 21 elephants (Mubalama, pers. comm., 2013) replaces the guess of 110 ± 15 from 2002 (Mubalama, pers. comm., 2006). A new **guess** of 40-60 for Upemba National Park (Hasson, pers. comm., 2013) replaces a guess of 145 from 2005 (Mubalama, pers. comm., 2006).

In the AESR 2007 there is possible range shown close to the southern town of Lubumbashi. It has been many years since elephants occurred in this area, and this has been degraded to **non-range** (Hasson, pers. comm., 2013).

There are no longer believed to be any elephants in the Bushimaie Reserve and Hunting Area so this has been reported as a **lost population** (IUCN PAPACO, 2010).

Reports were received in 2012 of more than 20 elephants moving across the border from Angola and spending time in the Swa Kibula hunting area (Mbende et al., 2012). The map now shows this area as **known range**.

Low densities of elephants were found in the area south-west of Lake Tumba, close to the Congo River north of Kinshasa (Mbende et al., 2012). This has been changed from doubtful to **known range**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	1,718	—	—	—	2 %	3,739
Aerial Sample Counts	35	53	—	—	2 %	4,374
Other Dung Counts	0	—	2,829	3,343	8 %	17,707
Informed Guesses	41	—	505	1,025	12 %	27,979
Other Guesses	—	—	3,165	3,885	15 %	34,484
Degraded Data	—	—	1,304	1,304	12 %	26,450
Totals 2015	**1,794**	**52**	**7,803**	**9,557**		
Totals 2006	**6,507**	**4,080**	**12,897**	**13,569**		
Assessed Range					51 %	114,733
Unassessed Range					49 %	108,515
Total Range					100 %	223,248

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-118	±53	-195	-372	2 %	4,374
New Population	+20	0	+768	+1,852	15 %	34,464
Different Technique	-4,636	±4,081	-845	-1,295	4 %	8,106
Different Area	0	0	-987	-987	5 %	11,387
New Guess	+21	0	-3,115	-2,490	8 %	18,608
Population Lost	0	0	-120	-120	0 %	0
Data Degraded	0	0	0	0	0 %	0
No Change	0	0	0	0	17 %	37,794
Totals	-4,713	±4,081	-4,494	-3,412	51 %	114,733

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	3,739	0	3,739
Direct Sample and Reliable Dung	3,252	1,122	4,374
Informed Guesses	20,693	7,286	27,979
Other Dung Counts	17,525	182	17,707
Other Guesses	55,538	5,397	60,934
Unassessed Range	45,666	62,849	108,515
Totals	146,412	76,836	223,248

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bili Uere Hunting Zone (Bili-Gangu Sector)	NP	DC	C	2012	365	217	Hart, 2014	2	4,390	25.2˚E	4.3˚N
Bushimae	PL	O	E	2010	0		IUCN PAPACO, 2010	2	4,870	22.9˚E	7.7˚S
Garamba Ecosystem											
Garamba Ecosystem	DT	AT	A	2014	1,718		Mònico, 2014	2	3,581	29.4˚E	3.9˚N
Garamba Surrounding Area	DT	O	E	2014	206		Mònico, 2014	2	4,118	29.5˚E	4.3˚N
Kahuzi-Biega											
Kahuzi-Biega (Lowland) National Park	NP	O	E	2,010	50	50*	Plumptre, pers. comm., 2010	2	6,138	27.9˚E	2.0˚S
Kahuzi Biega National Park	NG	O	E	2010	20		Plumptre, pers. comm., 2010	3	584	28.7˚E	2.3˚S
Lomako Yokokala Faunal Reserve - Western Section	NP	DC	C	2014	105	40	Maputla, 2015	2	1,206	21.0˚E	1.0˚N
Luama Hunting Zone	NG	O	D	2013	21		Mubalama, pers. comm., 2013	2	9,469	28.2˚E	4.5˚S
Maiko National Park and Surrounding Area	NG	O	E	2015	100	650*	Nixon & Plumptre, pers. comm., 2016	1	11,508	27.2˚E	0.3˚S
Okapi Faunal Reserve	DA	DC	C	2011	1,701	888	Vosper et al., 2012	1	12,787	28.5˚E	1.5˚N
Rubi Tele Hunting Zone	NP	O	D	2011	5	20*	Hart, 2014	2	3,100	24.8˚E	2.5˚N
Salonga											
Salonga National Park	-	DC	E	2004	1,186	692	Blake, 2005	1	25,141	21.2˚E	2.1˚S
Salonga Outside	-	O	E	2006	2,800		Hart, 2006b	1	25,140	21.1˚E	2.5˚S
Sankuru Natural Reserve	NP	O	D	2009	0		Liengola et al., 2009	2	23,161	24.1˚E	2.8˚S
Swa Kibula	NP	O	D	2012	20		Mbende et al., 2012	2	12,326	17.7˚E	7.4˚S
Tshuapa Lomami Landscape	NP	O	D	2008	500	500*	Hart, 2009	1	40,000	25.0˚E	2.6˚S
Upemba National Park	NG	O	E	2011	40	20*	Hasson, pers. comm., 2013	1	11,370	26.6˚E	8.9˚S
Virunga											
Virunga (Mikeno) National Park	-	O	E	2003	43		Gray, pers. comm., 2005	3	256	29.5˚E	1.4˚S
Virunga (North & Central) National Park	RS	AS	B	2014	35	60	Wanyama et al., 2014a	2	4,810	29.5˚E	0.5˚S
Virunga (South) National Park	-	O	E	2002	75		Mubalama, pers. comm., 2003	2	1,290	29.2˚E	1.4˚S

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

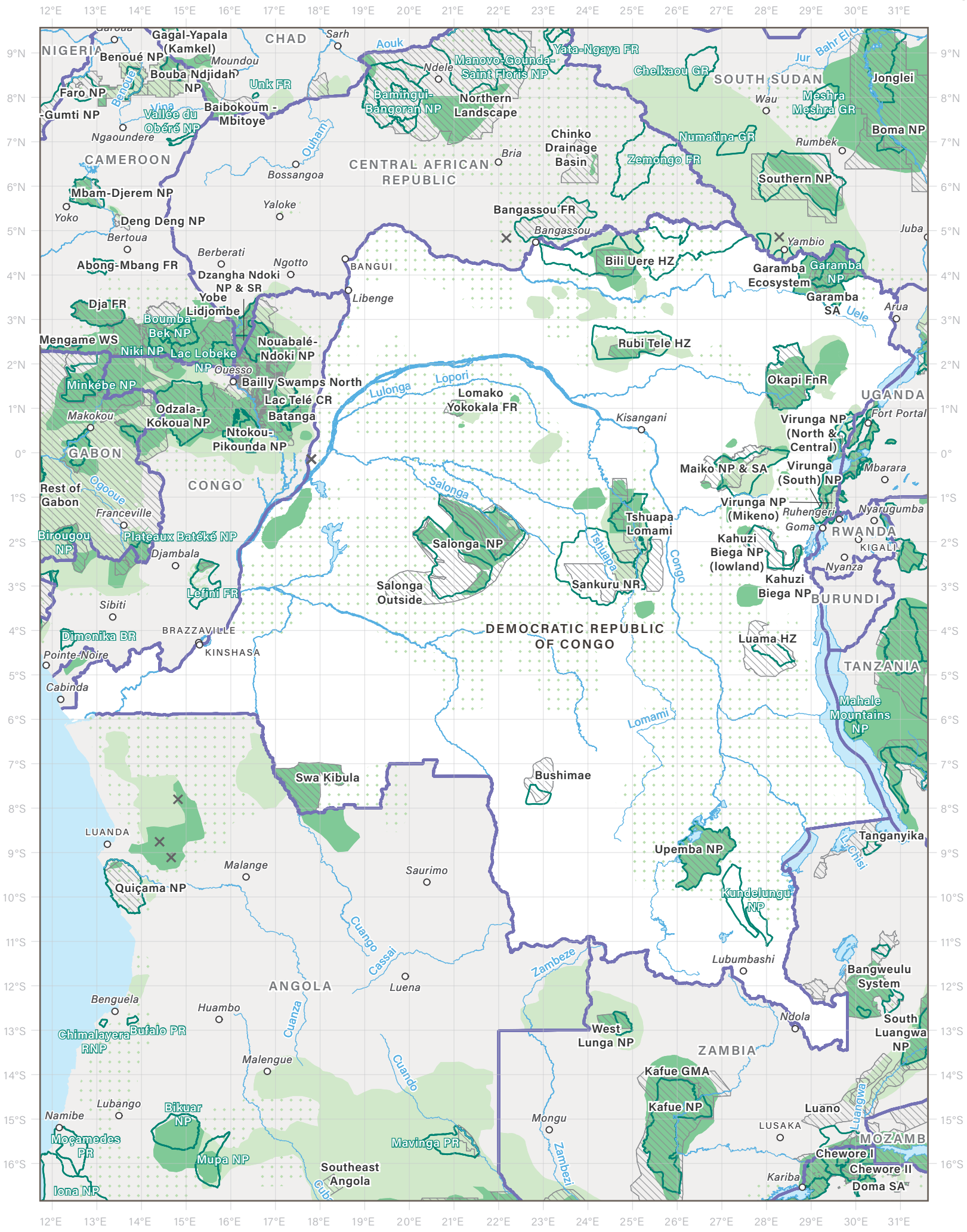
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Democratic Republic of Congo



AfESG

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COUNTRY

Equatorial Guinea

ESTIMATED TOTAL ELEPHANTS

884 ± 676

GUESSES

0 - 0

GENERAL STATISTICS

Country Area	28,050 km²
Range Area	19,701 km² (70%)
Protected Range	21 %
Information Quality Index (IQI)	0.57
CITES Appendix	I
Listing Year	1992 (year of accession)

CURRENT ISSUES

Río Muni is the mainland portion of Equatorial Guinea, a country with a rapidly developing economy based on petroleum extraction, and associated infrastructure development, which is having a negative impact on wildlife. Around 80% of Río Muni is covered in mostly secondary tropical forest. Commercial hunting has been facilitated in recent years by the expansion of the road network across the country and the ongoing construction of a new capital city in the centre-east of the country. Elephant poaching is widespread, especially near roads. Hunting signs were found inside all protected areas during the course of a nationwide survey (Murai et al., 2013).

Although a protected area network was created in 1988, Monte Alén National Park is the only area that has any effective protection (Larziliere & Doumenge, 2015).

Equatorial Guinea published an elephant conservation plan in 1991, although this is now out of date (Ministry of Agriculture, Livestock, Fisheries and Forestry, 1991).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Equatorial Guinea is 884 ± 676. This estimate applies to 19,704 km^2, which is 100% of the estimated known and possible elephant range in Equatorial Guinea.

In 2011 a systematic countrywide line transect survey was carried out (Murai et al., 2013) giving an estimate of 884 elephants (437-1,789). This replaces an estimate of 700 ± 330 from 2004 for the southern part of the Monte Alén National Park plus a guess of 300 for the remaining part of the park. There were no estimates from the remaining elephant range in Equatorial Guinea in the AESR 2007, so the new estimate covers a **different area**. Given that the current estimate for the entire country is lower than the previous estimate for Monte Alén National Park, a substantial reduction in overall numbers seems likely.

Elephants were most abundant within Monte Alén National Park and the Monts de Mitra region extending south towards Gabon and the Río Campo Nature Reserve (contiguous with the Campo Ma'an National Park in Cameroon) and the region to the east of the reserve. The range map has been modified to include new areas of **known range** in the eastern and western parts of the country.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Reliable Dung Counts	884	676	—	—	100 %	19,704
Totals 2015	**884**	**676**	**0**	**0**		
Totals 2006	**0**	**0**	**1,000**	**1,330**		
Assessed Range**					100 %	19,704
Unassessed Range					0 %	-2
Total Range					100 %	19,701

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Area	+884	±676	-1,000	-1,330	100 %	19,704
Totals	+884	±676	-1,000	-1,330	100 %	19,704

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	9,808	9,895	19,704
Unassessed Range	0	-2	-2
Totals	9,808	9,893	19,701

***This country is known to have 100% assessed range. Differences in table values exist due to minor variations between map layers.*

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LAT.	LAT.
Rio Muni Region	DA	DC	B	2011	884	676	Murai et al., 2013	1	24,635	10.5˚E	1.7˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2] KEY TO SURVEY REPORT

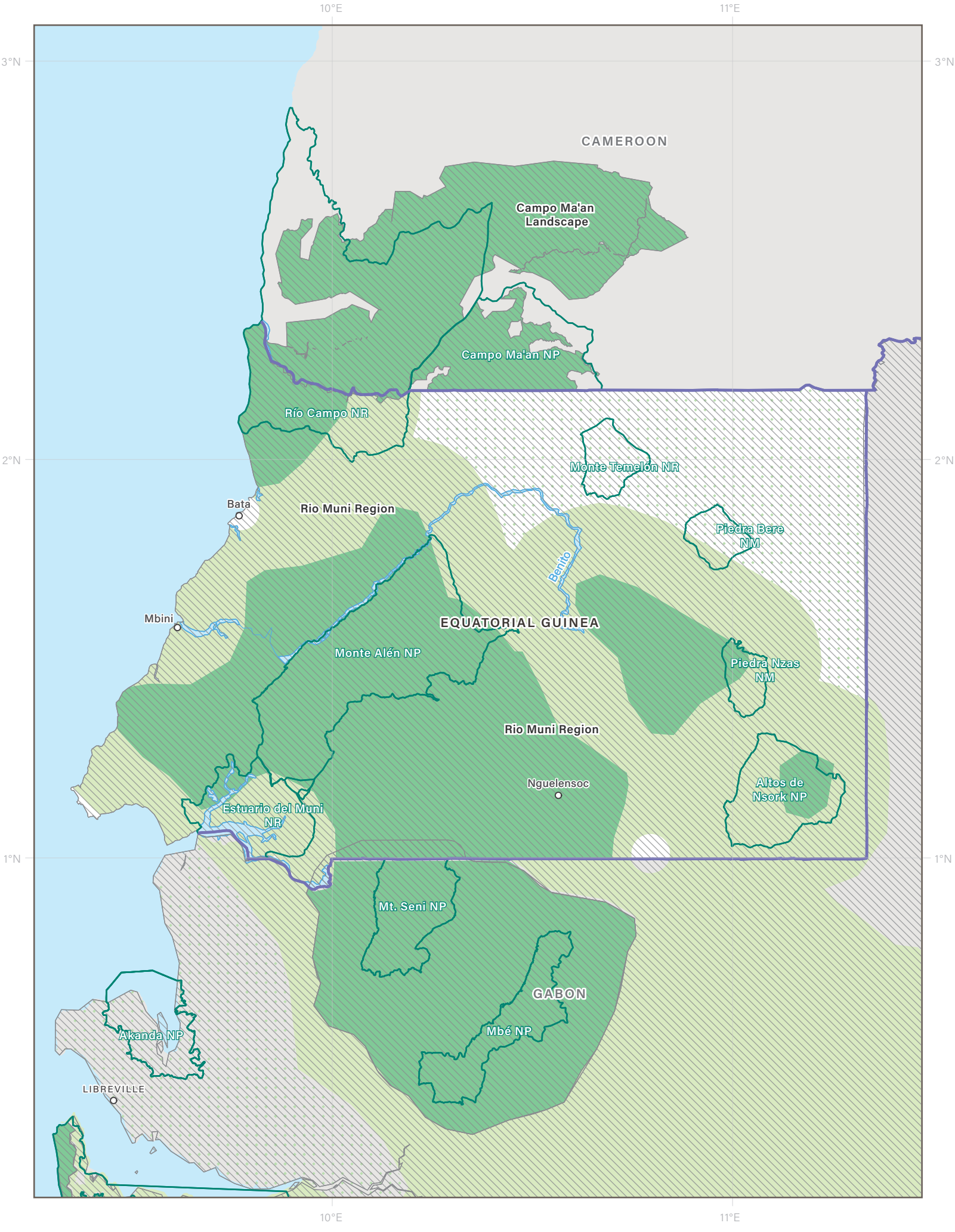
AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Equatorial Guinea

080



0 15 30 45 60 75 90km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Gabon

ESTIMATED TOTAL ELEPHANTS

7,058 ± 2,303

GUESSES

59,057 - 67,094

GENERAL STATISTICS

Country Area	267,670 km²
Range Area	213,373 km² (80%)
Protected Range	18 %
Information Quality Index (IQI)	0.09
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Gabon is a relatively stable country with a low human population concentrated in the cities. Over 80% of the country is forested, with Gabon's forests accounting for 12% of the total African tropical moist forest area (Verheggen et al., 2012). There are small areas of savanna in the Batéké Plateau in the south-east and behind the coastal strip. All elephants found in Gabon are forest elephants including those found in the savanna patches (Roca et al., 2015).

Until recently much of the forest was relatively inaccessible and Gabon has been a stronghold for forest elephants, holding about half of Africa's forest elephants (Maisels & Strindberg, 2012). In 2002, Gabon created a network of 13 national parks, which cover about 11% of the country. Until recently levels of poaching were far lower than in neighbouring range states, but this has changed in recent years as road access has improved and ivory prices increased, and poaching is now seen as a serious threat.

In recent analyses of seizure data in ETIS, prepared for CITES, Gabon has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Gabon was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan. Gabon submitted this to CITES in 2014 (CITES, n.d.-a). In June 2012, Gabon destroyed 4.8 tonnes of ivory from its national stockpile (Jones, 2012).

In 2015, as part of the Elephant Protection Initiative, Gabon developed a draft national strategy for elephant management (Government of Gabon, 2015), which is still under review. The Agence Nationale des Parcs Nationaux (ANPN) announced the creation, by presidential order, of a 240-strong

special forces unit within ANPN to operate as a rapid reaction unit anywhere in Gabon (Presidential Press Service, 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Gabon is 7,058 ± 2,303 at the time of the last survey for each area. There may be an additional 59,057 to 67,094 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 213,373 km^2, which is 100% of the estimated known and possible elephant range.

Elephants are believed to occur throughout much of Gabon, with the exception of a number of areas with high human population densities, but only 20% of Gabon has been surveyed. For this reason an estimate from a spatial model has been used for the remaining area (Maisels, Strindberg et al., 2013b).

The estimated number of elephants through systematic surveys has increased by 4,300, largely because of an increased number from a repeat survey of Lopé National Park. Guesses on the other hand have decreased by 10,000-20,000, partly because of the reduced numbers recorded from Minkébé NP.

A **dung count** of Minkébé NP and its neighbouring buffer zone in the north-east of the country in 2013 gave an estimate of 6,875 (3,677-12,852) (ANPN, 2013). This replaces an estimate of 21,070 ± 7,942 from 2004 (Blake, 2005). The more recent survey was less intense but indicated a dramatic decline in both numbers and range, with elephants now almost totally confined to the southern and eastern borders of the park. The 2013 survey included areas outside the park but a direct comparison of areas surveyed in 2004 and 2013 suggests that 60-80% of the population has been lost (ANPN, 2013). This increase in poaching was associated with the presence of over 6,000 gold miners in the park and buffer zone from about 2008 onwards until they were moved out in 2011 by ANPN and the Gabonese military (ANPN, 2013).

Djouah Bélinga is south-east of Minkébé NP on the Republic of Congo border. The estimate of 4,035 from 2002 (Lahm & Barnes, pers. comm., 2006) has been degraded to a guess.

A **dung count** of Mwagna National Park and its proposed extension to the north-west in 2012 (Maisels & Akou, 2012) gave an estimate of 1,680 (1,254 to 2,251) elephants for the whole area, of which 81% were in the park. This replaces a 2004 guess of 2,483 (Lahm & Barnes, pers. comm., 2006). A 2004 guess of 151 elephants is available for the Mwagna buffer area (Maisels & Strindberg, 2012).

The Plateaux Batéké National Park in the extreme south-east of the country is largely composed of savanna with small areas of forest. A reconnaissance **dung count** in 2006 (which was not reported in the AESR 2007) gave a **guess** of 301 elephants (Maisels & Strindberg, 2012). However 337 elephants have been individually identified in clearings to the north-west of the park (Douckaga, 2014) of which 17 were recognisable from the Batéké population just across the border with Congo.

A **dung count** of Ivindo NP and its southern buffer zone in 2009 gave an estimate of 3,489 ± 732

elephants (Maisels et al., 2010) of which 82% were in the park. This replaced an estimate of 1,216 (730-2,000) (Maisels, pers. comm., 2006). As the area surveyed in 2009 was 11% larger than the 2005 area, this was recorded as a **different area**.

A **dung count** was carried out in Lopé NP, in the centre of Gabon, in 2009. This gave an estimate of 4,142 (2,508-6,842) (Bezangoye & Maisels, 2010), replacing an estimate of 2,350 (1,385 to 4,200) from a similar survey in 2005 (Maisels, pers. comm., 2006). A logging company started operations on the western border of the park after the end of the 2006 survey, which may have caused elephants to seek refuge in the park (Bezangoye & Maisels, 2010).

A reconnaissance survey of the neighbouring Waka National Park was carried out in 2006, giving a **new guess** of 690 (Maisels & Strindberg, 2012). The intervening Lopé-Waka corridor was surveyed using **line transects** and **dung counts** in 2008 giving an estimate of 1,343 ± 778 (Maisels et al., 2008). There were no previous estimates for these sites.

The Monts Birougou National Park was not marked as elephant range in the AESR 2007 and this has been changed to **known range**. A **dung count** was carried out in 2007 which gave an estimate of 216 (168-554) elephants (Aba'a & Bezangoye, 2007) and this is recorded as a **new population**.

A reconnaissance survey of the Monts de Cristal area, along the border with Equatorial Guinea, in 2006 gave an estimate of 2,416 elephants (Aba'a, 2006; Maisels & Strindberg, 2012). This replaces an estimate from a smaller area of 1,396 from 2001 (Lahm & Barnes, pers. comm., 2006).

Several new **dung counts** have been carried out of elephant populations along the Gabon coast. However, Pongara NP in the north was not surveyed and an estimate of 344 ± 152 (Latour, 2006) has been retained from the AESR 2007.

Wonga-Wongue Presidential Reserve was surveyed in 2011 for the first time, giving an estimate of 1,039 (601-1,797) (new analysis of the raw data by Maisels: Motsaba & Aba'a, 2012). Some of these elephants visit savanna areas in the reserve and monthly **aerial total counts** are conducted. Just over 1,000 elephants were seen in a single flight in 2015 and it is thought that there may be 2,000-3,000 elephants (Fay, pers. comm., 2016). A reconnaissance survey was carried out of the previously unsurveyed Evaro area in the swamps of the Ogooue Delta in 2006, but this was not included in the AESR 2007. This gave a **guess** of 469 (Maisels & Strindberg, 2012).

Several surveys have been carried out of different parts of the Gamba Forest Complex. A **dung count** was carried out in Loango NP in 2007, resulting in a guess of 290 elephants (Maisels, pers. comm., 2016e). A **transect survey** of the Kivoro logging concession was carried out in 2008 (Blake et al., 2012) which gave an estimate of 900 elephants (231-1,617). There was a previous estimate of 11,205 ± 969 from 1999 (Thibault et al., 2001) for the entire area but this is not comparable because a larger area was covered and a different decay rate was used.

A survey of the Mayombe area, further south along the coast, gave a **new estimate** of 299

elephants (299-634) (Aba'a et al., 2011) and there was a **new guess** from a reconnaissance survey for Mayumba NP of 80 (Maisels & Strindberg, 2012).

Finally, a small part of the Moukalaba-Doudou NP and a part of the adjacent Sette Cama Reserve was surveyed in 2011 giving an estimate of 236 (183-304) (Ngoran, pers. comm., 2014).

Using the model of Maisels, Strindberg, et al. (2013b) and excluding the sites for which specific estimates are available, the remaining unsurveyed suitable for-est habitat is predicted to contain 32,378 elephants.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Reliable Dung Counts	5,721	2,303	—	—	4 %	8,314
Other Dung Counts	0	—	17,089	18,999	7 %	15,873
Informed Guesses	1,337	—	5,404	11,531	10 %	20,913
Degraded Data	—	—	4,186	4,186	3 %	6,048
Modeled Extrapolation	—	—	32,378	32,378	77 %	163,629
Totals 2015	**7,058**	**2,303**	**59,057**	**67,094**		
Totals 2006	**2,350**	**827**	**66,490**	**67,459**		
Assessed Range**					101 %	214,777
Unassessed Range					-1 %	-1,405
Total Range					100 %	213,373

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+1,792	±2,320	-0	0	2 %	4,669
New Population	0	0	+216	+216	1 %	1,289
Different Technique	+1,579	±780	-803	-803	2 %	5,219
Different Area	0	0	-12,877	-10,967	6 %	11,918
New Guess	+1,337	0	+9,239	+14,397	88 %	187,150
Data Degraded	0	0	0	0	0 %	0
No Change	0	0	0	0	2 %	4,531
Totals	+4,708	±2,447	-4,225	+2,843	101 %	214,777

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	8,190	124	8,314
Informed Guesses	39,428	145,114	184,542
Other Dung Counts	15,686	187	15,873
Other Guesses	4,771	1,277	6,048
Unassessed Range	-690	-714	-1,405
Totals	67,384	145,988	213,373

***This country is known to have 100% assessed range. Differences in table values exist due to minor variations between map layers.*

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Djouah Bélinga	-	O	E	2002	4,035		Lahm & Barnes, pers. comm., 2006	2	4,339	13.6˚E	1.2˚N
Evaro Zone	NG	O	D	2006	469	525*	Maisels & Strindberg, 2012	2	2,365	10.0˚E	0.9˚S
Gamba											
Kivoro	NG	DC	C	2008	900	693	Blake et al., 2012	2	2,337	10.0˚E	2.2˚S
Loango National Park	NG	O	D	2007	290	383*	Maisels, pers. comm., 2016e	2	1,510	9.6˚E	2.1˚S
Moukalaba-Doudou Central South	DT	DC	B	2011	236	60	Ngoran, pers. comm., 2014	3	609	10.5˚E	2.8˚S
Ivindo National Park	DA	DC	C	2009	3,489	732	Maisels et al., 2010	2	3,864	12.6˚E	0.1˚N
Lope-Waka											
Lopé National Park	RS	DC	B	2009	4,142	2,167	Bezangoye & Maisels, 2010	2	4,486	11.5˚E	0.6˚S
Lopé-Waka Corridor	DT	DC	B	2008	1,343	778	Maisels et al., 2008	2	3,000	11.3˚E	1.1˚S
Waka National Park	NG	O	D	2006	690	773*	Maisels & Strindberg, 2012	2	1,061	11.1˚E	1.3˚S
Mayombe Ecosystem	NG	O	D	2011	299	335*	Aba'a et al., 2011	2	1,682	11.0˚E	3.4˚S
Mayumba National Park	NG	O	D	2011	60	68*	Maisels & Strindberg, 2012	3	161	11.0˚E	3.8˚S
Minkébé National Park and buffer zone	DA	DC	C	2013	6,875	4,588	ANPN, 2013	1	11,956	12.6˚E	1.7˚N
Monts Birougou National Park and buffer zone	NP	DC	D	2007	216		Aba'a & Bezangoye, 2007	2	1,332	12.3˚E	1.9˚S
Monts de Cristal Ecosystem	NG	O	D	2006	2,416	2,707*	Maisels & Strindberg, 2012	2	5,300	10.3˚E	0.7˚N
Mwagna											
Mwagna Buffer	NG	O	E	2004	151	168*	Maisels & Strindberg, 2012	2	2,020	13.7˚E	0.7˚N
Mwagna National Park	DT	DC	C	2012	1,680	733	Maisels & Akou, 2012.	2	1,581	13.8˚E	0.5˚N
Plateaux Batéké National Park	NG	O	D	2006	301	336*	Maisels & Strindberg, 2012; Douckaga, 2014	2	2,042	12.5˚E	0.5˚S
Pongara National Park	-	DC	C	2006	344	152	Latour, 2006	3	378	9.4˚E	0.1˚N
Rest of Gabon Forest Range	NG	O	D	2011	32,378		Maisels, Strindberg et al., 2013	1	145,497	11.1˚E	0.4˚S
Wonga-Wongue Presidential Reserve	NG	O	D	2015	2,000	1,000*	Fay, pers. comm., 2016	2	4,967	9.5˚E	0.5˚S

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

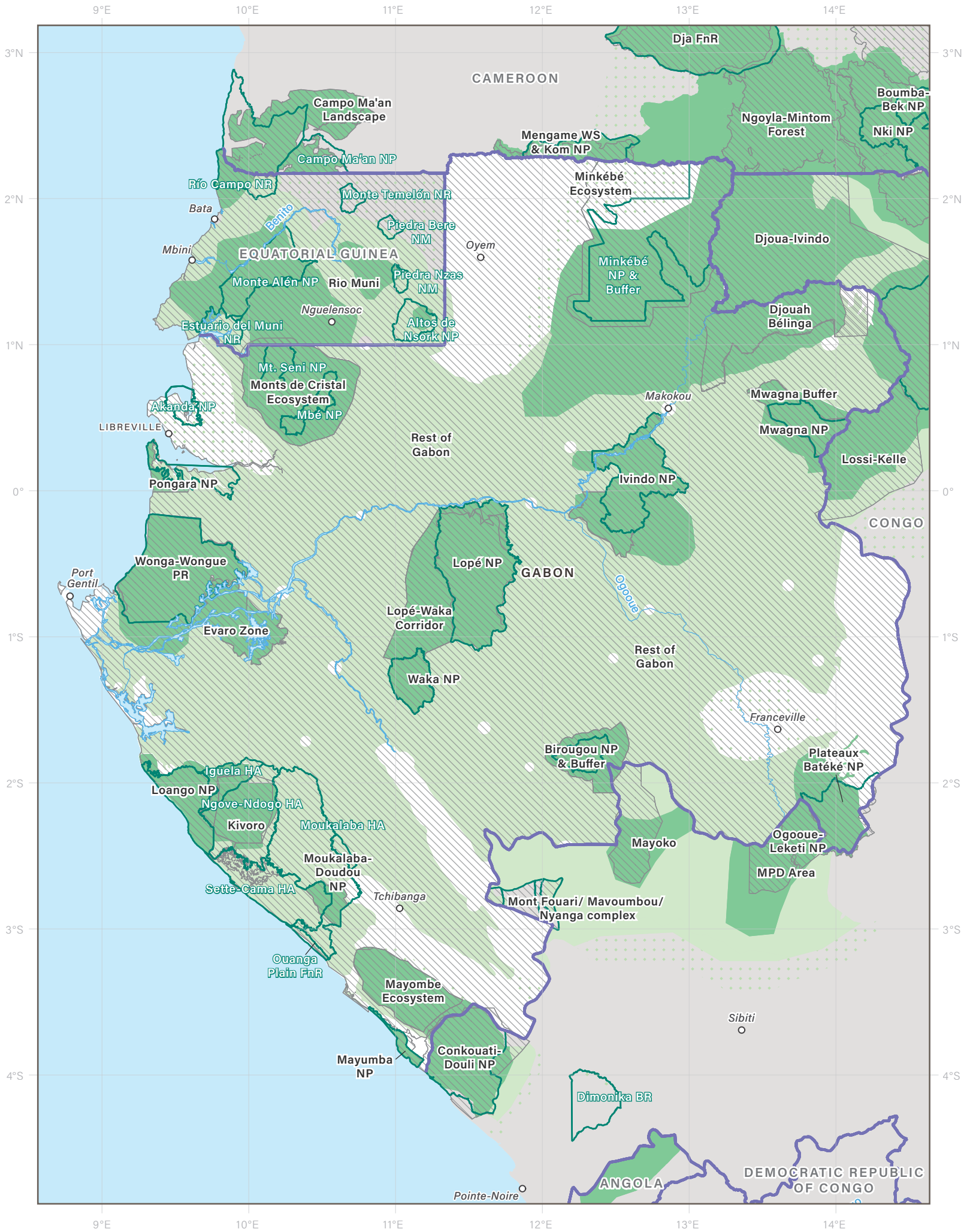
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Gabon



0 40 80 120 160 200 240km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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Eastern

REGION

Eastern Africa

ESTIMATED TOTAL ELEPHANTS

86,373 ± 10,549

GUESSES

11,973 - 12,060

GENERAL STATISTICS

Region Area	4,295,972 km²
Range Area	880,648 km² (20%)
Protected Range	35 %
Information Quality Index (IQI)	0.49

CURRENT ISSUES

Eastern Africa has been the region most affected by poaching, having experienced an approximately 50% decline in estimates from surveys since the AESR 2007, largely attributed to a greater than 60% decline in Tanzania's elephant numbers, including heavy losses in some of the region's formerly most significant populations.

The free flow of small arms in the region, providing a ready supply for poachers (Small Arms Survey, 2015), continues to be of concern. While major economic development has been underway in Ethiopia, Kenya, Rwanda, Uganda and Tanzania, political instability continues to cause problems for elephant conservation in South Sudan and Somalia. Extensive land transformation for agricultural expansion and exploration by extractive industries is taking place and elephant habitats are increasingly being fragmented, degraded and lost.

Eastern Africa has 16 MIKE sites. Mount Elgon National Park MIKE site in Uganda has not submitted any carcass data since the MIKE programme began in 2002. While reporting rates vary, the remaining 15 sites have submitted carcass data between 2007 and 2015. After a peak in 2011, 2015 was the fourth consecutive year in which the PIKE value declined in Eastern Africa. The PIKE value for Eastern Africa in 2015 is comparable to the levels recorded in the region in 2008 but is higher than the values for the five years prior to that (Figure 1, on the following page). (CITES Secretariat, 2016).

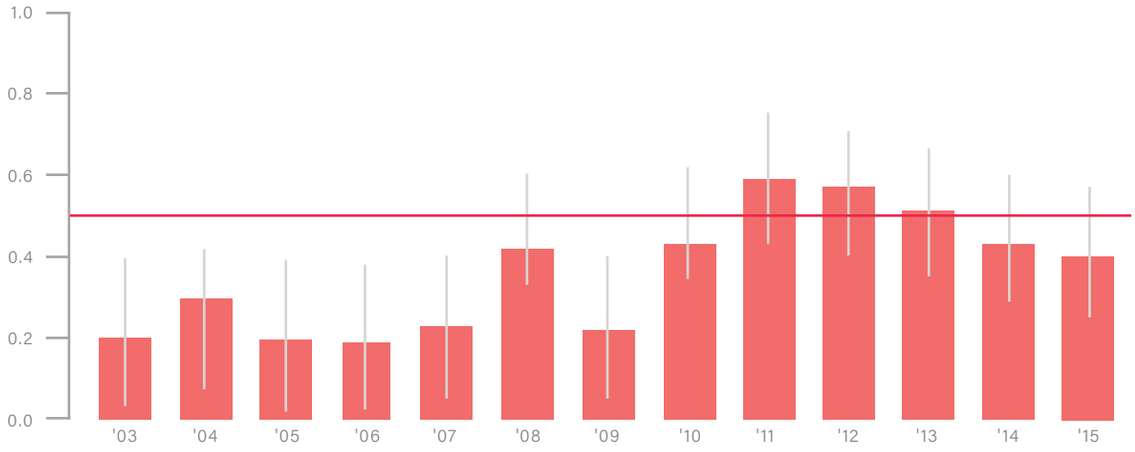

FIGURE 1: *Eastern African PIKE trends with 95% confidence intervals (CITES Secretariart, 2016)*

In recent analyses of seizure data prepared for CITES, Ethiopia, Kenya, Tanzania and Uganda were identified as countries with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016) and are currently part of the National Ivory Action Plan process. Further details are provided in the country summaries.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Eastern Africa is 86,373 ± 10,549 at the time of the last survey for each area. There may be an additional 11,973 to 12,060 elephants in areas not systematically surveyed. Together, this estimate and guess apply to 548,587 km^2, which is 62% of the estimated known and possible elephant range. There remains an additional 38% of range for which no elephant population estimates are available.

Between the AESR 2007 and this report, elephant numbers in Eastern Africa have declined by about 87,000, on the basis of updated estimates for sites where comparable survey techniques were employed. However, some populations have been surveyed for the first time and this has led to an increase of approximately 9,000 in the "new population" category. The result is that the current total number of elephants from surveyed populations represents a smaller estimated reduction of almost 79,000 elephants, still close to a 50% loss, during the period from late 2006 to the end of 2015.

The proportion of elephant range for which elephant estimates are available currently stands at 62%, an increase from 38% in the previous report. In fact, the AESR 2016 shows an important, essentially reversed situation from the AESR 2007, which reported approximately 40% assessed and 60% unassessed range for Eastern Africa. Furthermore, the overall reliability of estimates has increased considerably, with estimates from systematic surveys now accounting for 53% of total range, versus 38% in the previous report. The overall quality of information, as measured by the IQI, has also increased from 0.36 to 0.49.

The large reported losses, primarily due to poaching in Tanzania, account for much of the continent's overall decline since the AESR 2007. The Selous and Ruaha-Rungwa ecosystems suffered the heaviest losses. Other areas, such as the Moyowosi-Kigosi and Sagara-Nyamagoma ecosystem and Ugalla Game Reserve also suffered losses, primarily from 2009–2013. Although Tanzania remains an important range state with about 50,000 elephants, this has been a catastrophic time

for elephants in that country, which is especially tragic following the strong recovery they experienced following the last poaching crisis in the 1970s and 1980s.

Despite worrying levels of poaching, and continued concerns over the trafficking of illegal ivory through the region, Kenya and Uganda's overall populations have remained stable with indications of small but not significant increases in the latter. All estimates from Kenya's forest populations were degraded due to age, though a new round of forest surveys have recently been initiated. Kenya's elephant stronghold remains in the Tsavo National Park and its surrounding areas. The Laikipia-Samburu population lost some elephants to poaching but over the 10-year period there was a slight increase. There were concerning levels of poaching in Masai Mara and surrounding areas.

Both Ethiopia's slight increases and South Sudan's more substantial increases probably result from an improvement in knowledge rather than genuine increment in elephant numbers. Most of South Sudan's elephant populations were surveyed for the first time in many years from 2007-2010. The resurgence of civil unrest in South Sudan has made it impossible to carry out surveys more recently. Rwanda's elephant numbers remain stable at just over 100 elephants in two widely-separated populations. The fate of elephants in Eritrea and Somalia remains unknown.

No populations are recorded as having been lost in Eastern Africa.

There has been no net increase in range but improved information has led to an increase in the proportion of known range, which has increased from approximately 500,000 km^2 (57% of overall range) in the AESR 2007 to approximately 736,000 km^2 (about 85% of total range) in 2015. This is mostly the result of better information on range in South Sudan and Tanzania but also a real increase in range in the Laikipia-Samburu and Magadi areas in Kenya.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	32,960	—	—	—	17 %	151,113
Individual Registrations	1,656	—	—	—	0 %	3,553
Aerial Sample Counts	50,851	10,549	—	—	36 %	317,490
Reliable Dung Counts	118	—	—	—	0 %	132
Other Dung Counts	0	—	137	137	0 %	188
Informed Guesses	788	—	2,429	2,516	7 %	57,360
Degraded Data	—	—	9,407	9,407	2 %	18,751
Totals 2015	**86,373**	**10,549**	**11,973**	**12,060**		
Totals 2006	**165,151**	**27,990**	**10,722**	**12,066**		
Assessed Range					62 %	548,587
Unassessed Range					38 %	332,061
Total Range					100 %	880,648

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-87,414	±29,058	-400	-600	34 %	299,558
New Population	+8,665	±6,609	+270	+270	16 %	138,435
Different Technique	+861	±821	-911	-920	2 %	18,088
Different Area	+2,693	±2,373	-547	-547	6 %	52,754
New Guess	-488	0	+171	+181	2 %	21,200
Data Degraded	-3,095	±641	+3,095	+2,037	0 %	0
Totals	-78,778	±29,912	+1,678	+421	60 %	548,587

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	153,688	977	154,666
Direct Sample and Reliable Dung	302,942	14,680	317,622
Informed Guesses	48,591	8,769	57,360
Other Dung Counts	188	0	188
Other Guesses	15,619	43	15,662
Unassessed Range	214,531	115,844	330,625
Totals	735,559	140,314	876,123

ELEPHANT ESTIMATES

COUNTRY	# OF ELEPHANTS		GUESSES		RANGE			PFS	IQI
	ESTIMATE	± 95% CL	MIN	MAX	AREA (km²)	% REGIONAL	% ASSESSED		
Eritrea	0	0	100	120	5,275	1 %	100 %	3	0
Ethiopia	1,017	0	1,160	1,160	22,264	3 %	84 %	2	0.39
Kenya	22,809	0	8,023	8,090	130,725	15 %	80 %	2	0.59
Rwanda	88	0	37	37	1,079	0 %	99 %	4	0.7
Somalia	0	0	70	70	4,525	1 %	68 %	3	0
South Sudan	7,103	5,911	0	0	309,811	35 %	42 %	1	0.23
Tanzania	50,433	8,502	1,930	1,930	389,921	44 %	70 %	1	0.58
Uganda	4,923	2,012	653	653	17,048	2 %	79 %	2	0.51
Totals	86,373	10,549	11,973	12,060	880,648	100 %	62 %	1	0.49

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Eastern Africa

094

30°E 40°E 50°E

20°N 10°N 0° 10°S

LIBYA
EGYPT
CHAD
SUDAN
KHARTOUM
ERITREA
ASMARA
DJIBOUTI
ADDIS ABABA
ETHIOPIA
SOUTH SUDAN
NTRAL AFRICAN REPUBLIC
SOMALIA
MOGADISHU
UGANDA
KAMPALA
KENYA
NAIROBI
DEMOCRATIC REPUBLIC OF CONGO
KIGALI
RWANDA
BURUNDI
TANZANIA
DAR ES SALAAM
MALAWI
LILONGWE
ZAMBIA
LUSAKA
MOZAMBIQUE

30°E 40°E 50°E

0 200 400 600 800 1000 1200km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

COUNTRY

Eritrea

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

100 - 120

GENERAL STATISTICS

Country Area	121,320 km²
Range Area	5,275 km² (4%)
Protected Range	0 %
Information Quality Index (IQI)	0.00
CITES Appendix	I
Listing Year	1994 (year of accession)

CURRENT ISSUES

Elephants in Eritrea are confined to the small area of Gash-Setit along the Ethiopian border in the southwest of the country. Continued tension between Eritrea and Ethiopia make conservation and research difficult in this area. The elephants are not within a protected area and conflicts with farmers are common (Shoshani et al., 2004).

A study of the genetics of Eritrean elephants indicates that they are savanna elephants, with limited genetic diversity (Brandt et al., 2014).

No elephant action plan has been developed for Eritrea.

NUMBERS AND DISTRIBUTION

There may be 100 to 120 elephants in areas of Eritrea which have not been systematically surveyed. This guess likely represents a minimum number, and actual numbers could be higher than those reported. It applies to 5,275 km², which is the entirety of the estimated known and possible elephant range.

There is very little recent information on the status of Eritrea's elephant population, with no surveys since 1997 (Litoroh, 1997a, 1997b). Brandt et al. (2014) suggested there may be as many as 120 elephants and this has been entered as an **informed guess**, replacing the previous guess of 104 (Shoshani, pers. comm., 2006). Since this is a cross-border population with Kafta Sheraro National Park in Ethiopia, there is a possibility that elephants may have been double counted.

NUMBERS AND DISTRIBUTION
CONT.

No changes have been made to the range map for this report, which is based on an old study of elephant sign and spoor. There appears to be a regular movement pattern, with elephants spending the dry season (October to March) in Eritrea and crossing the border twice every year to spend the wet season in Ethiopia. The mapped elephant range extends to the Sudanese border, but it is believed that elephants do not cross the border (Shoshani et al., 2004).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Informed Guesses	0	—	100	120	100 %	5,275
Totals 2015	**0**	**0**	**100**	**120**		
Totals 2006	**96**	**0**	**8**	**8**		
Assessed Range					100 %	5,275
Unassessed Range					0 %	0
Total Range					100 %	5,275

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Guess	-96	0	+92	+112	100 %	5,275
Totals	-96	0	+92	+112	100 %	5,275

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	5,275	0	5,275
Unassessed Range	0	0	0
Totals	5,275	0	5,275

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Gash-Setit	NG	O	D	2014	100	20*	Brandt et al., 2014	1	5,275	37.3˚E	14.8˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Eritrea

0 50 100 150 200 250 300km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

AfESG

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COUNTRY

Ethiopia

ESTIMATED TOTAL ELEPHANTS

1,017 ± 0

GUESSES

1,160 - 1,160

GENERAL STATISTICS

Country Area	1,127,127 km^2
Range Area	22,264 km^2 (2%)
Protected Range	56%
Information Quality Index (IQI)	0.39
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Elephant populations in Ethiopia are mostly small and scattered, primarily occurring in the peripheral low-lying parts of the country, or in remnant forests. The formal establishment and gazettement of protected areas in Ethiopia took place in 2014. Delays in this process were in part due to the devolution of authority to a regional level. In many instances boundaries have not been demarcated and people continue to live in protected areas. There is little active management or patrolling of protected areas. Large-scale agricultural developments are a threat to a number of Ethiopia's remaining elephant populations, particularly around Omo and Gambella National Parks in the west of the country.

African Parks Network was responsible for the management of Omo NP (2005-2007) and has provided support to the management of Gambella NP since 2014.

The Ethiopian Elephant Action Plan (EEAP) was drafted in 2015, but remains under review.

In recent analyses of seizure data in ETIS, prepared for CITES, Ethiopia has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Ethiopia was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan. Ethiopia's plan was submitted in January 2015 (CITES, n.d.-a). In March 2015, Ethiopia destroyed 6.1 tons of ivory from its national stockpile (BBC News, 2015b). Ivory trafficking through Bole Airport remains a concern, since it is an important hub for air traffic from the rest of Africa to the Middle and Far East.

While elephant trophy hunting remains legal in Ethiopia, no quotas were declared to the CITES Secretariat between 2007 and 2015.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Ethiopia is 1,017 at the time of the last survey for each area. There may be an additional 1,160 elephants in areas not systematically surveyed. This guess probably represents a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 18,598 km^2, which is 84% of the estimated known and possible elephant range. There remains an additional 16% of the estimated range for which no elephant population estimates are available.

There has been an increased estimate of about 700 elephants since the AESR 2007, largely because of the increase in numbers observed in Gambella NP. Previously there had been much uncertainty about the status of the elephant population of Gambella NP, in the far west of the country, and it was not known whether elephants were resident, or only visiting from the Boma area of South Sudan. A reconnaissance survey in 2009 found six elephants, and only four were seen in 2010 (TFCI, 2010). However, during an aerial total count in 2013, 337 elephants were seen (Grossmann et al., 2013). In 2015, 550 elephants were observed in the south-west of the park in an aerial total count, and another 56 were seen during the course of an **aerial sample count** of the wider ecosystem (Mònico & Schapira, 2015). This replaces a guess of 200 from 2002 (Ethiopia Wildlife Conservation Organization, 2002). Radio-collared elephants moved in a single large herd along the southern edge of the park close to the South Sudanese border and south-east to the Akobo CHA (Rolkier et al., 2015); using this information a new area of **known range** has been added to the range map, and the amount of **possible range** reduced. A point record to the north of Gambella has been added for a sighting during the 2015 survey.

While Mizan Teferi Controlled Hunting Area was previously considered to be the main area for elephants in the south-western forests, more recent reports suggest that Chebera Churchura National Park, which was gazetted in 2014, holds the largest remaining population. Ground counts from 2012-14 in Chebera Churchura indicated that there were 420 elephants (Ali, pers. comm., 2016). No details were given so this is treated as an **informed guess**, which replaces the previous informed guess of 60 from 2001 (Chago et al., 2001). The AESR 2007 included an old guess of 500 elephants for Mizan Teferi, which has been replaced by a new **informed guess** of 20 (Ali, pers. comm., 2016).

The elephant population in the Omo Valley is believed to move between Omo and Mago National Parks and the intervening Tama Controlled Hunting Area, and possibly into South Sudan. This population is under pressure from the development of sugar plantations in Tama (Chase et al., 2014a). During a **sample aerial count** in 2014, no elephants were observed on transect but 411 elephants were seen in Omo NP and 32 in Mago NP (Chase et al., 2014a). However, it is thought that there are more elephants in Mago NP and an estimate of 80 has been used (Ali, pers. comm., 2016). The previous guess for both Omo and Mago was 324-524 elephants in 2002 (Demeke, pers. comm., 2006).

There have been occasional reports of elephants in the Geralle National Park to the south of the country. It is not known whether this is a resident population, or if it moves between Ethiopia and Kenya. Local residents reported about 50 elephants in this area in 2015 (Ali, pers. comm., 2016). There was no estimate in the AESR 2007. An area of **possible range** has been added.

A helicopter-based aerial survey in 2014, carried out as part of the Great Elephant Census, only located 36 elephants in the Babille Elephant Sanctuary (Chase et al., 2014a), but elephant are difficult to count from the air when they are in thick riverine vegetation. A ground count, also in 2014, estimated 250 elephants, which has been treated as an **informed guess** (Ali, pers. comm., 2016). The previous informed guess was 264 in 2005 (Demeke, pers. comm., 2006).

A ground survey in 2014 of the Kafta-Sheraro National Park (previously Shire Wildlife Reserve) in the north of Ethiopia (a transfrontier population shared with Eritrea) indicated that it contains about 300 elephants (Ali, pers. comm., 2016). This **informed guess** replaces an old total count estimate of 12 for the neighboring Shire and Tekezze Valley areas (Litoroh, 1997b).

It is estimated that there are 20 elephants in the Alitash National Park (Ali, pers. comm., 2016). This is likely to be a transfrontier population with Dinder National Park in Sudan. There was no estimate for this population in the AESR 2007. An area of **possible range** has been added.

There is an **informed guess** of 20 elephants close to the Sudanese border in the Dabus Valley Controlled Hunting Area on the Blue Nile (Ali, pers. comm., 2016). This replaces a guess of 200 from 1998 (Abdi, pers. comm., 1998).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	550	—	—	—	6 %	1,231
Informed Guesses	467	—	1,160	1,160	78 %	17,367
Totals 2015	**1,017**	**0**	**1,160**	**1,160**		
Totals 2006	**310**	**0**	**1,453**	**1,453**		
Assessed Range					84 %	18,598
Unassessed Range					16 %	3,666
Total Range					100 %	22,264

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	0	0	+70	+70	18 %	4,095
Different Technique	+606	0	-200	-200	14 %	3,028
Different Area	+411	0	-447	-447	8 %	1,806
New Guess	-310	0	+284	+284	43 %	9,668
Totals	+707	0	-293	-293	84 %	18,598

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	1,231	0	1,231
Informed Guesses	8,911	8,456	17,367
Unassessed Range	782	2,885	3,666
Totals	10,923	11,341	22,264

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Alitash National Park	NP	O	D	2015	20		Ali, pers. comm., 2016	1	2,600	35.8˚E	12.3˚N
Babille Elephant Sanctuary	NG	O	D	2015	250		Ali, pers. comm., 2016	1	6,982	42.5˚E	8.6˚N
Chebera Churchura National Park	NG	O	D	2015	420		Ali, pers. comm., 2016	1	3,160	36.7˚E	6.9˚N
Dabus Valley Controlled Hunting Area	NG	O	D	2015	20		Ali, pers. comm., 2016	1	2,127	35.1˚E	10.6˚N
Gambella	DT	AS	D	2015	606		Mònico & Schapira, 2015	1	19,366	34.1˚E	7.6˚N
Geralle National Park	NP	O	D	2015	50		Ali, pers. comm., 2016	1	4,212	40.1˚E	4.5˚N
Kafta-Sheraro National Park	NG	O	D	2015	300		Ali, pers. comm., 2016	1	1,130	37.2˚E	14.2˚N
Mago National Park	DA	O	D	2015	80		Ali, pers. comm., 2016	1		36.2˚E	5.6˚N
Mizan Teferi Controlled Hunting Area	NG	O	D	2015	20		Ali, pers. comm., 2016	1	3,160	35.7˚E	7.4˚N
Omo National Park	DA	O	D	2014	411		Chase et al., 2014	1	3,146	35.7˚E	5.7˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

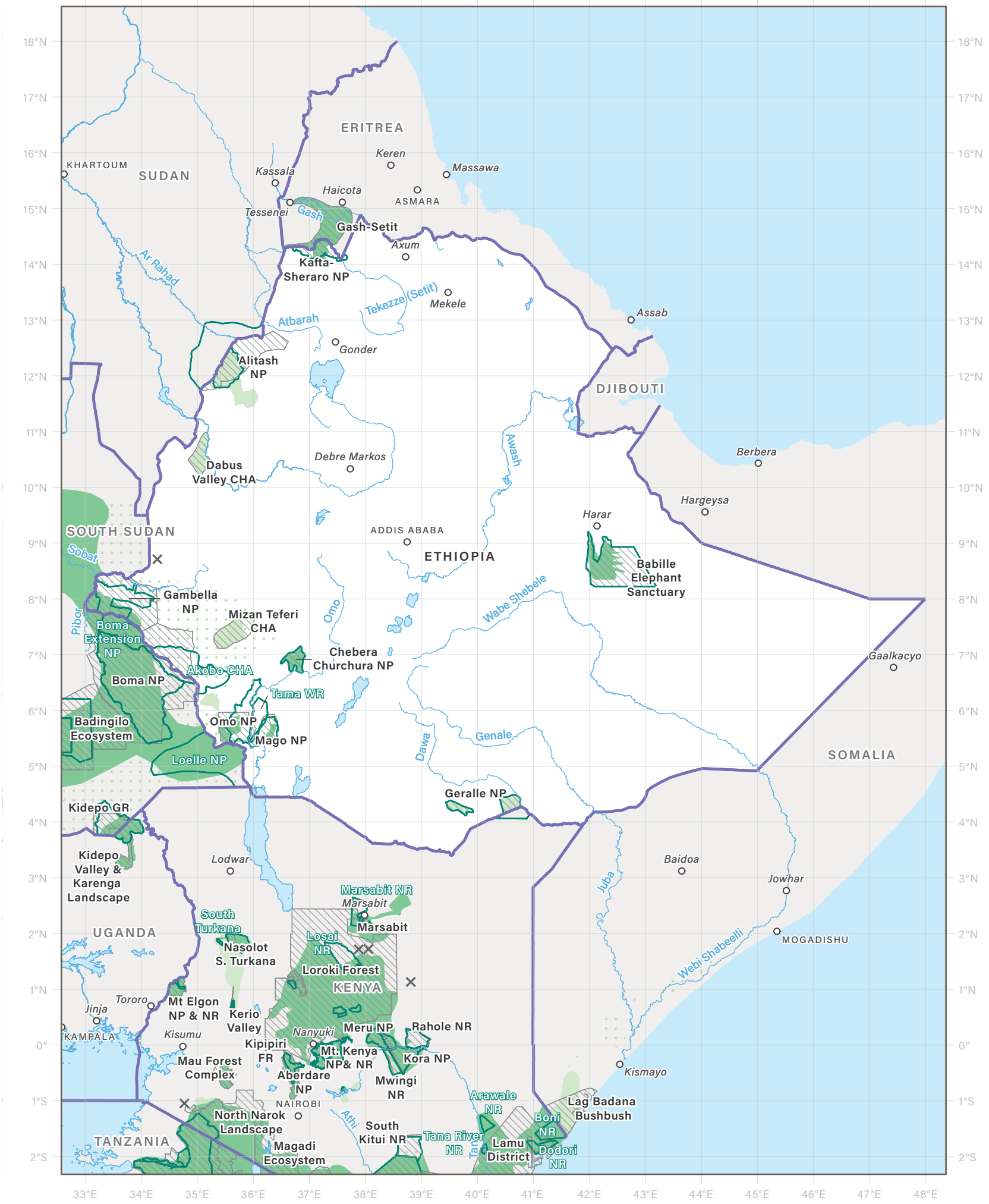
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Ethiopia



0 100 200 300 400 500 600km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Kenya

ESTIMATED TOTAL ELEPHANTS

22,809 ± 0

GUESSES

8,023 - 8,090

GENERAL STATISTICS

Country Area	582,650 km²
Range Area	130,725 km² (22%)
Protected Range	27%
Information Quality Index (IQI)	0.59
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

There was an upsurge in poaching between 2008 and 2012, particularly in Laikipia-Samburu and Tsavo. This had reduced by 2014-15 due to improved law enforcement, and increased penalties for illegal killing of endangered species, including elephants laid out in a new Wildlife Conservation and Management Act (Republic of Kenya, 2013).

In 2012, Kenya adopted the Conservation and Management Strategy for the Elephant in Kenya, 2012 -2021 (Litoroh et al., 2012).

In analyses of seizure data in ETIS, prepared for CITES, Kenya was identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Kenya was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan, which was submitted to CITES in 2015, and is now in the process of being implemented (CITES, n.d.-a).

In July 2011, Kenya destroyed approximately 5 tonnes of ivory from its national stockpile (BBC News, 2011). In February 2015, Kenya destroyed approximately 15 tonnes of ivory from its national stockpile (BBC News, 2015a) and in April 2016 destroyed a further 105 tonnes of ivory (Gettleman, 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Kenya is 22,809 at the time of the last survey for each area. There may be an additional 8,023 to 8,090 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 104,711 km^2, which is 80% of the estimated known and possible elephant range. There remains an additional 20% of the estimated range for which no elephant population estimates are available.

Since the AESR 2007, a decrease of about 1,200 elephants has been recorded in population estimates from surveys and an increase of about 1,500-2,400 in guesses. This is largely because of the degrading of data quality from old forest surveys, rather than any real population changes. There was an increase of about 1,100 elephants in areas where repeat surveys had been carried out.

Tsavo National Park and its surrounding areas have the largest elephant population in Kenya. Total and sample aerial counts were carried out nearly simultaneously in 2014 as part of the Great Elephant Census. The **aerial sample count** gave an estimate of 14,087 ± 21% (Chase et al., 2014b) compared to the aerial total count of 11,158 (Kyale et al., 2014). Although sample counts generally give more accurate results than total counts, the total count has been used for consistency with previous estimates. This replaces an estimate from an aerial total count in 2005 of 10,397 elephants (Omondi & Bitok, 2005). An aerial total count was also carried out in 2011, which gave an estimate of 12,182 (Ngene et al., 2013b).

At the end of 2015, there were 1,656 **individually registered** elephants in the Amboseli ecosystem (Fishlock, pers. comm., 2016) compared to 1,417 at the end of 2005 (Poole, pers. comm., 2006). This apparent stability conceals substantial drought mortality in 2009 followed by rapid growth – there has been very little poaching. An aerial total count in 2013 gave an estimate of 1,281 (Kenana et al., 2013) and aerial sample count in 2014 gave an estimate of 1,736 ± 77% (Chase et al., 2014b).

There has been an increase in the number of elephants seen in the Magadi area (which includes part of the Nguruman Hills) together with an expansion of range. Four hundred and forty nine elephants were counted in 2013 in an **aerial total count** (Kenana et al., 2013). This replaces a guess of 120-150 for the Ngurumans from 2005 (Mwathe et al., 2006).

An **aerial total count** of the Masai Mara ecosystem was carried out in 2014 as part of the Great Elephant Census (Mduma et al., 2014) giving an estimate of 1,428 elephants. This replaces a comparable estimate of 2,116 from 2002. However, there was another aerial total count in 2010 which gave a surprisingly high estimate of 3,069 (Kiambi et al., 2012). There were high levels of illegal killing in the Mara ecosystem, which peaked in 2012 (Poole et al., 2016). Elephants move between the Masai Mara and Serengeti National Park in Tanzania (Poole et al., 2016).

The elephants in the TransMara forests to the west of the Masai Mara have come under severe pressure as a result of deforestation and their range has reduced. It is now guessed that there are only 100 elephants in the area (Sitati, pers. comm., 2016) compared to an informed guess of 513 ± 49 from a dung count carried out in 2007 (Sitati & Bitok, 2007). This new **informed guess** replaces one of 200 ± 139 from 1997 (Wamukoya et al., 1997).

There is no new information on elephant numbers from the Mau Forest Complex to the north of the Masai Mara and a guess of 1,003 from the early 1990s has been retained but its reliability degraded due to age (Njumbi et al., 1995). It is likely that there has been a significant reduction in elephant numbers in this area, due to parts of the forest being converted to agriculture.

An **aerial total count** of the Laikipia-Samburu ecosystem was carried out in 2012 which gave an estimate of 6,365 elephants (Ngene et al., 2013a). This replaces another total count estimate of 5,447 from 2002 (Omondi et al., 2002a), although the population estimate had risen to 7,415 in 2008 (Litoroh et al., 2010). The decline between 2008 and 2012 was associated with high reported poaching levels from 2008 to 2014 as well as a drought in 2009 (Ngene et al., 2013a). A combined total and sample count was carried out as part of the Great Elephant Census in 2015, giving an estimate of 7,134 ± 786 (Chase et al., 2014b). However, this survey differed both in methodology and area from previous surveys of the ecosystem, so is not directly comparable.

The old estimate for Loroki Forest, which is part of the Laikipia-Samburu ecosystem, has been replaced by a **other guess** of zero (Thouless, pers comm., 2016) since most of the elephants present in the forest in the dry season would probably have been counted in the wet season surveys of surrounding areas.

Range expansion has taken place in the north-east of the Laikipia-Samburu ecosystem, linked to the development of community based conservation and the recovery of elephants from the poaching of the 1970s to 1980s, which eliminated them from the area (Douglas-Hamilton, pers. comm., 2016b).

A **dung count** was carried out of Mt Marsabit in 2014, giving an estimate of 100 (72–139) elephants (Kiambi et al., 2014). This replaces an informed guess of 150 (Omondi, pers. comm., 2006). Eighty six elephants were counted in an aerial total count in 2012 (Ngene et al., 2013a) and 55 were seen in an aerial total count carried out as part of the Great Elephant Census in 2015 (Chase et al., 2016).

An **aerial total count** was carried out of the core of the Meru ecosystem in 2015 as part of the Great Elephant Census, giving an estimate of 659 animals (Chase et al., 2016). This replaces an estimate of 377 from an aerial total survey in 2002 (Omondi et al., 2002c) although an aerial total count in 2007 gave a total of 747 elephants (Mwangi et al., 2007). It is unlikely that there are significant numbers of elephants left in Kora National Park and Rahole National Reserve but there is a new **guess** of zero (Kiambi, 2016) and an estimate of 27 from 2007 (Mwangi et al., 2007) for these areas.

No detailed survey of the Mt Kenya National Park and Forest Reserve has been carried out since the **dung counts** carried out by Vanleeuwe (2004) which gave an estimate of 2,911 ± 640. This figure is being retained, in preference to a survey from 2009 (Ngoru et al., 2009), which was probably an over-estimate since reconnaissance data was analysed as line transect data. There has never been a full survey of the Aberdares National Park and the surrounding forests, including the Kipipiri Forest Reserve and the combined estimate of 3,553 from the AESR 2007 has been retained (Bitok & Kones, 2005) although this is also likely to be an over-estimate for the same reason as the 2009 Mt Kenya survey.

An **aerial total count** of the small fenced population of elephants in the Mwea National Reserve was carried out as part of the Great Elephant Census in 2016, giving an estimate of 71 elephants (Chase et al., 2016), replacing a ground count estimate of 55 from 1998 (Managene & Musoki, 1998). Another aerial total count in 2012 found 90 elephants (Ngene et al., 2012).

There are a number of small coastal elephant populations, which are difficult to count because they inhabit densely forested areas. An **aerial total count** of Shimba Hills National Reserve, Mkongani Forest Reserve and Mwaluganje Elephant Sanctuary was carried out in 2012, giving an estimate of 274 individuals (Ngene & Mukeka, 2012). This replaces an estimate of 649 ± 151 from a dung count carried out in 2002 (Litoroh, 2002a). One hundred and fifty elephants were translocated out of the Shimba Hills to Tsavo NP after the 2002 survey (Pinter-Wollman et al., 2009).

The Arabuko-Sokoke Forest Reserve is now fenced. The old estimate of 184 ± 43 from a dung count carried out in 2002 has been retained but degraded due to age (Litoroh, 2002b).

A small population of elephants lives in Lamu District along the lower reaches of the Tana River and be-tween the river and the Somali border. An **aerial total count** was carried out as part of the Great Elephant Census in 2015 (Chase et al., 2016) and 60 elephants were counted. However, it is difficult to count elephants in thick woodland, so there may be more elephants here. This replaces a series of guesses amounting to 182 elephants (Knocker, pers. comm., 2003, 2005; Litoroh, pers. comm., 2003). At least one elephant has moved from this area to just across the border in Somalia (Douglas-Hamilton, pers. comm., 2016a).

A **total aerial count** was carried out of the Kerio Valley, and the Nasalot and South Turkana National Reserves in western Kenya in 2015 (Chase et al., 2016). Three hundred and eleven elephants were seen in the Kerio Valley and 351 in South Turkana (total 662). This replaces an estimate of 490 for the whole area in 2002 (Omondi et al., 2002b). Another total aerial count in 2010 gave an estimate of 362 elephants (Edebe et al., 2010). Since the area between South Turkana NR and the Kerio Valley is heavily settled, and no elephants have been seen here in recent surveys, it has been changed to **possible range**.

No systematic surveys have been carried out in the Mt Elgon forests bordering Uganda since the last update. However there are currently thought to be about 200 elephants (Redmond, 2015), compared to a guess of 139 from 2002 (Bitok, pers. comm., 2002).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	21,153	—	—	—	70 %	91,227
Individual Registrations	1,656	—	—	—	3 %	3,553
Informed Guesses	0	—	372	439	3 %	4,465
Degraded Data	—	—	7,651	7,651	4 %	5,466
Totals 2015	**22,809**	**0**	**8,023**	**8,090**		
Totals 2006	**23,994**	**641**	**6,012**	**7,000**		
Assessed Range					80 %	104,711
Unassessed Range					20 %	26,014
Total Range					100 %	130,725

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+1,142	0	0	0	56 %	72,559
New Population	+89	0	0	0	1 %	1,539
Different Technique	+779	0	-513	-476	8 %	10,548
Different Area	-6	0	-100	-100	8 %	11,021
New Guess	-94	0	-60	-60	3 %	3,577
Data Degraded	-3,095	±641	+3,095	+2,137	0 %	0
Totals	-1,185	±641	+2,422	+1,501	76 %	104,711

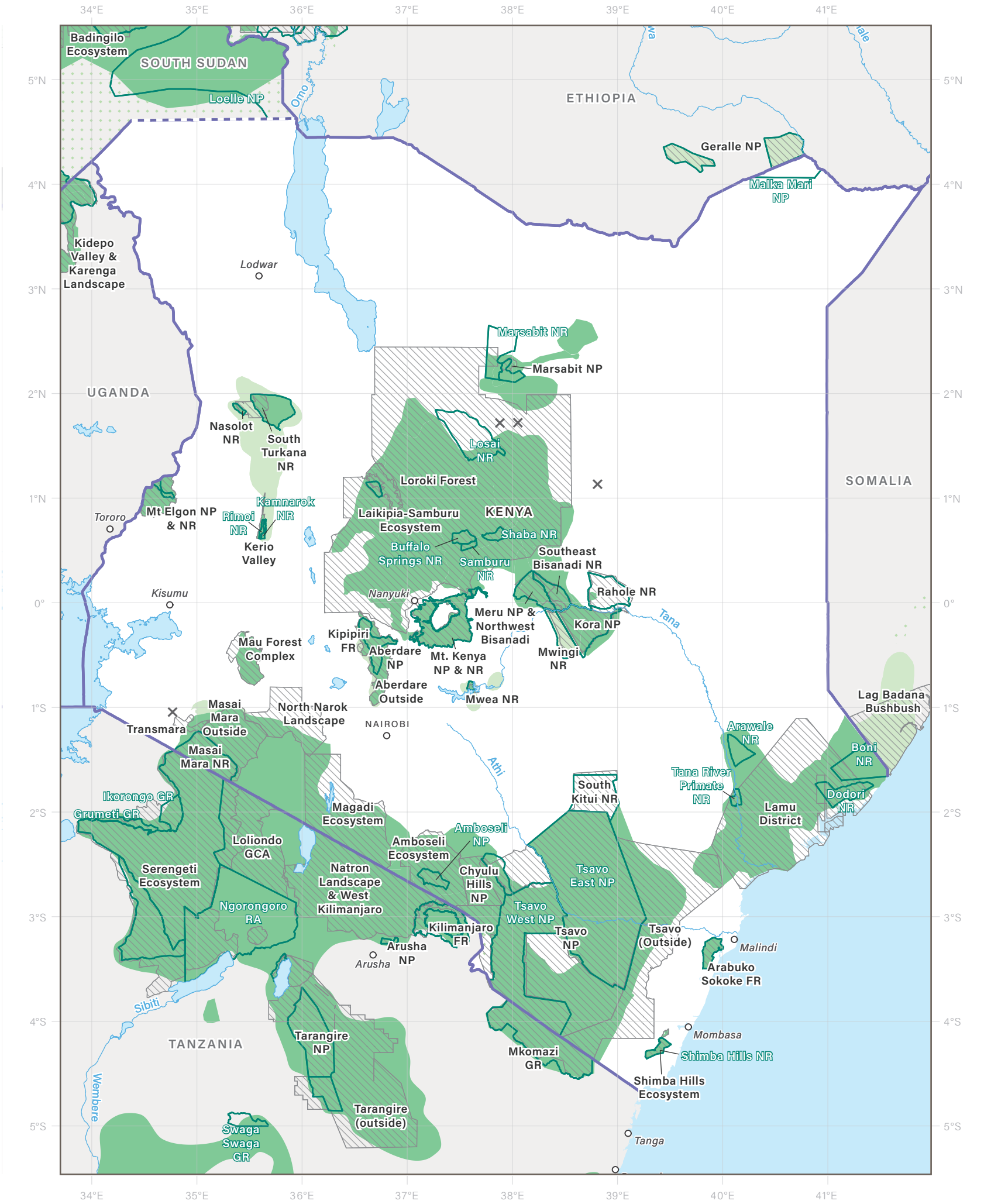
AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	93,803	977	94,780
Informed Guesses	4,465	0	4,465
Other Guesses	5,423	43	5,466
Unassessed Range	20,247	5,767	26,014
Totals	123,937	6,787	130,725

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km^2)	LON.	LAT.
Aberdares											
Aberdare National Park	-	O	E	2005	1,840	461*	Bitok & Kones, 2005	2	767	36.7˚E	0.4˚S
Aberdare Outside	-	O	E	2005	1,700	472*	Bitok & Kones, 2005	2	663	36.7˚E	0.6˚S
Kipipiri Forest Reserve	-	O	E	2005	13	25*	Bitok & Kones, 2005	3	43	36.6˚E	0.4˚S
Amboseli Ecosystem	DT	IR	A	2015	1,656		Fishlock, pers. comm., 2016	2	5,547	37.3˚E	2.5˚S
Arabuko Sokoke Forest Reserve	-	DC	E	2002	184	43	Litoroh, 2002b	3	415	39.9˚E	3.3˚S
Kerio Valley	RS	AT	A	2015	311		Chase et al., 2016	3	122	36.7˚E	0.6˚N
Laikipia-Samburu Ecosystem	RS	AT	A	2012	6,365		Ngene et al., 2013a	1	35,247	37.3˚E	1.0˚N
Lamu District	DA	AT	A	2015	60		Chase et al., 2016	1	15,363	36.7˚E	0.6˚N
Loroki Forest	NG	O	D	2015	0		Thouless, pers. comm., 2016	2	596	36.8˚E	1.1˚N
Magadi Ecosystem	DT	AT	A	2013	449		Kenana et al., 2013	2	6,348	36.9˚E	2.4˚S
Mara Ecosystem											
Masai Mara National Reserve	RS	AT	A	2014	876		Mduma et al. 2014	2	1,509	35.6˚E	1.3˚S
Masai Mara Outside	RS	AT	A	2014	532		Mduma et al. 2014	2	1,978	35.6˚E	1.3˚S
North Narok Landscape	NP	AT	A	2014	20		Mduma et al. 2014	2	310	35.9˚E	1.1˚S
Transmara	DT	O	D	2015	100		Sitati, pers. comm., 2016	3	320	34.9˚E	1.2˚S
Marsabit	DT	DC	D	2014	100	39	Kiambi et al., 2014	3	137	38.0˚E	2.3˚N
Mau Forest Complex	-	DC	E	1995	1,003		Njumbi, et al., 1995	2	1,267	35.5˚E	0.5˚S
Meru Ecosystem											
Kora National Park	NG	O	D	2014	0		Kiambi, 2016	2	1,618	38.7˚E	0.2˚S
Meru National Park and Northwest Bisanadi	DT	AT	A	2015	659		Chase et al., 2016	2	1,005	36.7˚E	0.6˚N
Mwingi National Reserve	RS	AT	A	2007	0		Mwangi et al., 2007	3	682	37.6˚E	0.1˚N
Rahole National Reserve	NP	AT	A	2007	27		Mwangi et al., 2007	2	1,477	37.6˚E	0.1˚N
Southeast Bisanadi National Reserve	DT	O	D	2014	0		Kiambi, 2016	3	593	38.4˚E	0.1˚N
Mt Elgon National Park & National Reserve	NG	O	D	2015	200		Redmond, pers. comm., 2015	2	1,083	34.6˚E	1.0˚N
Mt Kenya National Park & National Reserve	-	DC	E	2001	2,911	640	Vanleeuwe, 2004	2	2,007	37.4˚E	0.2˚S
Mwea National Reserve	DA	AT	A	2015	71		Chase et al., 2016	4	79	36.7˚E	0.6˚N
Nasolot and S. Turkana	RS	AT	A	2015	351		Chase et al., 2016	3	581	36.7˚E	0.6˚N
Shimba Hills Ecosystem	DT	AT	A	2012	274		Ngene & Mukeka, 2012	3	274	39.4˚E	4.3˚S
Tsavo Ecosystem											
Chyulu National Park	NP	AT	A	2014	42		Kyale et al., 2014	3	1,180	38.5˚E	2.9˚S
South Kitui National Reserve	RS	AT	A	2014	0		Kyale et al., 2014	2	1,930	38.5˚E	2.9˚S
Tsavo National Park	RS	AT	A	2014	9,504		Kyale et al., 2014	1	20,432	38.5˚E	2.9˚S
Tsavo (Outside)	RS	AT	A	2014	1,612		Kyale et al., 2014	1	21,081	38.5˚E	2.9˚S

Kenya



0 50 100 150 200 250 300km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Rwanda

ESTIMATED TOTAL ELEPHANTS

88 ± 0

GUESSES

37 - 37

GENERAL STATISTICS

Country Area	26,340 km²
Range Area	1,079 km² (4%)
Protected Range	100%
Information Quality Index (IQI)	0.70
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Rwanda is one of Africa's smallest and most densely populated nations and there is little space for wildlife. Only two fragments of elephant range remain: the Akagera National Park on the north-eastern border with Tanzania, to which elephants were translocated in the mid-1970s, and the Volcans National Park on the northern border with the DRC. In 2010, the African Parks Network took over responsibility for the management of Akagera NP (Sullivan, 2014).

Rwanda published an elephant conservation plan in 1991, although this is now 25 years out of date (Office Rwandais du Tourisme et des Parcs Nationaux, 1991).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years and at the time of the last survey in Rwanda is 88. There may be an additional 37 elephants in an area not systematically surveyed. This guess likely represents a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 1,079 km², which is the entirety of the estimated known and possible elephant range.

There have been minor changes in elephant population estimates in Rwanda since AESR 2007. The Akagera population appears to be stable or increasing, although survey methodologies have not been consistent.

After the elephant population of Akagera NP in eastern Rwanda was eliminated in the early 1960s, 22 elephants were translocated to Akagera NP from Bugusera, south of Kigali (Van de Weghe, 1990). The number of elephants subsequently increased, despite a reduction in the size of the park. The most recent survey, an **aerial total count** carried out in 2013 (Macpherson, 2013a), provided an estimate of 88 individuals. This replaces a guess of 34-80 from 2002 based on an aerial sample count (Lamprey, 2002). A sample count in 2010 gave an estimate of 27 individuals (Viljoen, 2010). A dung count was also conducted in 2006 (Parker, 2006); the elephant population estimate for the lakeside stratum was 28 (17-45). Due to a low dung encounter rate, it was not possible to calculate dung density and elephant numbers for the highland stratum. Elephants used to move between Akagera and Ibanda, Burigi and Biharamulo in Tanzania, but their passage was restricted by high levels of refugee settlement on the Tanzanian side starting in the mid-1990s (TAWIRI, 2015c) and it is unlikely that such movements continue.

The estimate of 37 for the Volcans NP has been retained (Gray, pers. comm., 2005) but degraded due to age. The range has been left as known because of recent reports that there are still elephants (Kanyesigye, 2013), and confirmed records just across the border in Virunga NP in DRC.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	88	—	—	—	78 %	840
Degraded Data	—	—	37	37	21 %	226
Totals 2015	**88**	**0**	**37**	**37**		
Totals 2006	**34**	**0**	**37**	**83**		
Assessed Range**					99 %	1,066
Unassessed Range					1 %	13
Total Range					100 %	1,079

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Technique	+54	0	0	-46	78 %	840
Data Degraded	0	0	0	0	0 %	0
Totals	+54	0	0	-46	78 %	1,066

AREA OF RANGE COVERED BY EACH DATA CATEGORY

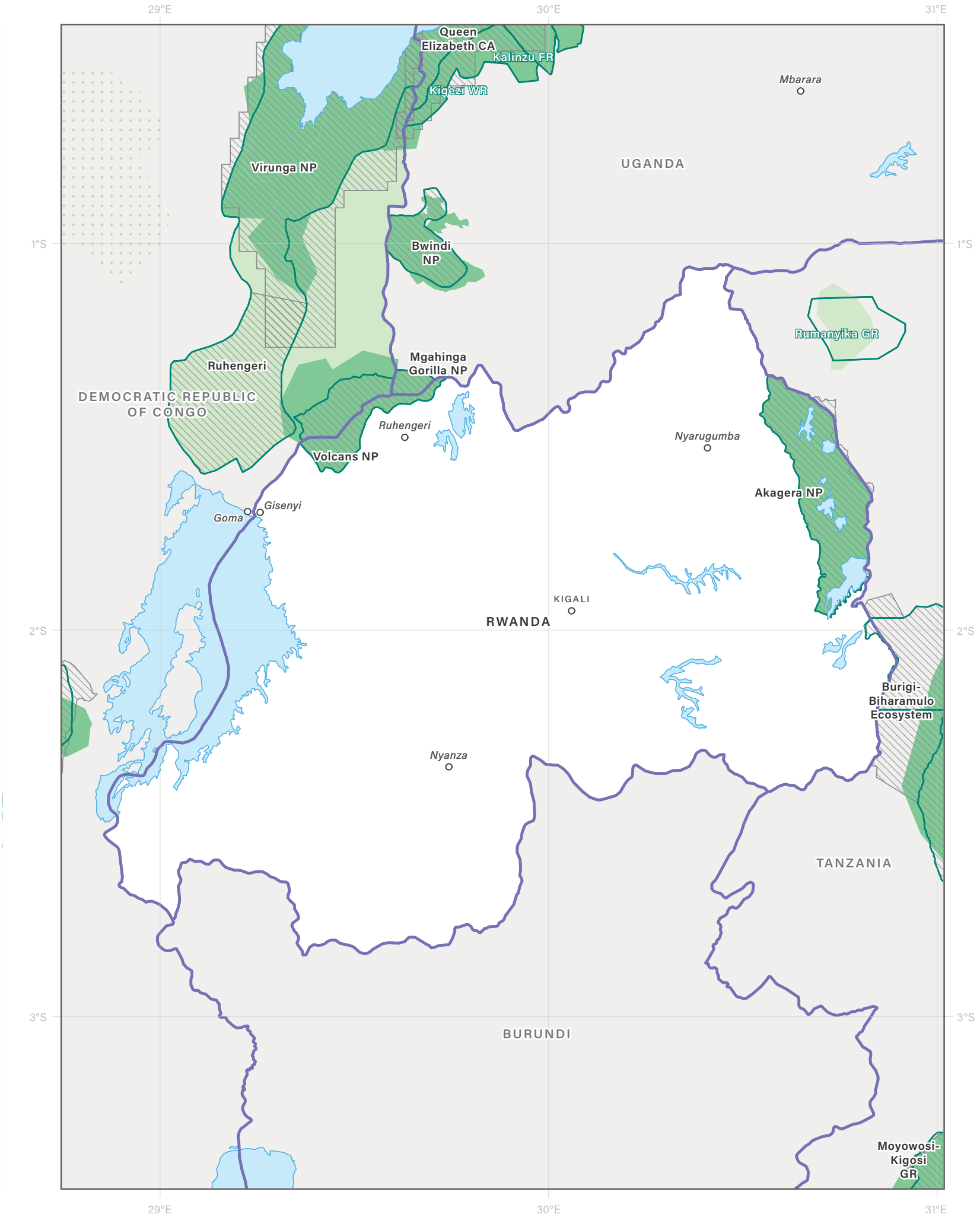
DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	840	0	840
Other Guesses	226	0	226
Unassessed Range	13	0	13
Totals	1,079	0	1,079

***This country is known to have 100% assessed range. Differences in table values exist due to minor variations between map layers.*

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Akagera National Park	DT	AT	A	2013	88		Macpherson, 2013a	1	1,087	30.7˚E	1.7˚S
Volcans National Park	-	O	E	2003	37		Gray, pers. comm., 2005	1	150	29.5˚E	1.5˚S

Rwanda



0 15 30 45 60 75 90km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Somalia

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

70 - 70

GENERAL STATISTICS

Country Area	637,660 km²
Range Area	4,525 km² (1%)
Protected Range	0 %
Information Quality Index (IQI)	0.00
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Ongoing political instability in Somalia has made conservation assessment work impossible for over 25 years, and it is not known whether there is still a resident elephant population in the country.

It has been suggested that the Al-Shabaab insurgents derive much of their income from the illegal ivory trade. However, a detailed review in 2015 indicated that any Al-Shabaab involvement in the ivory trade is likely to have been opportunistic, ad hoc and small-scale (Maguire & Haenlein, 2015). Ivory was reported to be openly for sale in Mogadishu in 2015 (Amir, pers. comm., 2016).

Somalia published an elephant conservation plan in 1991 (National Range Agency, 1991) and it has not been updated since.

NUMBERS AND DISTRIBUTION

It is unknown whether there is still a resident elephant population in Somalia. There may be 70 elephants in areas not systematically surveyed. This guess applies to 3,089 km², which is 68% of the estimated known and possible elephant range. There remains an additional 32% of the estimated range for which no elephant population estimates are available.

There is only one area, in the far south of the country and adjacent to the border with Kenya, which remains categorised as possible range while the Juba and Webi Shabeelli valleys remain as doubtful range.

NUMBERS AND DISTRIBUTION
CONT.

The only estimate remaining, for Lag Badana-Bushbush (Bauer, pers. comm., 1995), has already been degraded to the category of 'other guess'. Local residents reported in 2016 that elephants were regular visitors to the area, but not resident (Amir et al., 2016). A collared elephant from Kenya moved briefly into the border regions of Somali in 2016 (Douglas-Hamilton, pers. comm., 2016a). Press reports in 2015 suggested that security operations in the Boni-Dodori area of Kenya had driven elephants north into Somalia (Mohamed, 2015).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Degraded Data	—	—	70	70	68 %	3,089
Totals 2015	**0**	**0**	**70**	**70**		
Totals 2006	**0**	**0**	**70**	**70**		
Assessed Range					68 %	3,089
Unassessed Range					32 %	1,436
Total Range					100 %	4,525

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Lag Badana Bushbush	-	O	E	1995	0	70	Bauer, pers. comm., 1995	1	4,500	41.7˚E	1.1˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS´ denotes a repeat survey that is not statistically comparable for reasons such as different season); — : No Change

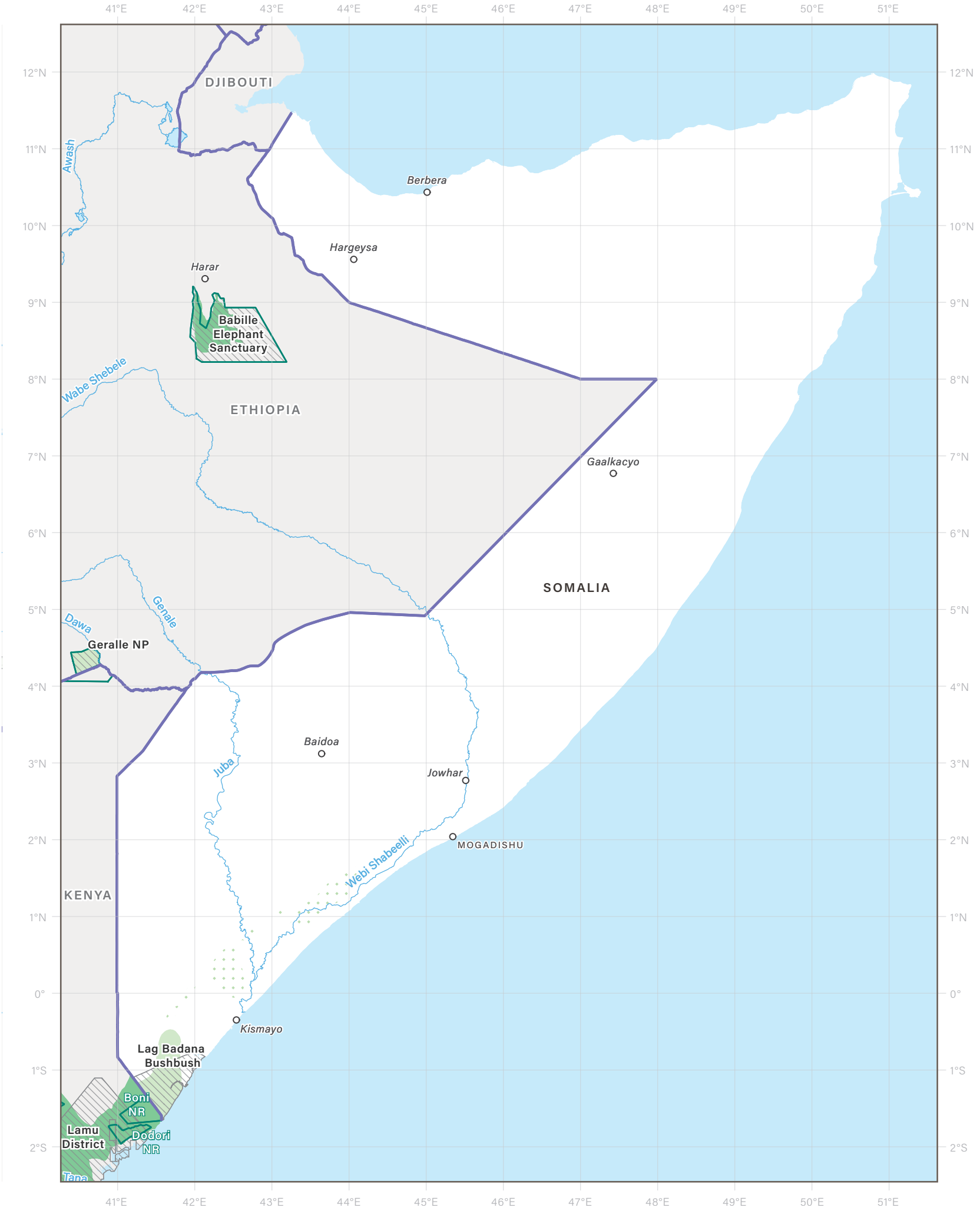
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Somalia



0 70 140 210 280 350 420km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

South Sudan

ESTIMATED TOTAL ELEPHANTS

7,103 ± 5,911

GUESSES

0 - 0

GENERAL STATISTICS

Country Area	619,745 km²
Range Area	309,811 km² (50%)
Protected Range	26%
Information Quality Index (IQI)	0.23
CITES Appendix	N/A
Listing Year	-

CURRENT ISSUES

South Sudan acquired its independence from Sudan in 2011, after a long running civil war which ended in 2005. Efforts were made by the new country to develop a conservation programme and to support protected areas, but these were suspended when a new civil war broke out in 2013. A series of surveys, which took place from 2007-2010, gave hope that more elephants had survived than was previously thought, but there may have been a reduction in numbers thereafter. A third of the 60 elephants collared by the Wildlife Conservation Society from 2010 were believed to have been poached (Russo, 2014).

An elephant conservation plan was developed for Sudan in 1991 (Winter, 1991), but this has not been updated or replaced and there is no current plan for South Sudan.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in South Sudan is 7,103 ± 5,911 at the time of the last survey for each area. This estimate applies to 129,362 km², which is 42% of the estimated known and possible elephant range. There remains an additional 58% of the estimated range for which no elephant population estimates are available.

In the AESR 2007, no survey results were reported for Sudan except for a guess for Nimule National Park, so there is no information on change in numbers. Results from the 2007-2010 aerial surveys have allowed a more accurate delineation of range in the eastern part of the country. There is less certainty about range in the west since the surveys were less extensive in this area. With the

outbreak of civil war in late 2013, further survey work was no longer possible, and the planned surveys supported by the Great Elephant Census could not be carried out.

The largest surviving elephant population is in the Jonglei ecosystem, covering the Sudd swamplands of the White Nile. A low-intensity **aerial sample count** in 2007 gave an estimate of 5,462 ± 5,644 elephants (Fay et al., 2007). A sample count was carried out in 2010 of Shambe, a previously unsurveyed area to the south-east of the Sudd. Only five elephants were seen in transects so no estimate was given, but a total of 135 elephants was observed and entered as an **informed guess** (Grossman et al., 2011).

Boma National Park is in the south-east of the country, close to the Ethiopian border. An **aerial sample count** in 2007 gave an estimate of 606 ± 836 elephants (Fay et al., 2007). Radio-collared elephants have moved between Gambella National Park in Ethiopia and the area immediately north of Boma (Rolkier, 2015) and it is possible that elephants have been double-counted on both sides of the border. No elephants were observed in the Badingilo ecosystem to the west during the 2009 survey, but there were many tracks, suggesting that elephants use this area in the wet season (Grossman et al., 2011).

A few elephant signs were seen in 2008 in the Kidepo Game Reserve on the Ugandan border, suggesting that the elephants from this principally Ugandan population occasionally cross the border (Grossmann et al., 2008).

Nimule National Park is a small park on the White Nile, contiguous with the Ugandan border. A total aerial count in 2008 gave a minimum of 69 elephants (Grossmann et al., 2008), and a **dung count** from 2010-2012 indicated a population of 118 (47 to 297) (Tomor, 2015). This dung count replaces the 300 estimated in 2002 (Ojok, pers. comm., 2002) for the AESR 2007. Elephants move from here to the Otze Forest in Uganda (Tomor, 2015).

Southern National Park is in the south-west of the country. An **aerial sample count** in 2007 gave an estimate of 782 ± 1,425 elephants (Fay et al., 2007). This shows a significant reduction from the estimated 15,000 elephants in the area in the late 1970s (Boitani, 1981).

There have been recent camera trap photographs of what appear to be forest elephants in Western Equatoria (Flora & Fauna International, 2015). This is shown on the range map as a point record, with an approximate location.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	6,850	5,911	—	—	35 %	109,417
Reliable Dung Counts	118	—	—	—	0 %	132
Informed Guesses	135	—	0	0	6 %	19,813
Totals 2015	**7,103**	**5,911**	**0**	**0**		
Totals 2006	**20**	**0**	**280**	**280**		
Assessed Range					42 %	129,362
Unassessed Range					58 %	180,449
Total Range					100 %	309,811

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	+6,985	±5,911	0	0	42 %	129,230
Different Technique	+98	0	-280	-280	0 %	132
Totals	+7,083	±5,911	-280	-280	42 %	129,362

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	95,130	14,419	109,549
Informed Guesses	19,813	0	19,813
Unassessed Range	74,975	105,474	180,449
Totals	189,918	119,893	309,811

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE[1]	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS[3]	AREA	MAP LOCATION	
		TYPE[2]	RELIAB.[2]	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Badingilo-Boma Corridor	NP	AS	B	2009	0		Grossmann et al., 2011	2	10,468	33.2˚E	5.9˚N
Badingilo Ecosystem	NP	O	D	2009	0		Grossmann et al., 2011	2	16,897	31.9˚E	5.8˚N
Boma National Park	NP	AS	B	2007	606	836	Fay et al., 2007	1	30,801	34.0˚E	6.7˚N
Jonglei Ecosystem	NP	AS	B	2007	5,462	5,644	Fay et al., 2007	1	70,456	32.9˚E	7.0˚N
Kidepo Game Reserve	NP	AS	B	2008	0		Grossman et al., 2008	2	530	33.4˚E	4.0˚N
Nimule National Park	DT	DC	B	2012	118	179	Tomor, 2015	5	400	32.0kE	3.7˚N
Shambe Area	NP	O	D	2010	135		Grossmann et al., 2011	2	13,610	30.7˚E	7.0˚N
Southern National Park	NP	AS	B	2007	782	1,425	Fay et al., 2007	1	26,711	28.7˚E	6.3˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

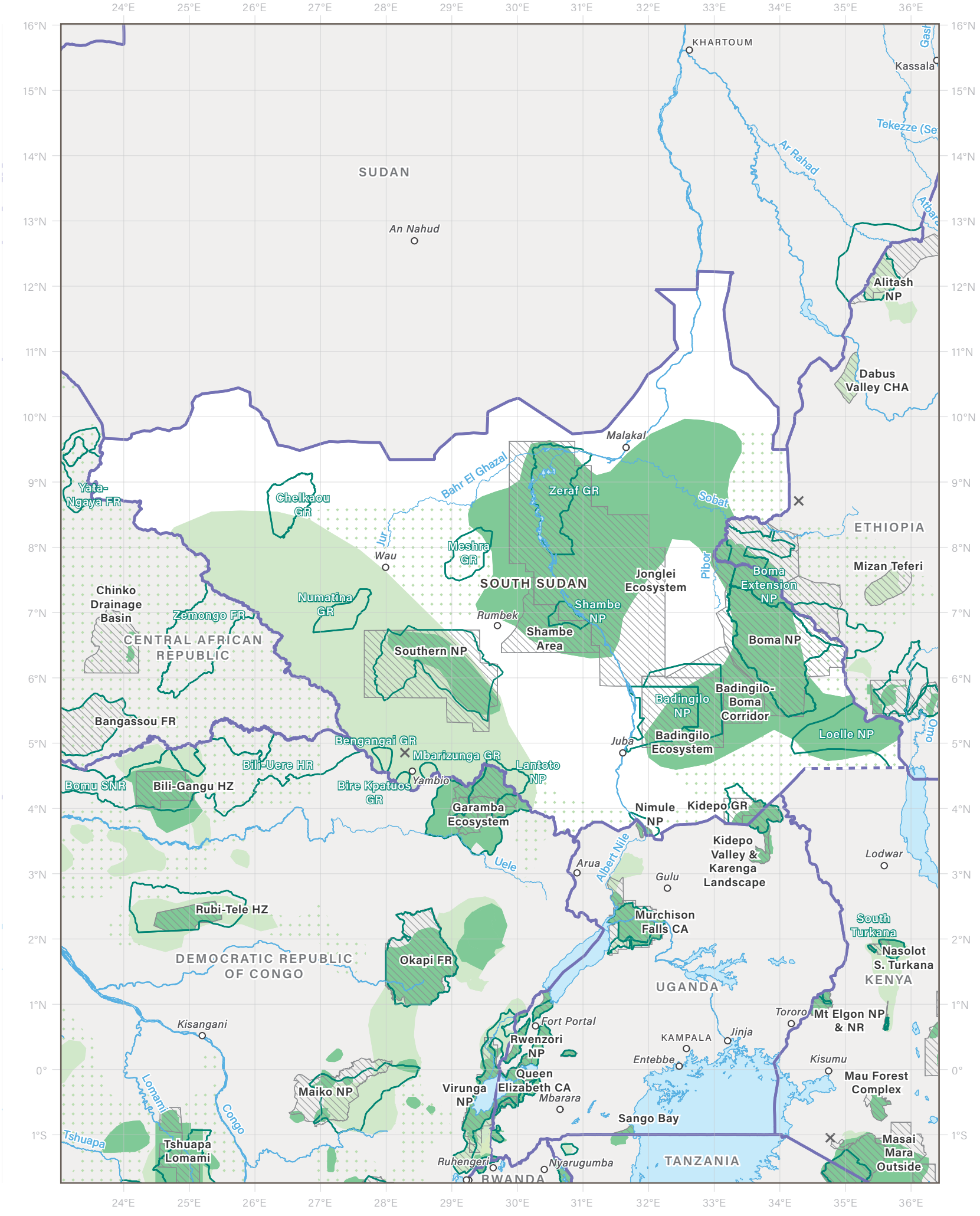
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

South Sudan



0 90 180 270 360 450 540km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

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COUNTRY

Tanzania

ESTIMATED TOTAL ELEPHANTS

50,433 ± 8,502

GUESSES

1,930 - 1,930

GENERAL STATISTICS

Country Area	945,090 km²
Range Area	389,921 km² (41%)
Protected Range	43%
Information Quality Index (IQI)	0.58
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Tanzania still has important elephant populations, a large elephant range and significant coverage of protected areas, despite heavy losses of elephants in the west and south of the country. With a rapidly growing human population, the country faces serious challenges in conserving elephant populations. The loss of connectivity between core wildlife habitat areas is a growing concern as corridors are becoming blocked by expanding agriculture, human settlements and livestock grazing, and destruction of habitats for logging and charcoal production (TAWIRI, 2010).

In response to the poaching crisis, Tanzania adopted a national strategy to combat poaching and illegal wildlife trade in 2014 (Ministry of Natural Resources and Tourism, 2014). The country launched a major anti-poaching operation - Operation Tokomeza, in 2013, which was halted after a few months due to allegations of human rights abuses (Legal and Human Rights Centre, 2015). In 2015 there were significant successes in anti-trafficking efforts, with some arrests of middlemen and poachers (John, 2016; Saria & Tesha, 2016).

Tanzania's most recent conservation plan, the Tanzania Elephant Management Plan, covered the period from 2010 to 2015 (TAWIRI, 2010).

In recent analyses of seizure data in ETIS, prepared for CITES, Tanzania was identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Tanzania was requested by the CITES Standing Committee to prepare a National Ivory Action Plan. The plan was finalized in May 2013, and a number of progress reports have been submitted to CITES (CITES, n.d.-a). Information from DNA analyses have indicated that

CURRENT ISSUES
CONT.

ivory from many large-scale ivory seizures has originated from Tanzania (Milliken et al., 2013; Wasser et al., 2015).

Tanzania is the only country in Eastern Africa with active legal trophy hunting of African elephants, declaring an annual export quota of 400 tusks (as hunting trophies from 200 animals) from 2007 to 2013, and a decreased annual quota of 200 tusks (as hunting trophies from 100 animals) in 2014 and 2015. The United States and the European Union have suspended imports of elephant trophies from Tanzania (EU, 2015; USFWS, 2015b).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Tanzania is 50,433 ± 8,502 at the time of the last survey for each area. There may be an additional 1,930 elephants in areas not systematically surveyed in the country. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 273,031 km^2, which is 70% of the estimated known and possible elephant range. There remains an additional 30% of the estimated range for which no elephant population estimates are available.

Tanzania has lost the majority of its estimated elephant population in the last ten years, with a reduction of more than 90,000 elephants from areas with repeat surveys. Some doubts have been expressed about the previous high estimates, particularly in the Selous and Ruaha-Rungwa ecosystems, but even so, there has been a large decline in numbers as a result of poaching for ivory.

Substantial changes have been made to the range map, primarily resulting from better knowledge coming from survey work done by the Tanzania Mammal Atlas Project (Foley, pers. comm., 2016). These include an increase in **known range** in the Longido area to the north, continuous range between Saadani National Park and Mikumi National Park and an extension of **known range** in the west towards Mahale National Park and south towards Zambia.

A 2014 **aerial sample count** of the Moyowosi-Kigosi ecosystem as part of the Great Elephant Census gave an estimate of 1,645 ± 2,389 (TAWIRI, 2015d), which replaces an estimate of 9,541 ± 3,657 in 2006 (TAWIRI, 2007b). To the south is the Sagara-Nyamagoma ecosystem, and the same survey gave an estimate of 503 ± 592, which replaces the 2007 estimate of 4,635 ± 3,028 (Tanzania Wildlife Research Institute, 2007). For Ugalla Game Reserve the estimate was 659 ± 549, with a very high carcass ratio of 26%, which replaces the 2007 figure of 4,133 ± 1,778 (TAWIRI, 2007b). For areas outside Ugalla Game Reserve, an estimate of 146 ± 278 replaces 1,352 ± 837 (TAWIRI, 2007b). Not all of these areas show a statistically significant decline, but the combined results point to a collapse in elephant numbers.

The 2014 **aerial sample count** of Katavi National Park and Rukwa Game Reserve, part of the Great Elephant Census (TAWIRI, 2015a) gave an estimate of 5,738 ± 2,993 for the entire ecosystem. This estimate replaces one of 6,261 ± 1,344 from 2006 (TAWIRI, 2007b). However, it should be noted that the 'outside' survey covered a larger area in 2014 so this estimate is not directly comparable. Other surveys were carried out in 2009 giving an estimate of 6,396 ± 3,763 (TAWIRI, 2009b) and again in 2012 giving an estimate of 7,107 ± 5,149 (TAWIRI, 2015a). None of these surveys have

provided statistically different estimates, suggesting that the population has been relatively stable over this period. However, the carcass ratio of 10% in 2014 (TAWIRI, 2015a) is a cause for concern.

The 2015 **aerial sample count** of the Ruaha-Rungwa ecosystem gave an estimate of 14,283 ± 6,123 (TAWIRI, 2015f) which replaces the 2006 figure of 35,409 ± 11,507 (TAWIRI, 2007b). A high carcass ratio of 15% supported the evidence of a substantial decline in numbers (TAWIRI, 2015f). Two intermediate surveys were carried out. An aerial sample count conducted in 2013 gave an estimate of 20,090 ± 6,433 (TAWIRI, 2013b), with a carcass ratio of 15%. Another aerial sample count conducted in 2014 as part of the Great Elephant Census gave a much lower estimate of 8,272 ± 3,181 (TAWIRI, 2015f) and a carcass ratio of 29%. This is believed to have underestimated true numbers, as elephants appeared to have moved out of Ruaha-Rungwa to an area in the west which was not surveyed (TAWIRI, 2015f). A survey in 2009 gave an estimate of 34,664 ± 8,188 (TAWIRI, 2009b), indicating that the major decline took place after this date. The 2015 survey also covered the Itigi Extension, which had not previously been surveyed, giving an estimate of 1,553 ± 2,956.

Figures from two areas not surveyed in 2014 have been retained from the AESR 2007. These are a guess of 600 from the Inyonga Game Conservation Area between Rungwa and Rukwa from 2002 (Angelides, pers. comm., 2003) and a guess of 200-300 from the Piti East Hunting Block just to the south of Inyonga from 2002 (Hurt, pers. comm., 2002).

The **aerial sample count** of the Selous-Mikumi ecosystem carried out in 2014 as part of the Great Elephant Census gave an estimate of 14,040 ± 3,252 with a very high carcass ratio of 40% (TAWIRI, 2015b), which replaces the estimate of 70,406 ± 24,843 in 2006 (TAWIRI, 2007a). However, there are concerns that the 2006 survey may have been an over-estimate (TAWIRI, 2009a) and the confidence limits allow for a wide range of population values. Other surveys carried out in 2009 and 2013 gave estimates of 38,975 ± 5,182 with a 2% carcass ratio and 13,084 ± 3,559 with a 30% carcass ratio (TAWIRI, 2009a, 2013a). The combination of a reduction in estimates together with a high carcass ratio indicates that the Selous elephant population has been significantly reduced in the last ten years.

In 2014 there was an estimate of 16 ± 31 from an **aerial sample count** in the Masasi area south of Selous (TAWIRI, 2015b) and 1,161 ± 1,341 in the Selous Niassa corridor (TAWIRI, 2015b) which replace estimates of 1,076 ± 107 from 2000 (Mduma, pers. comm., 2002a) and 0 from 2000 (TAWIRI, 2001) respectively, although somewhat different areas were surveyed. There was an additional estimate for Selous Niassa, of 4,577 ± 1,126, from 2009 (TAWIRI, 2009a).

During the course of an **aerial sample count**, part of the Great Elephant Census, of the Burigi-Biharamulo ecosystem in 2014, no elephants were counted in the sampling strips, but a single observation was made of 110 elephants (TAWIRI, 2015c). This replaces a previous estimate of 761 ± 821 from 2000 (Mduma, pers. comm., 2002b). Another count was carried out in 2012 in which 30 elephants were seen (TAWIRI, 2013a). The area has been under constant threat since 1994, with refugee incursions and invasions by cattle (TAWIRI, 2015c).

An **aerial total count** of Tarangire National Park and surrounding areas in northern Tanzania

was carried out in 2014 as part of the Great Elephant Census, giving an estimate of 3,282 for the Tarangire NP and 797 for surrounding areas (TAWIRI, 2015e). These estimates replace 1,119 for the Tarangire NP and 183 for the surrounding areas from 2006 (TAWIRI, 2007b).

An additional 19 elephants were recorded for Mto wa Mbu, an area which had not previously been counted. The population increase is too high to be explained solely through natural increase, and is probably affected by immigration. Lake Manyara National Park was counted in the same **aerial total count** in 2014 (TAWIRI, 2015e) giving an estimate of 104, which replaces the previous estimate of 36 (TAWIRI, 2007b); there was also a count of 94 in 2009 (TAWIRI, 2009b).

An **aerial total count** of the Serengeti ecosystem was carried out as part of the Great Elephant Census in 2014, giving an estimate of 6,087 (Mduma et al., 2014) replacing the estimate of 1,472 from 2006 (TAWIRI, 2007b). An aerial total count in 2009 gave an estimate of 2,941 (TAWIRI, 2009b). Movement from Kenya's Masai Mara ecosystem may account for some of this increase, as well as higher intensity surveys, additional blocks counted and the possibility of immigration of elephants from unsurveyed adjoining areas. An **aerial total count** of the adjoining Loliondo Game Controlled Area gave a zero estimate in 2009 (TAWIRI, 2009b), compared to one of 88 in 2006 (TAWIRI, 2007b).

An **aerial total count** of the West Kilimanjaro/Lake Natron system, which connects with Amboseli in Kenya, was carried out in 2013 and gave an estimate of 200 elephants (Kenana et al., 2013). This replaces an aerial total count of 79 from 2002 (TAWIRI, 2003). An old guess of 793 for the adjoining Kilimanjaro Forest Reserve has been retained (Munishi & Maganga, 2003).

The Arusha NP elephant population was estimated at 200 individuals in 2014 (TAWIRI, 2015a), and was not in the AESR 2007, so it is recorded as a **new population**.

Mkomazi National Park shares an elephant population with the much larger Tsavo National Park in Kenya, and elephant numbers are affected by movements across the border. In 2014 an **aerial total count** gave an estimate of 59 (Kyale et al., 2014), which replaces a count of 41 from 2005 (Omondi & Bitok, 2005).

A single herd of 30 elephants was seen in the coastal Saadani NP in 2014 (TAWIRI, 2015a), replacing a previous guess of 55 from 1998 (Mduma, pers. comm., 2002b).

Rubondo Island in Lake Victoria has an introduced population of elephants. A **dung count** was conducted in 2014, resulting in an estimate of 102 ± 35 (Mwambola et al., 2016). This replaces a guess of 20 from 2002 (Borner, pers. comm., 2003).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	10,548	—	—	—	14 %	55,562
Aerial Sample Counts	39,745	8,502	—	—	52 %	201,377
Other Dung Counts	0	—	137	137	0 %	188
Informed Guesses	140	—	200	200	2 %	7,255
Degraded Data	—	—	1,593	1,593	2 %	8,649
Totals 2015	**50,433**	**8,502**	**1,930**	**1,930**		
Totals 2006	**136,753**	**27,936**	**2,013**	**2,313**		
Assessed Range					70 %	273,031
Unassessed Range					30 %	116,890
Total Range					100 %	389,921

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-89,504	±28,943	-400	-600	56 %	218,050
New Population	+1,572	±2,956	+200	+200	1 %	2,865
Different Technique	-676	±821	+82	+82	1 %	3,539
Different Area	+2,288	±2,373	0	0	10 %	39,928
Data Degraded	0	0	0	-100	0 %	0
Totals	-86,320	±29,202	-118	-418	68 %	273,031

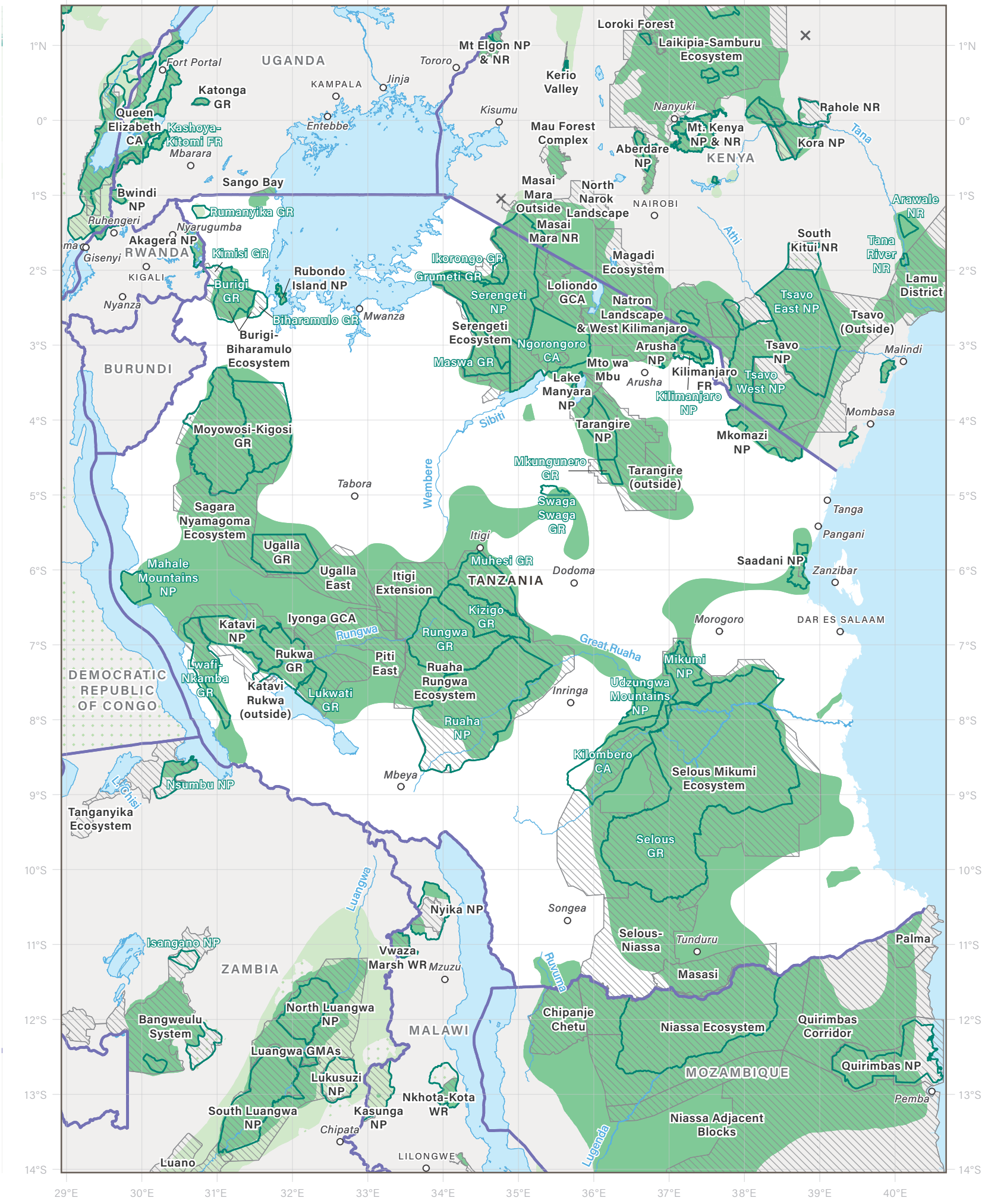
AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	55,562	0	55,562
Direct Sample and Reliable Dung	201,377	0	201,377
Informed Guesses	7,255	0	7,255
Other Dung Counts	188	0	188
Other Guesses	8,649	0	8,649
Unassessed Range	116,639	0	116,890
Totals	389,670	0	389,921

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Arusha National Park	NP	O	D	2014	200		TAWIRI, 2015a	4	322	36.8˚E	3.2˚S
Burigi-Biharamulo Ecosystem	DT	O	D	2014	110		TAWIRI, 2015c	2	4,713	30.9˚E	2.1˚S
Inyonga Game Conservation Area	-	O	E	2002	600		Angelides, pers. comm., 2003	2	6,050	32.8˚E	6.8˚S
Katavi-Rukwa Ecosystem											
Katavi National Park	RS	AS	B	2014	3,128	1,944	TAWIRI, 2015a	2	4,187	31.7˚E	7.2˚S
Katavi Rukwa (Outside)	DA	AS	B	2014	2,488	1,859	TAWIRI, 2015a	2	11,673	31.7˚E	7.2˚S
Rukwa Game Reserve	RS	AS	B	2014	122	131	TAWIRI, 2015a	2	4,092	31.7˚E	7.2˚S
Kilimanjaro Forest Reserve	-	O	E	2003	793		Munishi & Maganga, 2003	3	499	37.2˚E	3.0˚S
Mkomazi Game Reserve	RS	AT	A	2014	59		Kyale et al. 2014	2	3,509	38.3˚E	4.2˚S
Moyowosi-Kigosi Game Reserve	RS	AS	B	2014	1,645	2,389	TAWIRI, 2015d	1	19,520	31.7˚E	5.2˚S
Natron Landscape and West Kilimanjaro	RS	AT	A	2013	200		Kenana et al., 2013	2	10,060	36.7˚E	2.6˚S
Piti East Hunting Block	-	O	E	2002	200	100*	Hurt, pers. comm., 2002	2	2,223	33.3˚E	7.1˚S
Ruaha-Rungwa Ecosystem											
Itigi Extension	NP	AS	B	2015	1,553	2,956	TAWIRI, 2015f	2	2,596	34.3˚E	6.9˚S
Ruaha-Rungwa Ecosystem	RS	AS	B	2015	14,284	6,123	TAWIRI, 2015f	1	50,608	34.3˚E	6.9˚S
Rubondo Island National Park	DT	DC	C	2014	102	35	Mwambola et al., 2016	4	210	31.8˚E	2.3˚S
Saadani National Park	DT	O	D	2014	30		TAWIRI, 2015a	4	2,502	38.8˚E	6.0˚S
Sagara Nyamagoma Ecosystem	RS	AS	B	2014	503	592	TAWIRI, 2015d	2	11,922	31.7˚E	5.2˚S
Selous-Mikumi Ecosystem											
Masasi	DA	AS	B	2014	16	31	TAWIRI, 2015b	2	5,726	37.3˚E	8.9˚S
Selous-Mikumi Ecosystem	RS	AS	B	2014	14,040	3,252	TAWIRI, 2015b	1	83,907	37.3˚E	8.9˚S
Selous-Niassa	DA	AS	B	2014	1,161	1,341	TAWIRI, 2015b	2	16,097	37.3˚E	8.9˚S
Serengeti Ecosystem											
Loliondo Game Controlled Area	RS	AT	A	2009	0		TAWIRI, 2009b	2	5,356	35.0˚E	2.5˚S
Serengeti Ecosystem	RS	AT	A	2014	6,087		Mduma et al., 2014	2	23,660	34.8˚E	2.6˚S
Tarangire Ecosystem											
Lake Manyara	RS	AT	A	2014	104		TAWIRI, 2015e	3	882	36.2˚E	4.0˚S
Mto wa Mbu	NP	AT	A	2014	19		TAWIRI, 2015e	4	191	36.2˚E	4.0˚S
Tarangire National Park	RS	AT	A	2014	3,282		TAWIRI, 2015e	2	2,637	36.2˚E	4.0˚S
Tarangire (Outside)	DA	AT	A	2014	797		TAWIRI, 2015e	2	13,657	36.2˚E	4.0˚S
Ugalla East	RS	AS	B	2014	146	278	TAWIRI, 2015d	2	6,391	31.7˚E	5.2˚S
Ugalla Game Reserve	RS	AS	B	2014	659	549	TAWIRI, 2015d	2	4,857	31.7˚E	5.2˚S

Tanzania



0 80 160 240 320 400 480km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Uganda

ESTIMATED TOTAL ELEPHANTS

4,923 ± 2,012

GUESSES

653 - 653

GENERAL STATISTICS

Country Area	236,040 km^2
Range Area	17,048 km^2 (7%)
Protected Range	73%
Information Quality Index (IQI)	0.51
CITES Appendix	I
Listing Year	1991 (year of accession)

CURRENT ISSUES

Elephant numbers in Uganda were reduced to a very low level by the late 1980s as a result of poaching for ivory and conflict for land with Uganda's dense human population (Uganda National Parks, 1991). Since then elephant populations, which are mostly confined to a small number of protected areas, are believed to have slowly increased.

Elephant poaching is currently at a significantly lower level than it was during the years of civil unrest and insecurity during the late 1970s and early 1980s but an upward trend has been detected in recent years (Harrison et al., 2015).

In recent analyses of seizure data in ETIS, prepared for CITES, Uganda has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Uganda was requested to prepare a National Ivory Action Plan which was finalized in May 2013 and a number of progress reports have been submitted (CITES, n.d.-a).

In 2015, as part of the Elephant Protection Initiative, Uganda developed a draft national strategy for elephant management.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Uganda is 4,923 ± 2,012 at the time of the last survey for each area. There may be an additional 653 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 13,455 km², which is 79% of the estimated known and possible elephant range. There remains an additional 21% of the estimated range for which no elephant population estimates are available.

Although there has been an increase of nearly 1,000 elephants in the estimates for Uganda, confidence limits associated with these surveys are high, and this increase is not statistically significant.

Elephants in Uganda are largely confined to protected areas in the western region of the country, and most are thought to be savanna elephants. Some forest-savanna hybrids have been found in the south-west (Mondol et al., 2015).

An **aerial total count** of Kidepo Valley (including the Kidepo Valley NP and Karenga Community Wildlife Area) in the extreme north-east of Uganda was carried out in 2014, giving an estimate of 621 elephants (Wanyama et al., 2014c). This replaces a total count estimate of 454 from 2005 (Rwetsiba & Wanyama, 2005). Other aerial total counts were con-ducted in 2008 (WCS Flight Programme, 2008) and 2012 (Wanyama, 2012) giving estimates of 387 and 502 respectively. An aerial sample count carried out in 2012 gave an estimate of 656 ± 663 (Wanyama et al., 2014c). In the 1990s, elephants of Kidepo mostly occurred in a single group in the vicinity of the park headquarters, but as numbers have increased, their range has expanded into the Kidepo Valley to the east of the park, and into the Karenga corridor to the south. The range map has been amended and a new area of **known range** was added to show this. There are believed to be movements between Kidepo NP and adjacent range in southern Sudan and, sporadically, into north-western Kenya (Grossmann et al., 2008).

There are still small numbers of elephants in the Otze Forest but they are probably not resident and come from Nimule National Park in South Sudan (Tomor, 2015). A **guess** of six from 2004 (Lamprey, pers. comm., 2015) replaces the earlier guess of 200 from 1998 (Michelmore, pers. comm., 1998).

An **aerial sample count** was conducted in the Murchison Falls Conservation Area (including Murchison Falls National Park) in 2014, resulting in an estimate of 1,352 ± 900 (Wanyama, et al., 2014b). This estimate replaces a comparable one of 516 ± 635 from 2005 (Rwetsiba & Wanyama, 2005). Additional aerial sample count surveys were conducted in 2010 (Rwetsiba & Wanyama, 2010) and 2012 (Rwetsiba et al., 2012) giving estimates of 904 ± 333 and 1,617 ± 1,174 respectively. The majority of elephants are found on the north bank of the Victoria Nile, but there are extensive patches of woodland on the south bank and elephants there may be under-recorded in aerial surveys. Oil exploration has been carried out in the northern part of Murchison Falls NP and some road and well infrastructure has been constructed. In order to study the impact of this development, a number of elephants were fitted with radio-collars (Plumptre et al., 2015a) and the **known range** has been extended to the north-east using information from this study.

The status of elephants in East Madi and the Madi corridor, north of Murchison Falls National Park, is uncertain. An aerial sample survey carried out in 2008 found no elephants in the area (WCS Flight Programme, 2008) but 19 were reported as having been seen in the corridor in 2009 (Edward, 2009). Radio-collared elephants have been recorded moving north from Murchison NP but not as far as East Madi, so this area has been changed to **possible range** (Rwetsiba et al., 2012).

An **aerial sample count** of the Queen Elizabeth Conservation Area (including Queen Elizabeth National Park) was carried out in 2014 giving an estimate of 2,904 ± 1,800 (Wanyama et al., 2014a). This replaces a comparable 2006 estimate of 2,959 ± 1,476. Another sample count was carried out in 2010, giving an estimate of 2,502 ± 1,440 (Plumptre et al., 2010). Total counts were conducted in 2010, 2012 and 2014 giving estimates of 1,570, 3,018 and 2,561 respectively (Plumptre et al., 2010; Wanyama, 2012; Wanyama et al., 2014a). Part of the reason for this variability in numbers may be movements of elephants between Queen Elizabeth NP and Virunga National Park across the border in the DRC. This has been demonstrated by movements of elephants fitted with radio collars in Virunga NP in 2015 (Douglas-Hamilton, pers. comm., 2016b).

An aerial total count was carried out in the Toro Semliki Wildlife Reserve in 2013, giving a minimum estimate of 27 elephants (Wanyama, 2013) and the UWA provides an **informed guess** of 27 (Uganda Wildlife Authority, 2016). This replaces a guess of 80 from 1998 (Michelmore, pers. comm., 1998). Forty- seven elephants were counted in another aerial total count in 2010 (Wanyama, 2013).

There are some new **guesses** from other areas of elephant range in the vicinity of Queen Elizabeth NP, including 11 in the Mgahinga Gorilla National Park and 43 in Bwindi National Park (Uganda Wildlife Authority, 2016). A guess of 30 from the Semliki National Park (Michelmore, pers. comm., 1998) and one of 20 in Rwenzori National Park (Keigwin, pers. comm., 2005) have been retained from the AESR 2007.

There is a new estimate of 487 elephants in Kibale National Park from a **dung count** in 2010 (Uganda Wildlife Authority, 2016) which replaces an estimate of 393 ± 210 (Wanyama, 2005). There is a remnant population of perhaps 20 elephants in the Katonga Game Reserve, east of Kibale NP (Uganda Wildlife Authority, 2016). These elephants are thought to have once been part of a larger population extending to Kibale NP, but are now isolated.

Elephants are still believed to occur in the Sango Bay area in the south of Uganda and there is a new **guess** of 36 (Uganda Wildlife Authority, 2016) replacing an old guess of 30 (Michelmore, pers. comm., 1998).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	621	—	—	—	13 %	2,252
Aerial Sample Counts	4,256	2,012	—	—	39 %	6,696
Informed Guesses	46	—	597	597	19 %	3,185
Degraded Data	—	—	56	56	8 %	1,322
Totals 2015	**4,923**	**2,012**	**653**	**653**		
Totals 2006	**3,944**	**1,607**	**1,007**	**1,017**		
Assessed Range					79 %	13,455
Unassessed Range					21 %	3,593
Total Range					100 %	17,048

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+948	±2,575	0	0	53 %	8,948
New Population	+19	0	0	0	4 %	705
New Guess	+12	0	-145	-155	16 %	2,679
Data Degraded	0	0	0	0	0 %	0
Totals	+979	±2,575	-145	-155	73 %	13,455

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	2,252	0	2,252
Direct Sample and Reliable Dung	6,435	261	6,696
Informed Guesses	2,872	313	3,185
Other Guesses	1,322	0	1,322
Unassessed Range	1,874	1,719	3,593
Totals	14,755	2,293	17,048

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE[1]	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS[3]	AREA	MAP LOCATION	
		TYPE[2]	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km^2)	LON.	LAT.
Bwindi National Park	NG	O	D	2015	43		UWA, 2016	2	336	29.7˚E	1.0˚S
Katonga Game Reserve	NG	O	D	2015	20		UWA, 2016	2	214	30.8˚E	0.2˚N
Kibale National Park	NG	O	D	2010	487		UWA, 2016	1	795	30.4˚E	0.5˚N
Kidepo Valley National Park and Karenga Wildlife Community Area	RS	AT	A	2014	621		Wanyama et al., 2014c	1	2,398	33.8˚E	3.6˚N
Madi East	NP	O	D	2009	19		Edward, 2009	2		31.5˚E	2.7˚N
Mgahinga Gorilla National Park	NG	O	D	2015	11		UWA, 2016	2	67	29.6˚E	1.4˚S
Murchison Falls Conservation Area	RS	AS	B	2014	1,352	900	Wanyama et al., 2014b	1	6,235	31.8˚E	2.2˚N
Otze Forest	NG	O	E	2004	6		Lamprey, pers. comm., 2015	2	200	31.9˚E	3.7˚N
Queen Elizabeth Conservation Area	RS	AS	B	2014	2,904	1,800	Wanyama et al., 2014a	1	2,259	29.9˚E	0.3˚S
Rwenzori National Park	-	O	E	2003	20		Keigwin, pers. comm., 2005	1	929	30.0˚E	0.4˚N
Sango Bay	NG	O	D	2015	36		UWA, 2016	2	305	31.7˚E	0.9˚S
Semliki National Park	-	O	E	1998	30		Michelmore, pers. comm., 1998	2	195	30.0˚E	0.8˚N
Toro Semliki Wildlife Reserve	NG	O	D	2015	27		UWA, 2016	2	784	30.4˚E	1.0˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

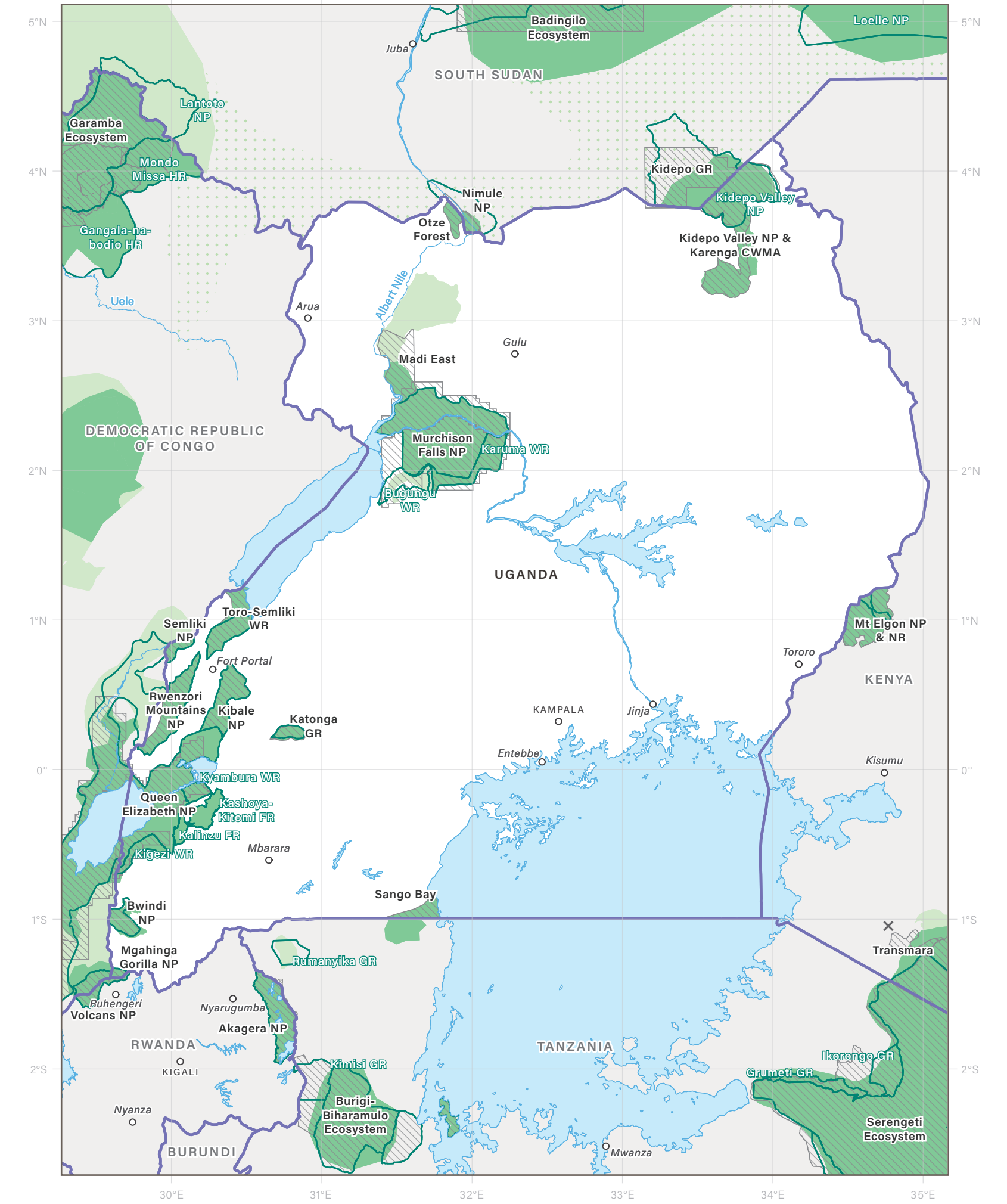
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Uganda



0 40 80 120 160 200 240km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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Southern

REGION

Southern Africa

ESTIMATED TOTAL ELEPHANTS

293,447 ± 16,682

GUESSES

15,157 - 16,672

GENERAL STATISTICS

Region Area	5,973,020 km²
Range Area	1,325,998 km² (22%)
Protected Range	23 %
Information Quality Index (IQI)	0.50

CURRENT ISSUES

Southern Africa continues to hold by far the largest number of elephants on the continent, and nearly 75% of southern Africa's elephants occur as part of a single population in the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), some 520,000 km² in extent. Whereas conservation challenges associated with high elephant densities in large protected areas were common in the region a decade ago, contemporary elephant conservation in southern Africa is now also faced with the emergence of a growing poaching threat (UNEP et al., 2013). While overall, poaching has not had the same impact in Southern Africa as in other regions, it has severely affected populations in Zimbabwe, Angola, Mozambique, and to a lesser extent, Zambia.

As human population growth has often not been matched by regional economic growth, many unemployed people either remain at or have returned to their rural homes from urban areas (Taylor, 2009). These communally owned unprotected areas have previously provided up to 60% or more of elephant range (Blanc et al., 2007; Cumming & Jones, 2005). However, habitat encroachment and transformation, together with ivory poaching, growing human-wildlife conflict and unsustainable bushmeat harvesting increasingly threaten the survival of elephant populations in these areas (Ripple et al., 2015). Poor governance could become potentially threatening for the long-term survival of elephants in southern Africa (CITES Secretariat, 2014).

Under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), there are ten sites in Southern Africa for Monitoring the Illegal Killing of Elephants (MIKE). Elephant carcass data from these sites can be used to calculate the Proportion of Illegally Killed Elephants (PIKE). For Southern Africa between 2007 and 2015 the PIKE values show an increasing

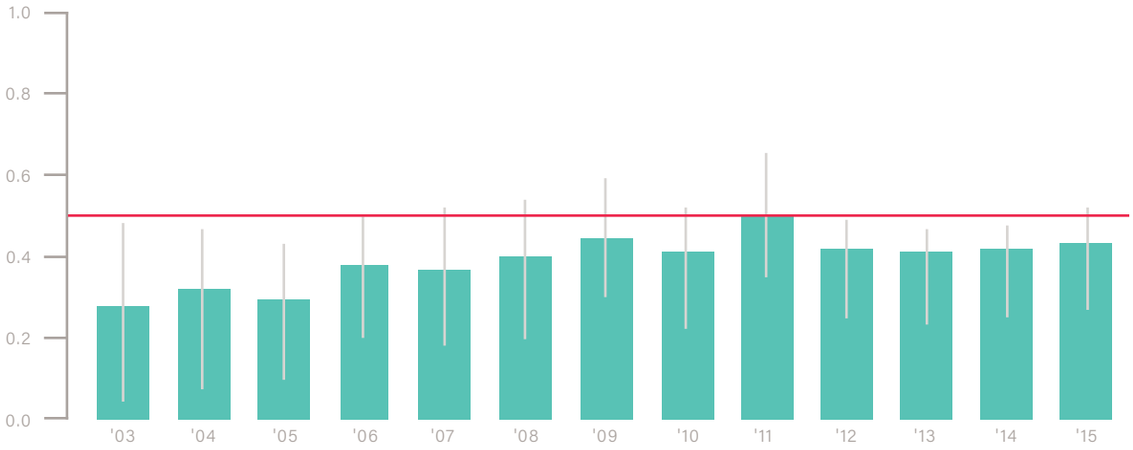


FIGURE 1: *Southern African PIKE trends with 95% confidence intervals (CITES Secretariart, 2016)*

trend, with a spike of 0.5 in 2011. PIKE levels above 0.5 (i.e. where half of dead elephants found are deemed to have been illegally killed) are considered to be unsustainable and Southern Africa is the only region whose overall PIKE values have not risen above 0.5 since 2003 (Figure 1) (CITES Secretariat, 2016).

In response to the challenge of increased poaching of elephants, rhinos and other wildlife, in 2015 the Southern African Development Community (SADC) ministers responsible for environment and natural resources approved the SADC Law Enforcement and Anti-Poaching Strategy 2016-2021 (SADC, 2015). The 2005 Southern Africa Regional Elephant Conservation and Management Strategy (SADC, 2007) is in need of revision.

In recent analyses of seizure data from the Elephant Trade Information System (ETIS), prepared for CITES, a number of countries in Southern Africa have been identified as having a worrying involvement in illegal ivory trade (CITES, 2012; Milliken et al., 2013, 2016). Angola and Mozambique have been requested to prepare and implement National Ivory Action Plans.

Whereas all populations of the African elephant have been listed in CITES Appendix I since 1989, those of Botswana, Namibia and Zimbabwe were transferred to Appendix II in 1997 and South Africa's was transferred in 2000. In 2008, these four elephant range states conducted a one-off legal sale of 101,766 kg of raw ivory to approved trading partners in China and Japan (CITES, 2009; Wijnstekers, 2011) (Table 1) .

		Weight (kg)	*Price USD*
Sellers	Botswana	43,153	$7,093,551
	Namibia	7,503	$1,147,369
	South Africa	47,346	$6,702,695
	Zimbabwe	3,764	$487,162
Buyers	Japan	39,434	$6,545,374
	China	62,333	$8,990,622

TABLE 1: *Ivory sales in 2008 (Wijnstekers, 2011)*

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Southern Africa is 293,447 ± 16,682 at the time of the last survey for each area. There may be an additional 15,157 to 16,672 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 734,824 km^2, which is 55% of the estimated known and possible elephant range. There remains an additional 45% of range for which no elephant population estimates are available.

Between the AESR 2007 and this report, elephant numbers in Southern Africa have declined by almost 30,000, on the basis of updated estimates for sites where comparable survey techniques were employed. However, some populations have been surveyed for the first time and this has led to an increase of approximately 3,000 in the 'new population' category. The result is that the current total number of elephants from surveyed populations represents a smaller estimated reduction of about 27,000 elephants. Although there have been real declines in Mozambique and Zimbabwe, the main contributor to this decline is a reduction in the estimate for Botswana, which may be the result of uncounted elephants, range expansion, increased poaching or methodological differences between surveys.

Southern Africa has a relatively high reliability and quantity of elephant information, especially for the larger populations. Although overall survey coverage has increased since 2007, largely as a result of the Great Elephant Census carried out in 2014-2015, there is still wide variation amongst countries.

One population was recorded as having been lost from Angola.

The proportion of elephant range for which elephant estimates are available currently stands at 55%, an increase from 53% in the previous report. The overall quality of information, as measured by the IQI, has increased from 0.48 to 0.50.

There is reliable information available for Botswana, Namibia, Swaziland, South Africa, Zambia and Zimbabwe. In Angola, only the south east region of the country has been surveyed, and one population in the Bongola area on the Angola-Namibia international border has been reported as lost (Vaz Pinto & Verissimo, pers. comm., 2014). Detailed nationwide surveys of elephant abundance and distribution are urgently needed in Angola. Surveys in Mozambique, although improved, have been spatially and temporarily variable and have used different techniques, apart from in the Niassa ecosystem in the north. Malawi with its high human population and small fragmented elephant population has relied mostly on total counts or informed guesses.

Southeast Angolan and southwest Zambian elephant populations continue to experience losses to poaching (Chase & Schlossberg, 2016; DNPW, 2016). Population trends from repeat surveys in northern Botswana remain equivocal. Mozambique's elephant population has been reduced by an estimated 25%, mostly in the north due to severe poaching.

In Namibia the elephant population has increased, notably in the north-east Kavango and Zambezi Regions. South Africa's elephant population, mostly contained within Kruger National Park, is

NUMBERS AND DISTRIBUTION
CONT.

increasing, with small but growing numbers of elephants in other provincial and private reserves. Zambia's elephant population appears to be relatively stable apart from losses in the south-west of the country which amount to approximately 2% of the overall population. Zimbabwe's elephant population has declined due to reductions in two populations, partially compensated by increases in two other populations.

The current range area for Southern Africa is 1,325,998 km^2, a slight increase from the 1,305,000 km^2 recorded in the AESR 2007, and the percentage of this which is known range has increased from 53% to 60%. There has been no major loss of elephant range, and one notable expansion of range in Botswana where elephants were observed in large groups for the first time in the Central Kalahari Game Reserve (DWNP, 2016). Other changes result from improved information, particularly in Angola.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	21,937	—	—	—	2 %	29,142
Ground Total Counts	133	—	—	—	0 %	136
Individual Registrations	39	—	—	—	0 %	22
Aerial Sample Counts	270,769	16,683	—	—	36 %	471,590
Informed Guesses	569	—	9,514	9,824	5 %	73,310
Other Guesses	—	—	5,371	6,576	12 %	158,161
Degraded Data	—	—	272	272	0 %	2,462
Totals 2015	**293,447**	**16,682**	**15,157**	**16,672**		
Totals 2006	**320,690**	**23,132**	**11,197**	**13,253**		
Assessed Range					55 %	734,824
Unassessed Range					45 %	591,174
Total Range					100 %	1,325,998

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-29,913	±28,372	-56	-56	28 %	377,379
New Population	+2,978	±1,398	+787	+802	5 %	66,100
Different Technique	+3,292	±1,194	-6,847	-8,557	4 %	49,760
Different Area	+1,004	±2,255	-3	+36	4 %	50,641
New Guess	-4,551	±92	+10,094	+11,209	14 %	188,481
Population Lost	0	0	-60	-60	0 %	0
Data Degraded	-53	0	+53	+53	0 %	0
Totals	-27,243	±28,520	+3,968	+3,427	55 %	734,824

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	26,963	2,338	29,301
Direct Sample Reliable Dung	410,768	60,822	471,590
Informed Guesses	61,375	11,935	73,310
Other Guesses	130,779	29,844	160,623
Unassessed Range	166,452	424,722	591,174
Totals	796,337	529,661	1,325,998

ELEPHANT ESTIMATES

COUNTRY	# OF ELEPHANTS		GUESSES		RANGE			PFS	IQI
	ESTIMATE	± 95% CL	MIN	MAX	AREA (km²)	% REGIONAL	% ASSESSED		
Angola	3,396	1,562	96	111	323,270	24 %	13 %	1	.09
Botswana	131,626	12,508	0	0	228,073	17 %	56 %	1	.52
Malawi	1,307	0	398	398	7,789	1 %	72 %	3	.55
Mozambique	10,884	2,229	4,299	5,519	320,402	24 %	82 %	1	.48
Namibia	22,754	4,306	90	90	164,069	12 %	51 %	1	.43
South Africa	18,841	0	8,425	8,435	30,651	2 %	92 %	2	.64
Swaziland	42	0	0	0	50	0 %	100 %	5	.00
Zambia	21,967	4,704	214	314	170,466	13 %	62 %	1	.50
Zimbabwe	82,630	8,589	1,635	1,805	81,228	6 %	97 %	2	.86
Totals	293,447	16,683	15,157	16,672	1,325,998	100 %	55 %	1	.50

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

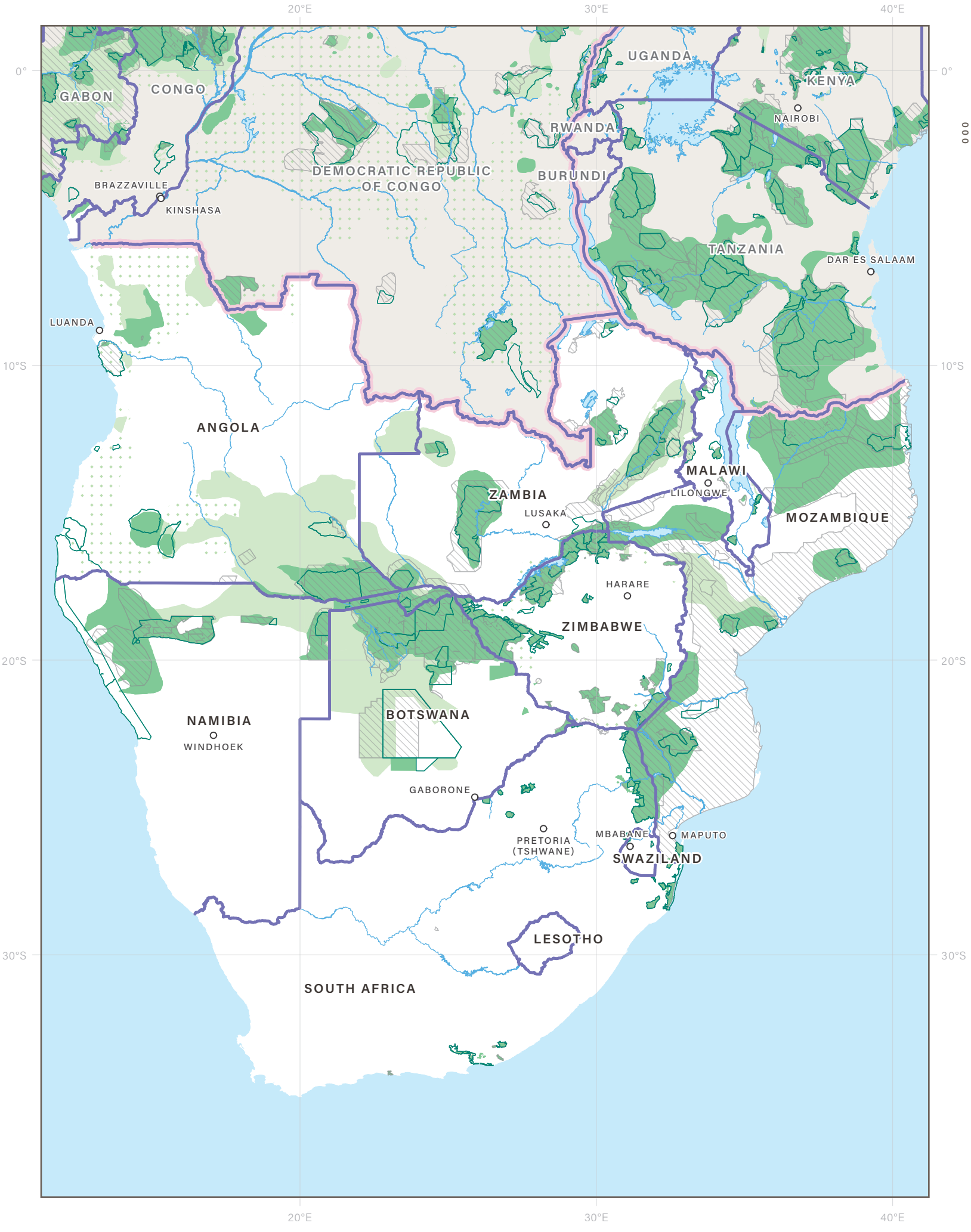
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Southern Africa



0 200 400 600 800 1000 1200km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Angola

ESTIMATED TOTAL ELEPHANTS

3,396 ± 1,562

GUESSES

96 - 111

GENERAL STATISTICS

Country Area	1,246,700 km²
Range Area	323,270 km² (26%)
Protected Range	15 %
Information Quality Index (IQI)	0.09
CITES Appendix	I
Listing Year	2013 (year of accession)

CURRENT ISSUES

Although elephant conservation and monitoring started in Angola after the end of the civil war in 2002, it has concentrated largely in the south-east of the country. A detailed nationwide study of elephant distribution and density is urgently required. Threats include poaching, illegal wildlife trade, human population expansion and settlement together with subsistence agriculture, fire and logging activities. There are weak incentives for elephant conservation and law enforcement is poor due to limited staff and capacity.

Wildlife legislation in Angola is limited largely due to the challenges of rebuilding administrative and governmental infrastructure after decades of conflict. Angola published an elephant conservation plan in 1991, although this is now seriously out of date (Instituto de Desenvolvimento Florestal, 1991). The development of a new plan was underway as of June 2016.

A study in Luanda in 2006 (Milliken et al., 2006) exposed a large and unregulated domestic ivory market in Luanda and eight years later this market was still flourishing with over 10,000 recently carved and illegal ivory items reported (Svensson et al., 2014; Vigne & Martin, 2014). It is believed that the majority of this ivory comes from forest elephants in countries such as the DRC. The increased demand for worked ivory was believed to be linked to the rising number of Chinese citizens working in Angola.

In recent analyses of seizure data in ETIS, prepared for CITES, Angola has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al.,

CURRENT ISSUES
CONT.

2013, 2016). Angola, a Party to CITES since 2013, was requested by the CITES Standing Committee to prepare a National Ivory Action Plan which it submitted in February 2015 (CITES, n.d.-a). Commencing in May 2016, the Government of Angola enacted a ban on domestic trade of ivory (Hungerford, 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Angola is 3,396 ± 1,562 at the time of the last survey for each area. There may be an additional 96 to 111 elephants in areas not systematically surveyed in Angola. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 41,847 km^2, which is 13% of the estimated known and possible elephant range. There remains an additional 87% of the estimated range for which no elephant population estimates are available.

The national totals show an increase of nearly 2,000 in estimated numbers. However, this is a result of a larger proportion of the main elephant population being covered than in earlier surveys, rather than a real increase.

Elephants are believed to be present in the far north and far south of the country, with forest elephants in the north-west and savanna elephants in the north-east and south (Enock, pers. comm., 2002), although the genetic status of these elephants has not been confirmed.

In 2015 an **aerial sample count** survey was carried out between the Kwando and Cuito-Kavango rivers in the south-east of Angola (Chase & Schlossberg, 2016). Elephants in this area form part of the KAZA transboundary population. The survey gave an overall estimate of 3,396 ± 1,562 elephants. This replaced an estimate of 1,827 ± 598 from the Luiana Partial Reserve in 2005 (Chase & Griffin, 2011). The 2015 survey expanded the range covered to include Cubango Game Reserve in the west and Mavinga on the Kwando to the north (though no elephants were sighted there). Data extracted by Chase and Schlossberg (Chase & Schlossberg, 2016) from their 2015 dataset for Luiana PR only, provided a comparable estimate of 1,437 ± 600 elephants, which although lower than the 2005 results, was not significantly so. The overall carcass ratio from the 2015 survey was 30%, suggesting a high level of mortality.

Thirty two elephants from South Africa were introduced to the Quiçama National Park by the Kissama Foundation in 2000 and 2001 and put into a 10,000-hectare, fenced, "soft release" area in the north of the park. In a 2015 survey 89 elephants were counted in the release area (Carmignani, 2015), and there were believed to be another 50 individuals in the rest of the park in 2002 (Vaz Pinto, pers. comm., 2003).

There is a small population of perhaps 10-25 elephants living on the escarpment to the east of Luanda in the Kambondo forest (Hines, pers. comm. 2015) and sightings of these elephants are marked as point records.

Reports were received in 2012 of more than 20 elephants moving across the border from Angola, spending time in the south-western part of Congo (Mbende et al., 2012) and this area is marked as **known range**.

NUMBERS AND DISTRIBUTION
CONT.

In the AESR 2007 there was an estimate of 60 elephants in the Bongola area on the Namibia border from 1992, but since this is no longer marked as elephant range, it has been removed and this is recorded as a **lost population**.

There is also a small area of elephant range in the Cabinda Enclave, a separate section of Angola surrounded by DRC and the Republic of Congo (Heffernan, 2005) but there is no estimate for this area.

Substantial changes have been made to the range map (Vaz Pinto & Verissimo, pers. comm., 2014). These include the removal of a large area of **possible range** in the dry south-west part of the country, the addition of a new area of **possible range** on the Zambian border, and a more defined range, including some **known range**, both east of Luanda and on the border with the DRC.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	3,396	1,562	—	—	13 %	41,342
Informed Guesses	0	—	10	25	0 %	75
Degraded Data	—	—	86	86	0 %	429
Totals 2015	**3,396**	**1,562**	**96**	**111**		
Totals 2006	**1,619**	**800**	**110**	**110**		
Assessed Range					13 %	41,847
Unassessed Range					87 %	281,423
Total Range					100 %	323,270

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	0	0	+10	+25	0 %	75
Different Area	+1,813	±1,756	0	0	13 %	41,342
Population Lost	0	0	-60	-60	0 %	0
Data Degraded	-36	0	+36	+36	0 %	0
Totals	+1,777	±1,756	-14	+1	13 %	41,847

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	36,253	5,089	41,342
Informed Guesses	75	0	75
Other Guesses	410	19	429
Unassessed Range	50,937	230,486	281,423
Totals	87,675	235,595	323,270

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bongola Area	PL	O	D	2014	0		Vaz Pinto & Verissimo, pers. comm., 2014	3	1,505	17.6˚E	17.3˚S
Cáua Camp	-	IR	E	2002	36		Vaz Pinto, pers. comm., 2003	3	9,500	13.3˚E	9.3˚S
Kambondo Forest	NP	O	D	2015	10	15*	Hines, pers. comm., 2015	4	75	14.7˚E	9.1˚S
Quiçama National Park	-	O	E	2002	50		Vaz Pinto, pers. comm., 2003	2	9,500	13.6˚E	9.8˚S
Southeast Angola	DA	AS	B	2015	3,396	1,562	Chase & Schlossberg, 2016	1	41,542	21.3˚E	17.0˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2]KEY TO SURVEY REPORT

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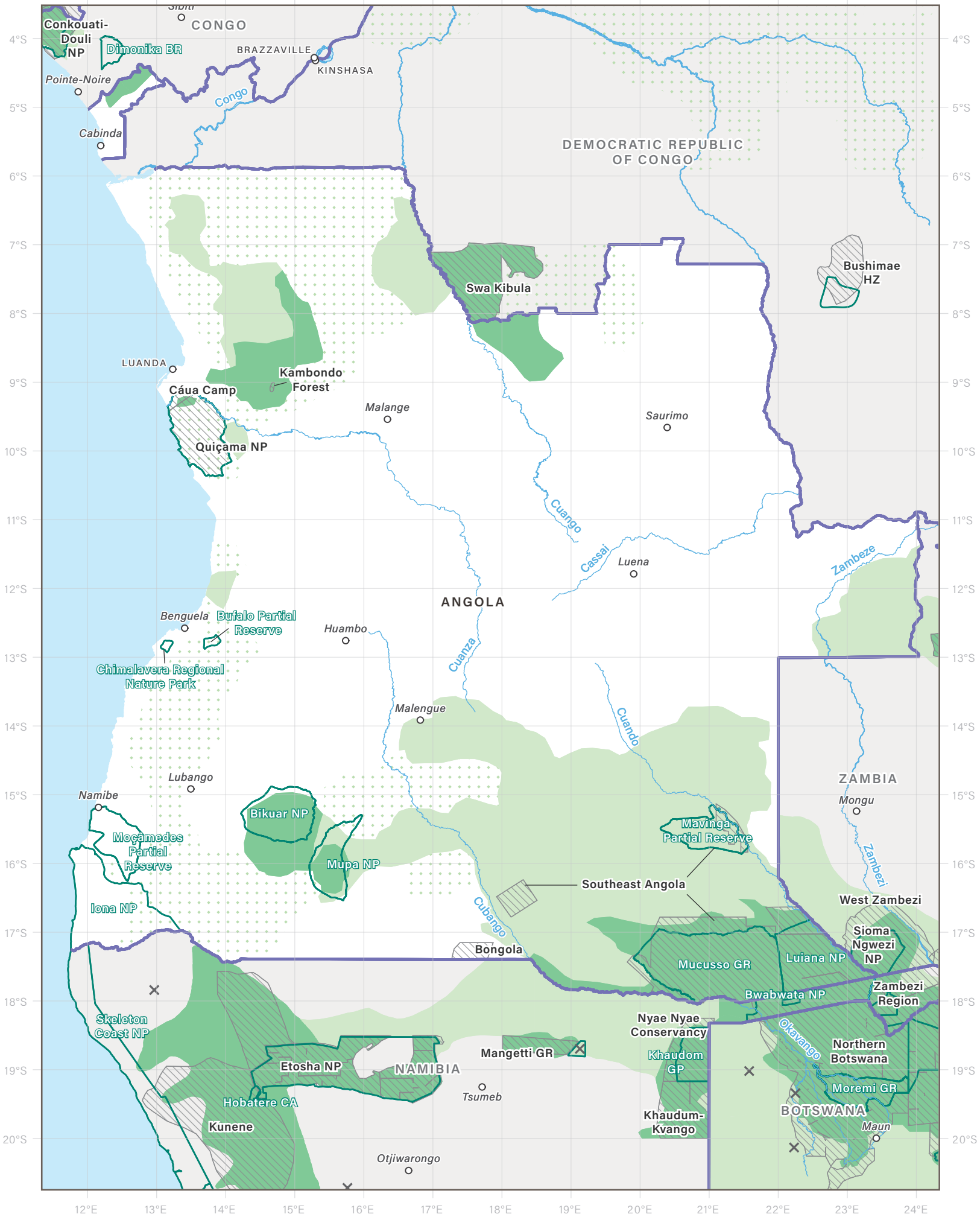
[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Angola



0 90 180 270 360 450 540km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Botswana

ESTIMATED TOTAL ELEPHANTS

131,626 ± 12,508

GUESSES

0 - 0

GENERAL STATISTICS

Country Area	600,370 km²
Range Area	228,073 km² (38%)
Protected Range	16 %
Information Quality Index (IQI)	0.52
CITES Appendix	II
Listing Year	1997

CURRENT ISSUES

Botswana has by far the largest elephant population of any country in Africa. The vast majority occur in the north of Botswana within the Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA), shared by Botswana, Namibia, Zambia, Zimbabwe and Angola, and elephants move between these countries.

Poaching of elephants by armed gangs has become an increasing threat in northern Botswana. Anti-poaching is undertaken by the Department of Wildlife and National Parks (DWNP), the Botswana Defence Force (BDF) and the Botswana Police (KAZA Secretariat, 2014a). DWNP has recently produced an approved National Anti-Poaching Strategy (Blackbeard, pers. comm., 2014).

The National Policy and Strategy for the Conservation and Management of the African Elephant was published in 2003 (DG Ecological Consulting, 2003). It is now outdated and in need of revision.

In 2008, Botswana undertook an approved one-off sale of 43,153 kg of ivory to Japan and China, at a total price of USD $7,093,551 (Wijnstekers, 2011).

Botswana declared an export quota of 600 tusks and other hunting trophies in 2007. The annual export quota for tusks and other hunting trophies fluctuated from 600 to 800 between 2009 and 2014. However, in 2014 a ban was placed on trophy hunting in the country and in 2015 a zero quota for exports of elephant hunting trophies was declared (CITES, n.d.-a).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Botswana is 131,626 ± 12,508 at the time of the last survey for each area. This estimate applies to 128,856 km^2, which is 57% of the estimated known and possible elephant range. There remains an additional 43% of the estimated known and possible elephant range for which no elephant population estimates are available.

The movement of elephants between northern Botswana and neighbouring countries requires that coordinated, simultaneous surveys are conducted to avoid the possibility of double counting or of missing animals entirely (KAZA Secretariat, 2014b). Counts flown of contiguous range in neighbouring countries were not synchronized with the 2014 Botswana survey.

The Botswana elephant population appeared to increase substantially from about 50,000 in 1990 to over 150,000 in 2006. However, this increase has been disputed (Junker et al., 2008). The estimate used in the AESR 2007 was the previously accepted national total of 154,658 ± 21,253 (Department of Wildlife and National Parks, 2006). More recent surveys have provided incompatible results. In 2010 and 2014 **aerial sample counts** of northern Botswana were undertaken by Elephants without Borders (Chase et al., 2015; Songhurst & Chase, 2010) and in 2012 and 2013 surveys were conducted by DWNP (DWNP, 2012). Results from the 2013 survey have not been released. The other surveys gave estimates of 128,340 ± 9,938 (2010), 207,545 ± 21,771 (2012) and 129,939 ± 12,501 (2014). These differences are so great that they are more likely to result from differences in survey technique or calculations rather than real population change or elephant movements.

Although a new total of 129,939 ± 12,501 from the Great Elephant Census in 2014 (Chase et al., 2015) has been included in the AED, this result raises questions with respect to the 2010 and 2012 surveys. It indicates no significant change since 2010 although a population that shows no evidence of serious poaching, excessive natural mortality or high levels of net emigration would be expected to show some increase. Compared to the 2012 survey results, the 2014 estimate would indicate a marked decline that is unlikely in the absence of any other indicators. Given that the KAZA TFCA transboundary population is the largest elephant population in Africa, of which the majority is within Botswana, it remains of the highest priority to carry out a simultaneous and coordinated count of the entire population.

The 2014 survey report gave a carcass ratio of 7% for northern Botswana (Chase et al., 2015), which is not considered exceptionally high, as carcass ratios of up to 8% are considered typical of a stable or increasing elephant population (Douglas-Hamilton & Burrill, 1991). However, it shows a notable increase over the earlier carcass ratio of 2% in 2010 and 2012.

Botswana is one of the few countries in Africa with confirmed elephant range expansion for elephants. In recent years the range has increased to the west towards Namibia (Songhurst, pers. comm. 2016) as well as southwards with large herds sighted for the first time in the Central Kalahari Game Reserve (CKGR) (Mokhandla, pers. comm., 2016). The 2015 dry season **aerial sample count** in Ghanzi District estimated 797 ± 437 (DWNP, 2016) of which 411 ± 252 were in CKGR. This is the first time that elephants have been counted in this area.

NUMBERS AND DISTRIBUTION
CONT.

There is a population estimated at 890 elephants from an **aerial total count** in 2014 in the Tuli Block in the extreme eastern part of the country (Selier & Page, 2015). This is part of a larger transboundary population in the Greater Mapungubwe Transfrontier Conservation Area that includes South Africa and Zimbabwe. This replaces an estimate of 1,038 ± 685 (Department of Wildlife and National Parks, 2006).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	890	—	—	—	1 %	1,389
Aerial Sample Counts	130,736	12,508	—	—	56 %	127,467
Totals 2015	**131,626**	**12,508**	**0**	**0**		
Totals 2006	**154,658**	**21,253**	**0**	**0**		
Assessed Range					57 %	128,856
Unassessed Range					43 %	99,218
Total Range					100 %	228,073

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-23,681	±24,283	0	0	42 %	95,331
New Population	+797	±437	0	0	14 %	32,136
Different Technique	-148	±685	0	0	1 %	1,389
Totals	-23,032	±24,296	0	0	57 %	128,856

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	1,389	0	1,389
Direct Sample and Reliable Dung	87,990	39,477	127,467
Unassessed Range	14,844	84,374	99,218
Totals	104,222	123,851	228,073

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Ghanzi District	NP	AS	B	2015	797	437	DWNP, 2016	1	51,269	22.5˚E	23.7˚S
Northern Botswana	RS	AS	B	2014	129,939	12,501	Chase et al., 2015	1	98,387	24.0˚E	19.2˚S
Tuli Game Reserve	DT	AT	A	2014	890		Selier & Page, 2015	2	1,456	28.9˚E	22.3˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

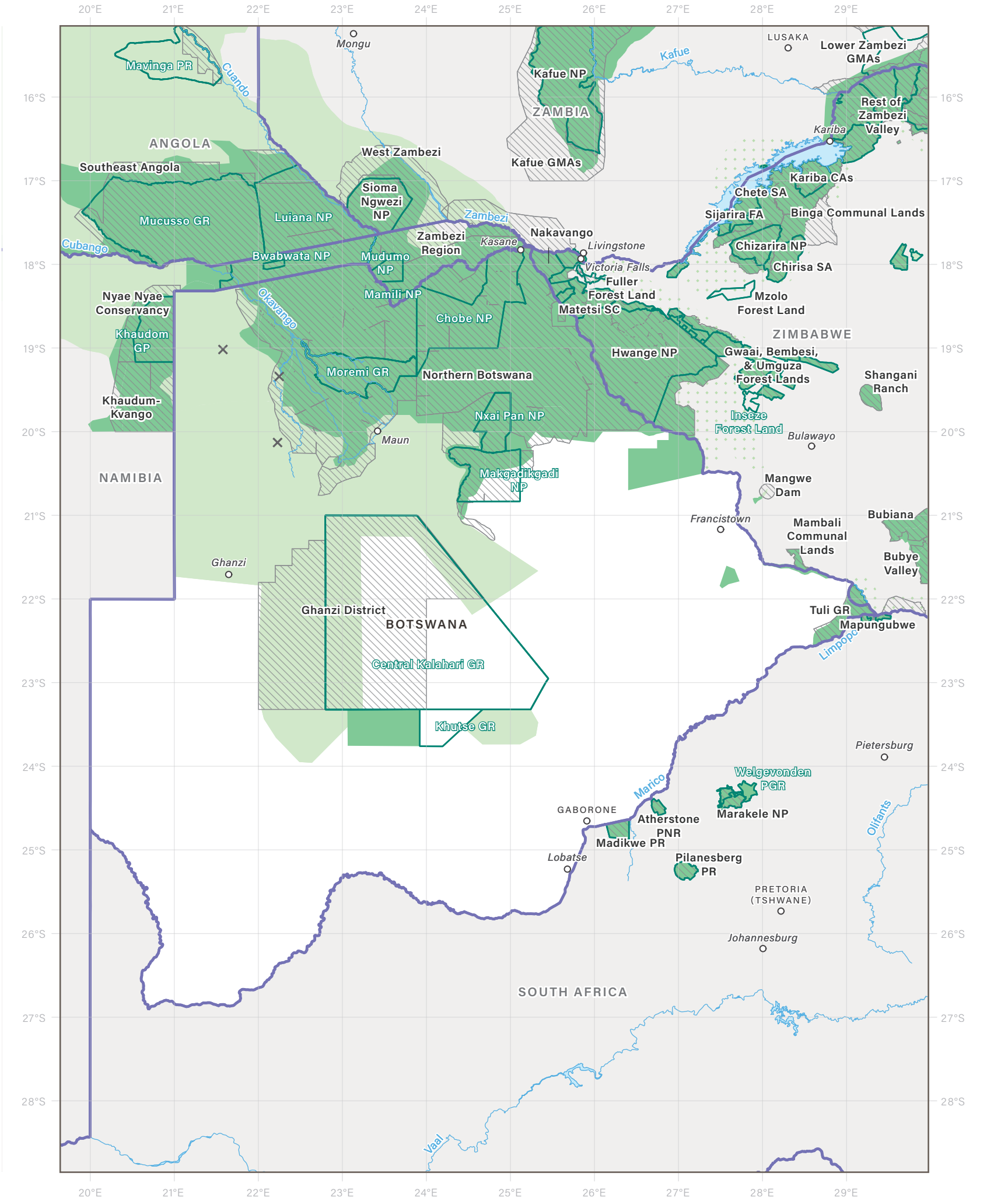
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Botswana



0 70 140 210 280 350 420km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Malawi

ESTIMATED TOTAL ELEPHANTS

1,307 ± 0

GUESSES

398 - 398

GENERAL STATISTICS

Country Area	118,480 km^2
Range Area	7,789 km^2 (7%)
Protected Range	89 %
Information Quality Index (IQI)	0.55
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Because of the country's high human population density, Malawi's elephants are almost entirely confined to protected areas. As a consequence, elephant populations in Malawi are small and fragmented. Human-elephant conflict is prevalent as a result, and poaching for meat and ivory is believed to be further reducing certain populations.

In an attempt to manage these populations a number of translocations have taken place in the last ten years. In 2006, 70 elephants were moved into Majete Wildlife Reserve from Liwonde National Park and a further 64 were moved in 2008 (Macpherson, 2012). In 2009, 83 elephants were moved into Majete WR from Phirilongwe Forest (Cunliffe, 2010).

Co-management of protected areas in Malawi is well established with the African Parks Network taking contractual responsibility for the management of Majete WR in 2003, and Liwonde NP and Nkhotakota Game Reserve in 2015.

In 2015, as part of the Elephant Protection Initiative, Malawi developed a draft 10-year national action plan for elephant management. This strategy is still under review. In addition Malawi is undertaking a review of the national wildlife policy (Ministry of Information, Tourism and Culture, 2014) as well as an illegal wildlife trade assessment (Lewis & Clark Law School, 2014).

In recent analyses of seizure data in ETIS, prepared for CITES, Malawi has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al.,

2013, 2016). Malawi has formed an Inter-Agency Committee to Combat Wildlife Crime (The Times Group, 2016) and in 2013, suspended its domestic ivory trade. In March 2016, following a national ivory inventory, Malawi destroyed approximately 2.6 tonnes of ivory (Reuters, 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Malawi is 1,307 at the time of the last survey for each area. There may be an additional 398 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 5,616 km^2, which is 72% of the estimated known and possible elephant range. There remains an additional 28% of the estimated range for which no elephant population estimates are available.

An **aerial total count** was conducted by helicopter in Nyika National Park in 2013 in which 47 elephants were seen (Macpherson, 2013c). However, because elephants occur in heavily wooded and rugged country, it is likely that some were missed. This replaces a sample count estimate of 339 ± 239 from 1997 (Gibson, 1997). A ground survey in 2005 in part of the Nyika NP resulted in a zero estimate (Ferreira et al., 2005) and a total aerial count in 2009 also gave a zero estimate (WCS Flight Programme, 2009), showing the difficulty of carrying out surveys in Nyika NP. Since elephants were observed in the south-west of the park in the 2013 survey, an additional area of **known range** was added. This population extends a short distance into Zambia (Macpherson, 2013c).

In Vwaza Marsh Wildlife Reserve to the south-west of Nyika NP 310 elephants were observed during an **aerial total count** in 2013 (Macpherson, 2013d). This replaces a guess of 270 (Ferreira et al., 2005) based on an uncompleted survey. A lower intensity total count was carried out in 2009 with 151 elephants observed (WCS Flight Programme, 2009).

Kasungu National Park used to hold Malawi's largest elephant population. However, in 2014, only 40 elephants were counted in Kasungu NP during an **aerial total count** (Macpherson, 2015a) which was part of the Great Elephant Census. Elephants now only occur in the immediate vicinity of the park headquarters and the area of **known range** has been adjusted accordingly. This replaces an estimate from 2005 of 58 ± 218 (Ferreira et al., 2005).

A **ground sample count** of Nkhotakota Wildlife Reserve in 2013 provided an estimate of 92 elephants, compared to 169 in 2011 (Sichali & Mkumbwa, 2014). The 2013 estimate replaces one of 1,037 ± 1,511 from a sample block count in 1995 (Japan Overseas Forestry Consultants Association & Pasco International Incorporated, 1997). There are doubts as to the validity of the 1995 numbers, since even in the 1980s there were thought to be no more than 300 elephants in the reserve. The northern section has been changed to **doubtful range** (Macpherson, 2013b).

The Thuma and Dedza-Salima Forest Reserves lie on the escarpment between Lilongwe and Lake Malawi. In 2015 a minimum of 133 elephants were observed during a **ground total count** (Clifford, 2016). This replaces a guess of 30-50 from 1998 (Munthali, pers. comm., 1998). The area of **known range** has been refined to fit the actual distribution.

NUMBERS AND DISTRIBUTION
CONT.

It is believed that six elephant remained in the Phirilongwe Forest after the translocation exercise (Kaunga-Nyirenda, pers. comm., 2014). This replaces a guess of 50 elephants from 1998 (Munthali, pers. comm., 1998).

Liwonde NP on the Shire River close to Lake Malawi holds Malawi's largest population. Seven hundred and seventy seven elephants were observed in an **aerial total count** in 2014, which was part of the Great Elephant Census (Macpherson, 2015b). This replaces a guess of 530 from 2006 (African Parks Foundation, 2006). Aerial surveys were carried out on an annual basis from 2007 to 2012, giving estimates from 404 to 696 (Macpherson, 2015b). This increase in numbers has taken place despite 134 elephants being translocated out of Liwonde. Variations in numbers may be due to seasonal movements to the north-east into the Mangochi Forest Reserve, which has been changed to **known range** (Macpherson, pers. comm., 2015c).

All of the elephants in the Majete WR were believed to have been exterminated by 2002. Two hundred seventeen elephants were translocated into the reserve between 2006 and 2009. A total aerial survey was carried out in 2012 during which 163 elephants were counted (Macpherson, 2012), but there are currently believed to be about 300 (Fearnhead, pers. comm., 2015), which seems more reasonable given the number brought in, and the limited amount of poaching. This **guess** replaces one of 70 from 2006 (African Parks Foundation, 2006). The **known range** has been expanded to cover the whole reserve, since the fenced elephant release area has been extended to include the whole reserve.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	1,174	—	—	—	49 %	3,842
Ground Total Counts	133	—	—	—	2 %	136
Informed Guesses	0	—	398	398	21 %	1,637
Totals 2015	**1,307**	**0**	**398**	**398**		
Totals 2006	**508**	**323**	**1,876**	**1,896**		
Assessed Range					72 %	5,616
Unassessed Range					28 %	2,173
Total Range					100 %	7,789

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Technique	+869	±323	-1,734	-1,754	60 %	4,706
New Guess	-70	0	+256	+256	12 %	910
Totals	+799	±323	-1,478	-1,498	72 %	5,616

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	1,641	2,338	3,979
Informed Guesses	1,637	0	1,637
Unassessed Range	1,716	457	2,173
Totals	4,994	2,795	7,789

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Kasungu National Park	DT	AT	A	2014	40		Macpherson, 2015a	1	2,316	33.1˚E	12.9˚S
Liwonde National Park	DT	AT	A	2014	777		Macpherson, 2015b	1	675	35.3˚E	14.9˚S
Majete Wildlife Reserve	NG	O	D	2015	300		Fearnhead, pers. comm., 2015	1	860	34.6˚E	15.9˚S
Nkhotakota Wildlife Reserve	DT	GS	D	2013	92		Sichali & Mkumbwa, 2014	1	747	34.1˚E	13.0˚S
Nyika National Park	DT	AT	A	2013	47		Macpherson, 2013c	1	1,679	33.8˚E	10.6˚S
Phirilongwe Forest Reserve	NG	O	D	2009	6		Kaunga-Nyirenda, pers. comm., 2014	1	640	35.0˚E	14.5˚S
Thuma and Dedza Salima Forest Reserves	DT	GT	A	2015	133		Clifford, 2016	1	418	34.3˚E	14.0˚S
Vwaza Marsh Wildlife Reserve	DT	AT	A	2013	310		Macpherson, pers. comm., 2013c	1	978	33.4˚E	11.0˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

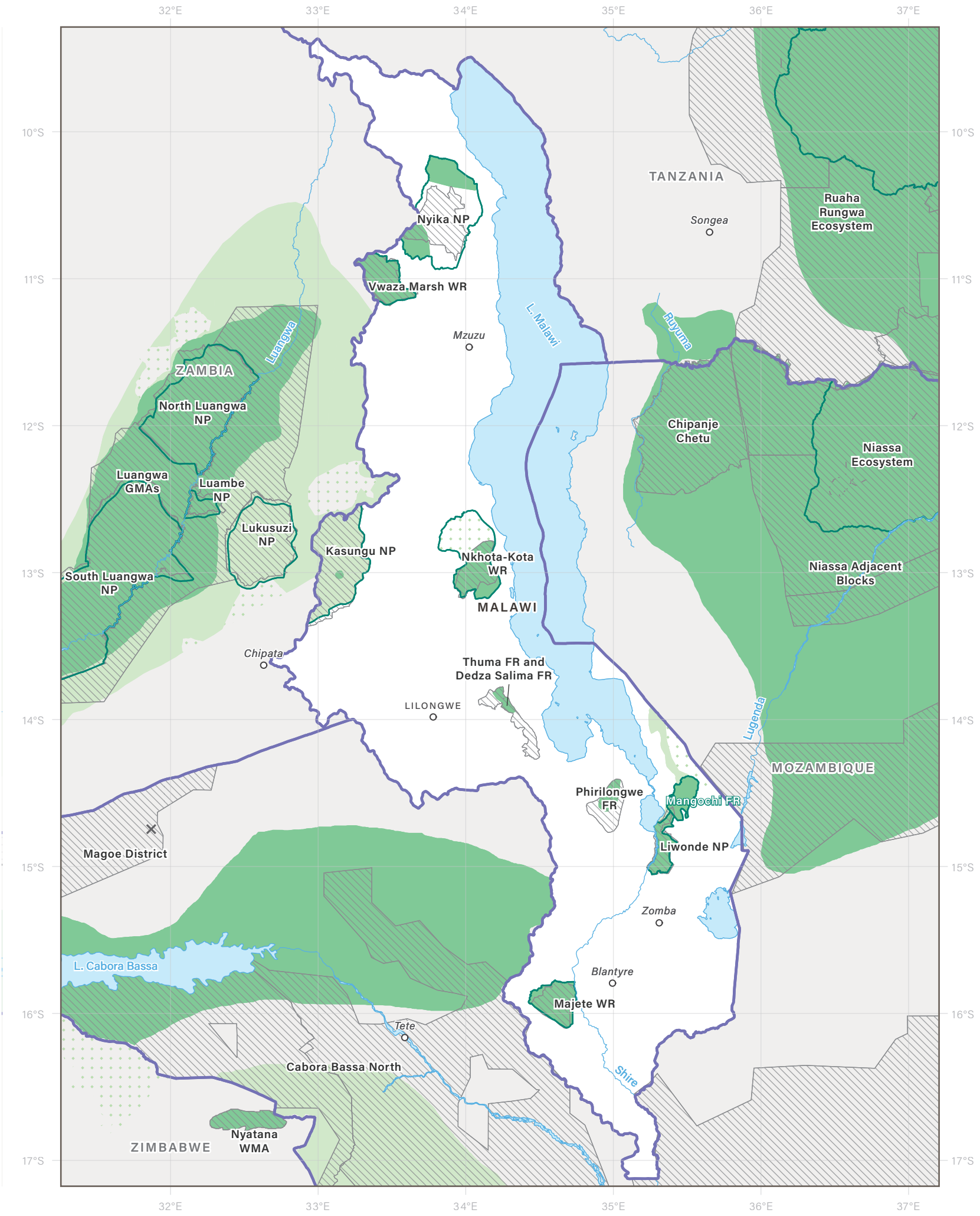
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Malawi



0 40 80 120 160 200 240km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

COUNTRY

Mozambique

ESTIMATED TOTAL ELEPHANTS

10,884 ± 2,228

GUESSES

4,299 - 5,519

GENERAL STATISTICS

Country Area	801,590 km²
Range Area	320,402 km² (40%)
Protected Range	17 %
Information Quality Index (IQI)	0. 48
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Mozambique has been severely affected by the recent upsurge in elephant poaching. This has been particularly striking in the country's largest population in the Niassa ecosystem (WCS, 2015b).

The Wildlife Conservation Society (WCS) co-manages Niassa National Reserve with the National Administration of Conservation Areas (ANAC) (WCS, 2015b). Considerable effort has gone into the rehabilitation of Gorongosa National Park, under joint venture arrangements with a private sector partner and foreign investor (Wilson, 2013).

In 2014 a new Biodiversity Law, which criminalises poaching, imposes deterrent sentences, and allows asset seizure, was signed into law (WCS, 2015b).

A five year strategy and action plan for the conservation and management of elephants in Mozambique was developed in 2010 (National Directorate of Conservation Areas, 2010).

Sport hunting of elephants is permitted in Mozambique. From 2007 to 2010, Mozambique's declared annual export quota increased from 80 (tusks as hunting trophies from 40 animals) to 200 (tusks as hunting trophies from 100 animals). The annual export quota of 200 remained from 2010 to 2015 (CITES, n.d.-b).

In recent analyses of seizure data in ETIS, prepared for CITES, Mozambique has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Mozambique was requested by the CITES Standing Committee, at its 65th

meeting, to prepare a National Ivory Action Plan. Mozambique's plan was submitted in January 2015 (CITES, n.d.-a). In July 2015, Mozambique destroyed 2.4 tonnes of ivory from its national stockpile (Vaughan, 2015).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Mozambique is 10,884 ± 2,228 at the time of the last survey for each area. There may be an additional 4,299 to 5,519 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 261,669 km^2, which is 82% of the estimated known and possible elephant range. There remains an additional 18% of the estimated range for which no elephant population estimates are available.

A country-wide aerial survey was carried out in 2008 (Agreco, 2008) and while it was undertaken at a low sampling intensity and did not cover all areas, it provided an important baseline. The country's most important population is in the far north, in and around the Niassa NR. Smaller populations occur in the west and centre of the country in Tete and Sofala Provinces and in the south in Gaza Province. The range map has been substantially altered using the information from the 2008 survey. Because surveys have been conducted using a variety of different techniques, it is not easy to compare the national estimates with those from the AESR 2007. The number of elephants estimated from systematic surveys in Mozambique has declined by about 4,000. However, this includes elephants in some areas that had not been previously surveyed, and there has actually been a decrease of about 9,000 in populations which have been surveyed using comparable techniques. There has also been a decline of about 3,000 in the guessed number of elephants.

An **aerial sample count** was conducted in the Niassa Ecosystem in 2014 as part of the Great Elephant Census, giving an estimate of 4,441 ± 1,360 (Grossman et al., 2014d), which replaces an estimate of 12,477 ± 2,111 from 2004 (Craig & Gibson, 2004). In 2009 and 2011 aerial sample count estimates of 20,118 ± 2,701 and 12,029 ± 2,531 were obtained (Craig, 2011a, 2009). There appears to have been a substantial population decline, which is supported by a carcass ratio of 42% in 2014. The 2009 result may have been an over-estimate (Booth & Dunham, 2014) or the result of elephants having moved into the area due to disturbance elsewhere (Craig, 2009).

The 2008 national elephant census (Agreco, 2008) indicated that there were elephants just to the south of Niassa. An additional 1,015 ± 591 elephants were counted in an extension zone on the southern boundary of Niassa in 2014 (Grossman et al., 2014d). In 2011 an **aerial sample count** gave an estimate of 333 ± 309 in the Chipanje Chetu area to the west of the Niassa Reserve, which was not counted in 2014 (Craig, 2012a).

The Quirimbas National Park to the south-east of Niassa was surveyed in 2011, in 2013 (Craig, 2012b, 2013) and in 2014 as part of the Great Elephant Census (Grossman et al., 2014c) giving estimates of 555 ± 448, 560 ± 460 and 328 ± 361 elephants respectively. The 2014 estimate replaces a guess of 2,000 from 2005 (Cumming & Jones, 2005). Estimates in a corridor linking Quirimbas NP to Niassa NR were 294 ± 231 and 306 ± 365 elephants respectively in 2013 and 2014 (Craig, 2013; Grossman et al., 2014c). The estimate for the Palma area of the Quirimbas ecosystem was 58 ± 83 (Craig, 2012b). The confidence limits associated with all these elephant estimates are too wide to draw

any conclusions about changes in numbers. However the carcass ratios were very high at 15% in 2011, 49% in 2013 and 45% in 2014, indicating an unsustainable offtake.

A ground survey of Gilé National Reserve was carried out in 2011-12 (Ntumi et al., 2012) which gave an **informed guess** of 21-166 elephants. This replaces a guess of 15-33 from 2002 (Ntumi, pers. comm., 2003).

Gorongosa National Park lost most of its large mammals during the civil conflict of 1977-1992. There were believed to be 2,000 elephants before the war compared to about 200 in 1994 (Cumming et al., 1994). An **aerial total count** in 2014 covering 50% of Gorongosa NP estimated at least 535 elephants (Stalmans et al., 2014), replacing an estimate of 22 from 2004 (Dunham, 2004), which suggests that numbers may be increasing (WCS, 2015).

A series of total counts, carried out in Marromeu Game Reserve since the mid-1960s (Bento et al., 2010), had been previously overlooked and thus no estimate was provided in the AESR 2007. In 2014, an **aerial sample count** was carried out as part of the Great Elephant Census, a few weeks after a helicopter count. The aerial sample count gave an estimate of 606 ± 634, which serves as the estimate for Marromeu GR, compared to 350 from the helicopter count (Grossman et al., 2014a).

An **aerial sample count**, which was part of the Great Elephant Census, estimated the elephant population in the Magoe area south of Lake Cahora Bassa in 2014 at 1,051 ± 721 and that of southern Tete Province further east at 604 ± 431 (Grossman et al., 2014b). These estimates replace an estimate of 1,628 ± 794 from 2003 (Dunham, 2004) and a guess of 2,260 to 3,910 from 1998 (Direcção Nacional de Florestas e Fauna Bravia, 1999) respectively. The 2014 survey had a high carcass ratio of 15%. Another aerial sample count in 2010 gave an estimate of 1,985 ± 1,102 (Dunham, 2010), suggesting that there had been no significant change between 2010 and 2014. No elephants were observed in the area north-west of Lake Cahora Bassa in 2014, compared to 90 in 2003 (Dunham, 2004). Note that the AESR 2007 incorrectly recorded an estimate of 1,718 elephants in this area. The 2014 survey did not cover the area between Lake Cahora Bassa and the Zambian border to the north, but there is recent evidence for the continued survival of elephants here (Jacobson, pers. comm., 2015) and the map shows the revised range based on this information.

An **aerial sample count** of Limpopo National Park and a southern extension along the South African border was carried out in 2014 as part of the Great Elephant Census (Grossmann et al., 2014e). This survey covered the entire national park and gave an estimate of 1,081 ± 641 elephants, which replaces an estimate of 630 (Whyte & Swanepoel, 2006) from a survey that covered only a section of the park. A further 173 ± 259 were estimated in the southern extension in 2014. There was a high carcass ratio of 17%. Fixed wing surveys were carried out in 2010 and 2013 but the results were considered unreliable (Grossmann et al., 2014e). A 2010 helicopter survey (Swanepoel, 2010) gave a minimum count of 1,007 elephants.

There are new records of elephants from the area north-east of the Limpopo Transfrontier Conservation Area, which includes Banhine National Park. In the AESR 2007, Banhine NP was shown as non-range with an estimate of zero. Five elephants were seen in an **aerial total count** of Banhine NP in 2012 (Stalmans, pers. comm., 2012) and further evidence of the survival of elephants

in this area was collected during the course of predator surveys (Andresen, pers. comm., 2015), so the area of **known range** has been modified accordingly. The numbers are likely to be low, however, as the 2014 Great Elephant Census survey of Gonarezhou in Zimbabwe covered the adjoining Massangena West area in Mozambique and no elephants were seen there (Dunham & van der Westhuizen, 2015).

Helicopter based counts were carried out in the Maputo Special Reserve in 2004, 2006, 2008, 2011 and 2012. During this period the maximum number counted was 348 in 2008 (Matthews, 2008) with a minimum of 80 in 2004. Although Bodasing and Cumbane (2013) counted 264 elephants in 2012, the authors considered that there were at least 400 elephants in the population (Bodasing & Cumbane, 2013). This count also included the Futi Corridor extension to Tembe Elephant Park in South Africa. The 2008 figure has been used in the report, since it is considered to be closer to the true number.

Some areas surveyed in 2008 have not been surveyed more recently, and a figure for the rest of Mozambique of 4,278 has been extracted from this dataset (Agreco, 2008). However, because of the uncertain overlaps in time and space with the other surveys this has been treated as an **informed guess**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	883	—	—	—	1 %	2,422
Aerial Sample Counts	9,996	2,229	—	—	29 %	93,274
Informed Guesses	5	—	21	166	5 %	16,336
Other Guesses	—	—	4,278	5,353	47 %	149,636
Totals 2015	**10,884**	**2,228**	**4,299**	**5,519**		
Totals 2006	**14,847**	**2,260**	**7,149**	**9,072**		
Assessed Range					82 %	261,669
Unassessed Range					18 %	58,732
Total Range					100 %	320,402

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-8,613	±2,730	0	0	14 %	43,933
New Population	+2,127	±1,326	0	0	6 %	19,581
Different Technique	+2,608	±918	-5,130	-6,830	12 %	37,099
Different Area	-90	±149	0	0	1 %	2,195
New Guess	+5	0	+2,280	+3,277	50 %	158,861
Totals	-3,963	±3,175	-2,850	-3,553	82 %	261,669

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	2,422	0	2,422
Direct Sample and Reliable Dung	90,528	2,746	93,274
Informed Guesses	15,708	628	16,336
Other Guesses	121,485	28,151	149,636
Unassessed Range	53,243	5,489	58,732
Totals	283,387	37,014	320,402

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Banhine National Park	NG	O	D	2012	5		Stalmans, pers. comm., 2012	2	6,510	32.9˚E	22.8˚S
Cahora Bassa											
Cahora Bassa North	DA	AS	D	2014	0		Grossmann et al., 2014b	2	3,028	31.7˚E	15.9˚S
Magoe District	RS	AS	B	2014	1,051	721	Grossmann et al., 2014b	2	2,290	31.7˚E	15.9˚S
Tete Province-South	DT	AS	B	2014	604	431	Grossmann et al., 2014b	1	14,500	31.7˚E	15.9˚S
Gilé National Reserve	NG	O	D	2012	21	145*	Ntumi et al., 2012	2	2,456	38.4˚E	16.6˚S
Gorongosa National Park	DT	AT	A	2014	535		Stalmans et al., 2014	3	1,832	34.4˚E	18.9˚S
Limpopo											
Limpopo Extension	NP	AS	B	2014	173	259	Grossman et al., 2014e	2	3,240	32.0˚E	23.7˚S
Limpopo National Park	DT	AS	B	2014	1,081	641	Grossman et al., 2014e	2	11,971	32.0˚E	23.7˚S
Maputo Elephant Reserve	DT	AT	A	2008	348		Matthews, 2008	3	827	32.8˚E	26.5˚S
Marromeu Game Reserve	NP	AS	B	2014	606	634	Grossmann et al., 2014a	2	2,307	35.9˚E	18.7˚S
Massangena West	NP	AS	B	2014	0		Dunham & van der Westhuizen, 2015	3	1,574	32.1˚E	21.7˚S
Northern											
Chipanje Chetu	NP	AS	B	2011	333	309	Craig, 2012a	2	6,641	35.2˚E	12.3˚S
Niassa Adjacent Blocks	NP	AS	B	2014	1,015	591	Grossman et al., 2014d	2	6,697	37.3˚E	12.2˚S
Niassa Ecosystem	RS	AS	B	2014	4,441	1,360	Grossman et al., 2014d	1	42,168	37.3˚E	12.2˚S
Quirimbas Corridor	DT	AS	B	2014	306	365	Grossmann, et al. 2014c	2	3,605	39.6˚E	12.5˚S
Quirimbas National Park	DT	AS	B	2014	328	361	Grossmann, et al. 2014c	2	11,298	39.6˚E	12.5˚S
Palma	DT	AS	B	2011	58	83	Craig, 2012b	2	3,816	39.6˚E	12.0˚S
Rest of Mozambique range	NG	O	E	2008	4,278	1,075*	Agreco, 2008	1	333,225	35.8˚E	18.3˚S

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

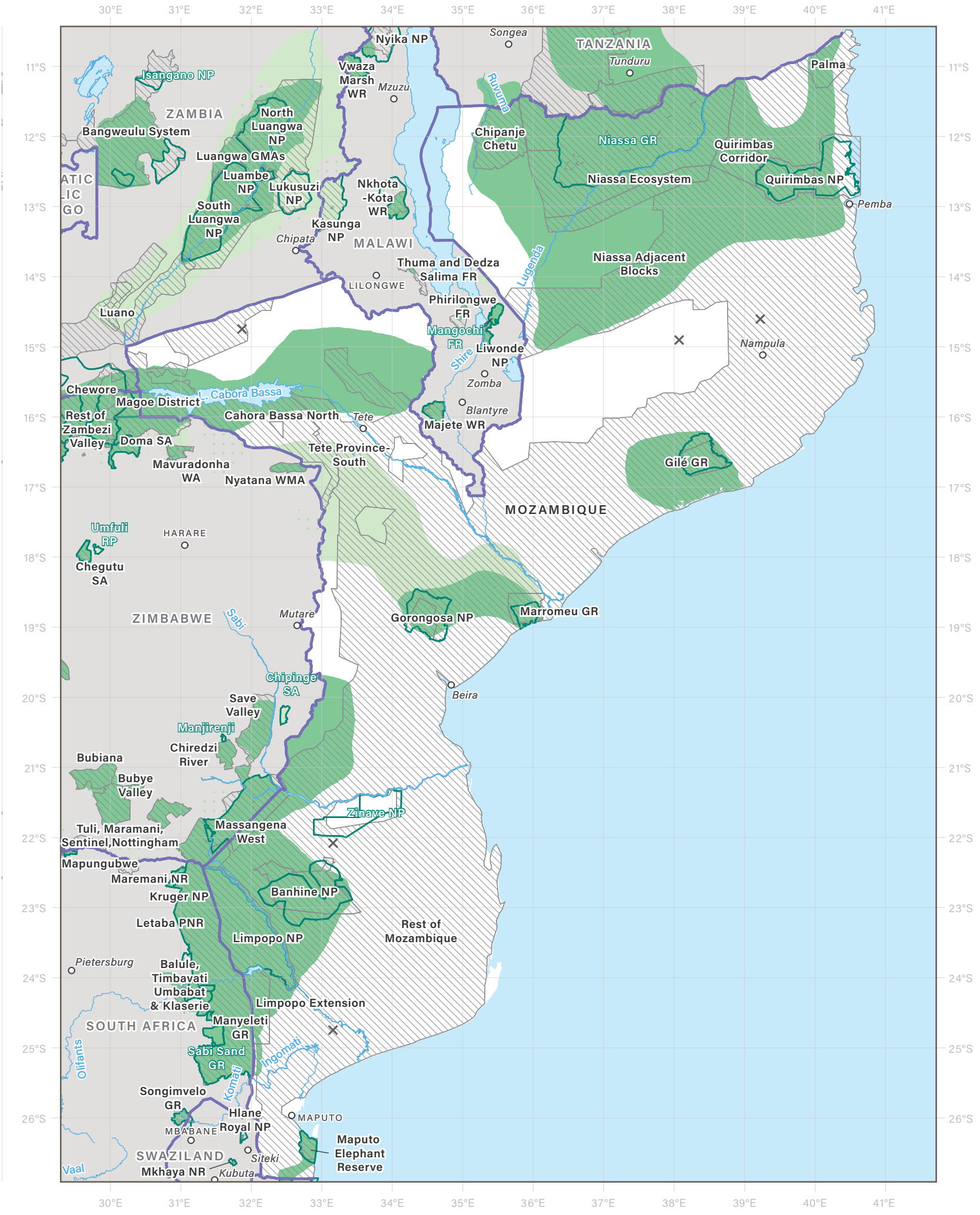
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Mozambique



0 80 160 240 320 400 480km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Namibia

ESTIMATED TOTAL ELEPHANTS

22,754 ± 4,305

GUESSES

90 - 90

GENERAL STATISTICS

Country Area	825,418 km²
Range Area	164,069 km² (20%)
Protected Range	18 %
Information Quality Index (IQI)	0.43
CITES Appendix	II
Listing Year	1997

CURRENT ISSUES

Namibia's elephants occur across the northern region of the country, mostly in national parks and community areas. Their range encompasses a wide variety of habitats, from the extremely arid north-west Kunene Region to the well-watered Zambezi (formerly Caprivi) Region, where the elephants form part of the KAZA transfrontier population. Although poaching has increased in the Zambezi Region in the past ten years, it is not seen as a significant threat in Etosha National Park or for populations in Khaudum National Park and Kunene Region.

Elephant hunting takes place in Namibia, and the revenue generated provides significant income to community conservancies (Naidoo et al., 2006). From 2007 to 2015, Namibia declared an annual export quota of elephant hunting trophies of 180, defined as tusks from 90 animals (CITES, n.d.-a).

Namibia's elephant management plan was published in 2007 (Ministry of Environment and Tourism, 2007).

In 2008, Namibia undertook an approved one-off sale of 7,503 kg of ivory to Japan and China, at a price of USD $1,147,369 (Wijnstekers, 2011).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Namibia is 22,754 ± 4,305 at the time of the last survey for each area. There may be an additional 90 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 84,283 km², which is 52% of the estimated known and possible elephant range. There remains an additional 48% of the estimated range for which no elephant population estimates are available.

The elephant population of Namibia has continued to increase although, with wide confidence limits in aerial surveys and elephants moving across international borders, it is not possible to be precise about how great the increase in the national population has been.

There are four main populations, the transfrontier population (with Zambia, Angola, Botswana and Zimbabwe) in the Zambezi Region, in Khaudum National Park in the north-east, the Etosha National Park population, and the Kunene population in the north-west which includes the "desert" elephants.

There has been an increasing trend in elephant numbers in the Zambezi Region since surveys started in the 1980s. This is likely to have been a result of both natural growth and movement from neighbouring countries. **Aerial sample counts** were carried out in 2007, 2011, 2013, 2014, and 2015, giving estimates of 8,380, 10,847 ± 3,580, 9,165 ± 2,016, 14,097 ± 2,678 and 13,116 ± 3,413 (Chase, 2007; Craig & Gibson, 2013b, 2014; Craig, 2011b; Gibson & Craig, 2015a). The previous estimate in the AESR 2007 was 8,725 ± 2,206 (Kolberg, 2004). There was also a total count carried out in 2007 (Chase, 2007) and a sample count in 2008 (Kolberg, 2008). However the latter was carried out with an inexperienced crew and the results were thought to be a considerable underestimate (Kolberg, 2008).

The elephant population of Khaudum NP and the neighbouring community conservancies of Nyae Nyae and N≠a Jaqna have been established since the 1980s, with the provision of artificial water and movements across the border from Botswana. Three **aerial sample counts** were carried out in 2011, 2013 and 2015 giving estimates of 4,731 ± 1,940, 3,638 ± 1,164, and 6,413 ± 2,566 (Craig & Gibson, 2013a; Gibson & Craig, 2015b; MET, 2012). The 2015 figure replaces an estimate of 3,758 ± 2,289 for Khaudum, 61 ± 115 for N#a Jaqna (Kolberg, 2004) and 967 ± 481 for Nyae Nyae (Stander, 2004). None of these are significant differences.

There is a limited movement of elephants between Angola and the Kavango region to the north-west of Khaudum (Terblanche, 2016).

There is a small elephant population in the Mangetti area between Khaudum and Etosha. The AESR 2007 indicated that they occupy the Mangetti Game Reserve, whereas their range is actually concentrated around the Mangetti Cattle Ranch to the west, and also probably extends into the Ukwuangali communal area to the north. Ninety individuals were observed in Mangetti in 2015 (Lindeque, pers. comm., 2016). This **informed guess** replaces one of 20 from 2005 (Ministry of Environment and Tourism, 2005).

NUMBERS AND DISTRIBUTION
CONT.

Etosha National Park in northern Namibia has an increasingly isolated elephant population, since the perimeter fencing has been upgraded in recent years. There has been a gradual increase in elephant numbers, moderated by deaths from anthrax and poaching. Aerial sample counts were carried out in 2011 and 2012, giving estimates of 3,378 ± 1,756 and 2,810 (confidence limits not available) (Kolberg, 2012; MET, 2012). The most recent **aerial sample count** from 2015 gave an estimate of 2,911 ± 637 (Kilian, 2015) and replaces an estimate of 2,057 ± 598 from 2004 (Kilian & Kolberg, 2004).

It is technically very difficult to count the widely scattered elephant population in the Kunene Region, which includes the 'desert elephants' in the dry, western extremity of the range and there has been controversy about the numbers in this area. A combined sample block count and **aerial total count** was carried out by helicopter in 2011, giving an estimate of 314 ± 154 (MET, 2012). This replaces an estimate of 210 ± 157 from a 2005 survey (Ministry of Environment and Tourism, 2005). It should be noted that the count did not include the extreme northern part of the range around Opuwo, nor the farms to the south of Etosha. There has been some range expansion to both the south and north, with elephants now being resident in the Ugab river basin and about ten elephants resident in the northern Etanga area (Owen-Smith, pers. comm., 2014). The area of **known range** has been changed, and the Etanga group is shown as a point record on the map. The Kunene population appears to have been increasing in numbers and range, despite evidence that the 'desert elephant' sub-population in the Houanib and Houarusib dry riverbeds reduced from 42 to 31 between 2002 and 2015 (Ramey & Brown, 2015).

There are occasional sightings of elephants in livestock ranching areas to the south of their normal range in the area north and east of Windhoek. These are shown as point records on the range map (Hartman, 2014; The Namibian, 2014).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	22,754	4,306	—	—	42 %	68,121
Informed Guesses	0	—	90	90	10 %	16,162
Totals 2015	**22,754**	**4,305**	**90**	**90**		
Totals 2006	**15,807**	**3,276**	**20**	**20**		
Assessed Range					52 %	84,283
Unassessed Range					48 %	79,786
Total Range					100 %	164,069

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+6,947	±5,410	0	0	50 %	81,727
New Guess	0	0	+70	+70	2 %	2,556
Totals	+6,947	±5,410	+70	+70	52 %	84,283

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	65,438	2,683	68,121
Informed Guesses	15,903	259	16,162
Unassessed Range	31,130	48,655	79,786
Totals	112,471	51,598	164,069

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Etosha National Park	RS	AS	B	2015	2,911	637	Kilian, 2015	1	18,549	15.8˚E	19.0˚S
Khaudum-Kavango	RS	AS	B	2015	4,149	1,864	Gibson & Craig, 2015b	2	5,843	20.7˚E	19.3˚S
Kunene	RS	AS	B	2011	314	154	MET, 2012	1	40,887	14.1˚E	20.0˚S
Mangetti Area	NG	O	D	2015	90		Lindeque, pers. comm., 2016	2	2,558	18.5˚E	18.6˚S
Nyae Nyae Conservancy	RS	AS	B	2015	2,264	1,729	Gibson & Craig, 2015b	2	7,001	20.7˚E	19.3˚S
Zambezi Region	RS	AS	B	2015	13,116	3,413	Gibson & Craig, 2015a	1	17,473	23.5˚E	17.9˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

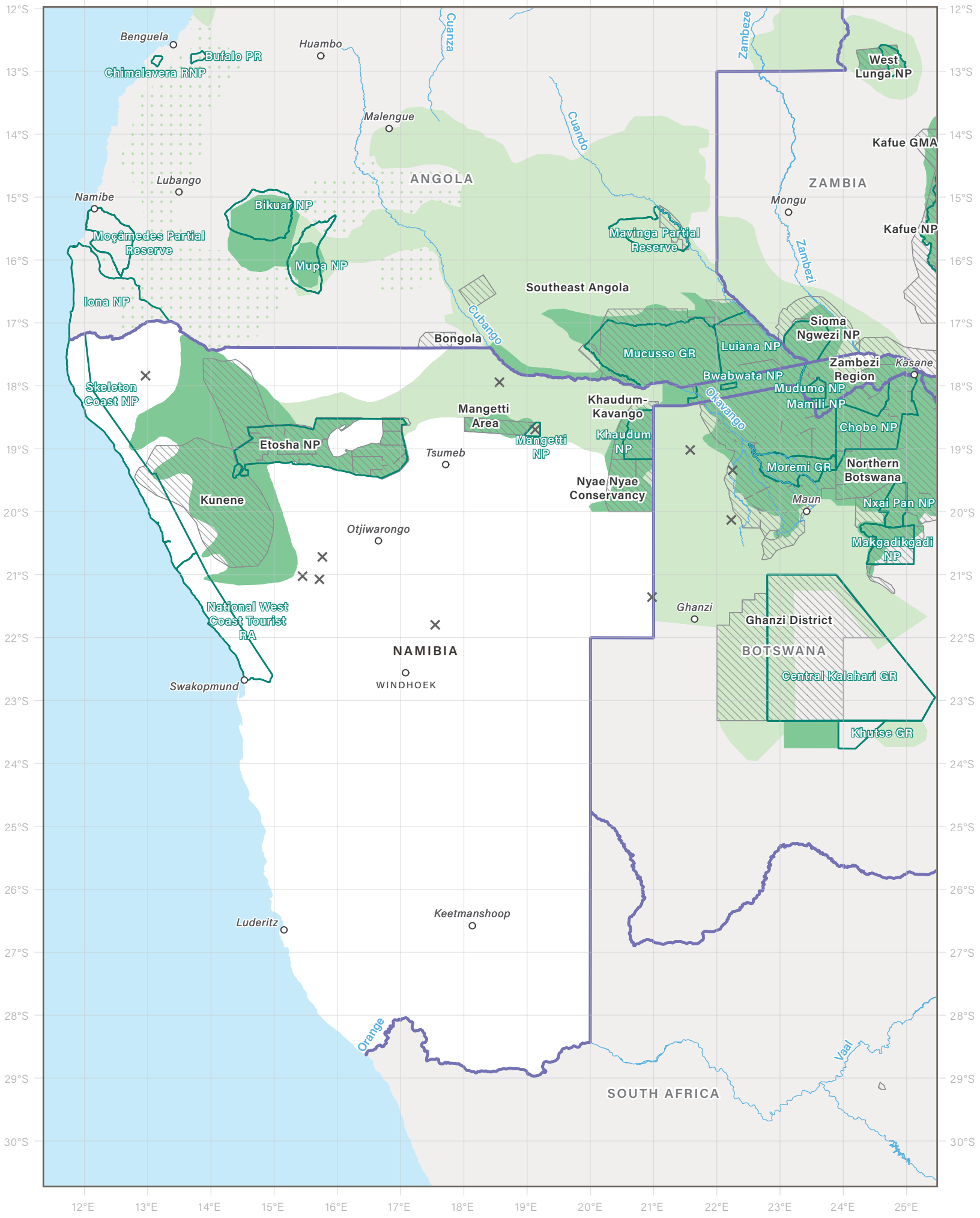
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Namibia



0 90 180 270 360 450 540km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

South Africa

ESTIMATED TOTAL ELEPHANTS

18,841 ± 0

GUESSES

8,425 - 8,435

GENERAL STATISTICS

Country Area	2,345,410 km^2
Range Area	30,651 km^2 (3%)
Protected Range	93 %
Information Quality Index (IQI)	0.64
CITES Appendix	II
Listing Year	2000

CURRENT ISSUES

Apart from the large population of elephants in the Kruger National Park, most of South Africa's elephant populations exist in relatively small fenced areas (Department of Environmental Affairs and Tourism, 2008), many of which are privately owned. In some places, local elephant overabundance has led to adverse impacts on other biodiversity and a number of management approaches have been undertaken. These include the use of immuno-contraception to control reproduction (Delsink et al., 2013).

Until 2008, there was little elephant poaching in South Africa. However this has recently changed, with increased poaching for ivory, particularly in Kruger National Park (AFP, 2014).

South Africa published a set of Norms and Standards for Managing African Elephants in 2008 (Department of Environmental Affairs and Tourism, 2008) and these were under review in 2014 (Department of Environmental Affairs, 2014).

In 2008, South Africa undertook an approved one-off sale of 47,346 kg of ivory to Japan and China, at a price of USD $6,702,695 (Wijnstekers, 2011). Trophy hunting of elephants is legal in South Africa, and from 2007 to 2015, the declared annual quota increased from 200 tusks as hunting trophies (from 100 animals) to 300 (CITES, n.d.-b).

In recent analyses of seizure data in ETIS, prepared for CITES, South Africa has been identified as a country with a worrying involvement in illegal ivory trade (Milliken et al., 2013, 2016).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in South Africa is 18,841 at the time of the last survey for each area. There may be an additional 8,425 to 8,435 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 28,203 km^2, which is 92% of the known and possible elephant range. There remains an additional 8% of the estimated range for which no population estimates are available.

There has been a reported increase of about 1,000 elephants in the form of estimates, and about 8,000 in guesses since the AESR 2007. While the major population in Kruger NP has increased substantially, the quality of information for other areas is lower than in the AESR 2007, and many areas that previously had documented surveys now have unsupported population figures, which means that elephant numbers are recorded as guesses.

South Africa's elephants are confined to protected areas, private reserves and other privately-owned properties, largely in the north and east of the country, though some populations remain – or are being newly established – in the far south. The largest population of elephants is found within and around Kruger NP, from where most of the elephants in other populations have been translocated.

Following implementation of a policy of managing landscapes rather than managing elephants, and the cessation of culling in 1994, the elephant population of Kruger NP has increased. Annual total counts were carried out until 2012, followed by an **aerial total count** in 2015 which gave an estimate of 17,086 (Ferreira et al., 2015). This replaces a count of 12,427 from 2006 (Whyte, 2007). Since 2003 the growth rate has slowed to 4.2% and this may be connected to the closure of artificial water sources in the park (Ferreira et al., 2015). Fences between Kruger and many neighboring private reserves have been removed, allowing free movement of elephants. However, there is no figure for the entire Kruger ecosystem, since one major private reserve has asked for its numbers to be aggregated with private reserves in other parts of the country (Garaï, pers. comm., 2016). Elephants from Kruger NP move into adjacent areas of Mozambique, especially the adjoining Limpopo National Park. One radio-collared elephant from northern Kruger moved through Mozambique as far as Gonarezhou National Park in Zimbabwe (Henley, 2011).

The population at Addo Elephant National Park has increased slightly, with an overall count of 595 in 2012 (Ferreira et al., 2012), replacing one of 459 in 2005.

In Eastern Cape province there are two elephants in Knysna and two in the Great Fish River Provincial Reserve (Selier, pers. comm., 2016). In KwaZulu Natal, Hluhluwe-Imfolozi Game Reserve has 700 elephants, Ithala Game Reserve has 162, uMkhuze Game Reserve has 90 and Tembe Elephant Reserve, linked via the Futi Corridor to Maputo Special Reserve in Mozambique, supports at least 220 elephants (EKZNW, 2016). The St Lucia Reserves have 110 elephants (EKZNW, 2016). These are all **informed guesses** and reflect increased numbers compared to earlier estimates, with the exception of Hluhluwe GR from where elephants have been translocated (EKZNW, 2016).

In Mpumalanga Province, there are 57 elephants in the Mthetomusha Provincial Reserve and 105 in Songimvelo Game Reserve (Garaï, pers. comm., 2016); these are both **informed guesses** and represent increases on previous estimates.

In North West Province both Madikwe Provincial Nature Reserve (1,006 elephants) and Pilanesberg Provincial Nature Reserve (240 elephants) show increases based on **informed guesses** (Garaï, pers. comm., 2016). In Limpopo Province **informed guesses** indicate that Atherstone Provincial Nature Reserve holds 105 elephants, Letaba Provincial Nature Reserve 621, Makuya Provincial Nature Reserve nine (Garaï, pers. comm., 2016), and Manyeleti Game Reserve 222 (SANParks, 2009). Marakele National Park has 171 elephants (Ferreira et al., 2012).

As part of a total count survey of the Greater Mapungubwe Transfrontier Conservation Area (Selier & Page, 2015), 347 elephants were counted in Mapungubwe National Park and three in the surrounding area.

Information on elephants in private reserves and other privately-owned elephant properties has been obtained from the Elephant Management and Owners Association (Garaï, pers. comm., 2016). At the request of their owners, some private reserves are grouped under one overall estimate and are not shown on the map. This **guess** totals 2,482 elephants. Other private nature reserves for which numbers are available are Maremani (64), Kwandwe (57), Kariega (41) and Balule, Timbavati, Umbabat and Klaserie combined (2,772).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	18,421	—	—	—	67 %	20,563
Informed Guesses	420	—	8,423	8,433	25 %	7,515
Other Guesses	—	—	2	2	0 %	125
Totals 2015	**18,841**	**0**	**8,425**	**8,435**		
Totals 2006	**17,847**	**0**	**638**	**660**		
Assessed Range					92 %	28,203
Unassessed Range					8 %	2,448
Total Range					100 %	30,651

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+4,810	0	0	0	63 %	19,184
New Population	0	0	+64	+64	0 %	0
Different Technique	+231	0	+162	+172	10 %	3,121
Different Area	+286	0	0	0	1 %	247
New Guess	-4,333	0	+7,561	+7,539	18 %	5,651
Totals	+994	0	+7,787	+7,775	92 %	28,203

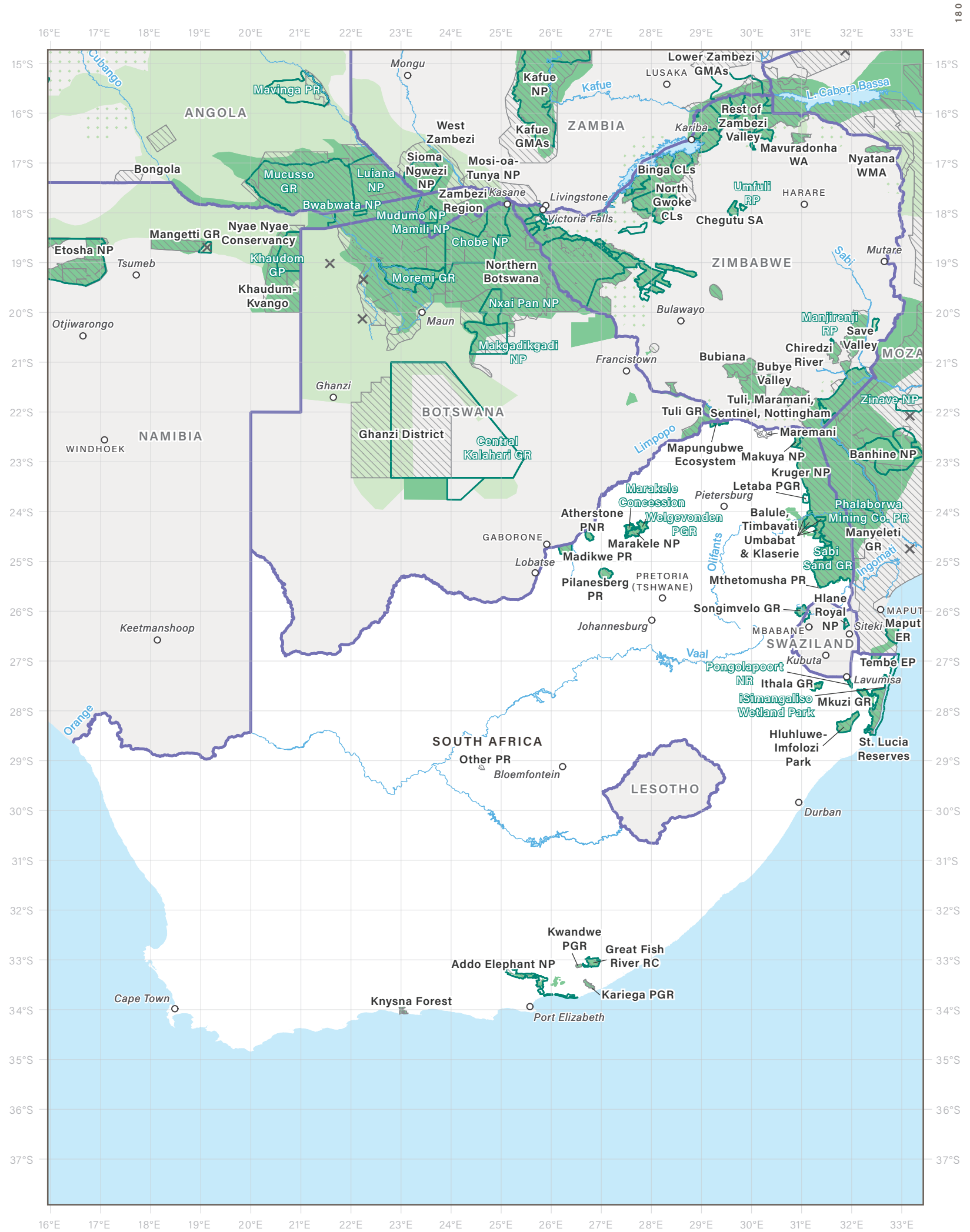
AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	20,563	0	20,563
Informed Guesses	7,515	0	7,515
Other Guesses	125	0	125
Unassessed Range	2,448	0	2,448
Totals	30,651	0	30,651

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Central Highveld Populations											
Atherstone Provincial Nature Reserve	NG	O	D	2015	105		Garaï, pers. comm., 2016	2	240	26.8˚E	24.5˚S
Madikwe Provincial Reserve	NG	O	D	2015	1,006		Garaï, pers. comm., 2016	2	605	26.3˚E	24.8˚S
Marakele National Park	DT	AT	A	2012	171		Ferreira et al., 2012	2	380	27.7˚E	24.4˚S
Pilanesberg Provincial Reserve	NG	O	D	2015	240		Garaï, pers. comm., 2016	2	491	27.1˚E	25.2˚S
Eastern Cape Populations											
Addo Elephant National Park	DT	AT	A	2012	595		Ferreira et al., 2012	2	1,250	25.5˚E	33.3˚S
Great Fish River Provincial Reserve	NG	O	D	2015	2		Selier, pers. comm., 2016	2	450	26.8˚E	33.1˚S
Kariega Private Game Reserve	NG	O	D	2015	41		Selier, pers. comm., 2016	2	190	26.7˚E	33.5˚S
Knysna Forest	NG	O	E	2015	2		Selier, pers. comm., 2016	2	126	23.0˚E	34.0˚S
Kwandwe Private Game Reserve	NG	O	D	2015	57		Selier, pers. comm., 2016	3	158	26.6˚E	33.1˚S
Eastern Lowveld Populations											
Balule, Timbavati Umbabat and Klaserie	NG	O	D	2015	2,772		Garaï, pers. comm., 2016	1	1,666	31.2˚E	24.2˚S
Kruger National Park	RS	AT	A	2015	17,086		Ferreira et al., 2015	1	19,073	31.5˚E	24.3˚S
Letaba Provincial Nature Reserve	NG	O	D	2015	621		Garaï, pers. comm., 2016	2	420	31.1˚E	23.7˚S
Makuya National Park	NG	O	D	2015	9		Garaï, pers. comm., 2016	2	165	30.9˚E	22.6˚S
Manyeleti Game Reserve	RS	AT	A	2009	222		SANParks, 2009	2	228	31.2˚E	24.1˚S
Maremani	NP	O	D	2015	64		Garaï, pers. comm., 2016	2	400	30.2˚E	22.4˚S
Mthetomusha Provincial Reserve	NG	O	D	2015	57		Garaï, pers. comm., 2016	3	72	31.3˚E	25.5˚S
Songimvelo Game Reserve	NG	O	D	2015	105		Garaï, pers. comm., 2016	2	490	31.0˚E	26.0˚S
Greater Mapungubwe Ecosystem											
Mapungubwe Ecosystem	DA	AT	A	2014	347		Selier & Page, 2015	2	279	29.3˚E	22.2˚S
KwaZulu-Natal Populations											
Hluhluwe Imfolozi Game Reserve	NG	O	D	2015	700		EKZNW, 2016	2	965	31.9˚E	28.3˚S
Ithala Game Reserve	DT	O	D	2015	162		EKZNW, 2016	2	297	31.3˚E	27.5˚S
St. Lucia Reserves	DT	O	D	2015	110		EKZNW, 2016	2	539	32.5˚E	27.9˚S
Tembe Elephant Park	DT	O	D	2015	220	10*	EKZNW, 2016	2	285	32.5˚E	26.9˚S
uMkhuze Game Reserve	NG	O	D	2015	90		EKZNW, 2016	2	380	32.3.˚E	27.7˚S
Other Private Reserves											
Other Private Reserves	NG	O	D	2015	2,482		Garaï, pers. comm., 2016	3		24.6.˚E	29.1˚S

South Africa



0 100 200 300 400 500 600km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

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COUNTRY

Swaziland

ESTIMATED TOTAL ELEPHANTS

42 ± 0

GUESSES

0 - 0

GENERAL STATISTICS

Country Area	17,360 km²
Range Area	50 km² (0%)
Protected Range	80 %
Information Quality Index (IQI)	0
CITES Appendix	I
Listing Year	1997 (year of accession)

CURRENT ISSUES

Swaziland has only two small fenced populations of elephants and concerns have been raised about their impact on the biodiversity of these areas. In 2016, the U.S. Fish and Wildlife Service approved an application to import 18 African elephants from Swaziland to three zoos in the United States. In March 2016 the elephants were flown to the US despite a pending legal challenge to block the importation (Peters, 2016).

There is no current or past action plan or strategy for the management of African elephants in Swaziland.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Swaziland is 42 at the time of the last survey for each area. This number applies to 50 km², which is 100% of the estimated known and possible elephant range in Swaziland.

Elephant distribution is well known in Swaziland, being mainly restricted to fenced enclosures within Hlane Royal National Park and Mkhaya Game Reserve. The enclosures only occupy a fraction of the reserves (6% and 19% respectively). **Individual registration** of all elephants is maintained for the Hlane Royal NP and Mkhaya GR populations. There were 25 elephants in Hlane in 2015 compared to 13 in 2005, and 14 in Mkhaya in 2015 compared to 15 in 2005 (Reilly, pers. comm., 2016).

Three elephants originating from the Songimvelo Game Reserve in South Africa are regularly seen in the Mololotja Nature Reserve in north-western Swaziland (Reilly, pers. comm., 2012). During 2014, two elephants, a cow and a sub-adult crossed from Mozambique into Swaziland at Lomahasha. Over a period of three days they traveled across Hlane Royal NP and west to the escarpment, west of eBuhleni, traversing communal areas. They then returned along a similar route, crossing Hlane Royal NP and Mlawula Nature Reserve, returning to Mozambique via the Umbuluzi river gorge (Reilly, pers. comm., 2016).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Individual Registrations	39	—	—	—	45 %	22
Informed Guesses	3	—	0	0	55 %	28
Totals 2015	**42**	**0**	**0**	**0**		
Totals 2006	**31**	**0**	**0**	**0**		
Assessed Range					100 %	50
Unassessed Range					0 %	0
Total Range					100 %	50

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+11	0	0	0	45 %	22
New Guess	0	0	0	0	55 %	28
Totals	+11	0	0	0	100 %	50

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	22	0	22
Informed Guesses	28	0	28
Unassessed Range	0	0	0
Totals	50	0	50

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km^2)	LON.	LAT.
Hlane Royal National Park	RS	IR	A	2015	25		Reilly, pers. comm., 2016	1	142	31.9˚E	26.3˚S
Malolotja Nature Reserve	NG	O	D	2012	3		Reilly, pers. comm., 2012	1	28	31.1˚E	26.1˚S
Mkhaya Nature Reserve	RS	IR	A	2015	14		Reilly, pers. comm., 2016	1	65	31.7˚E	26.6˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

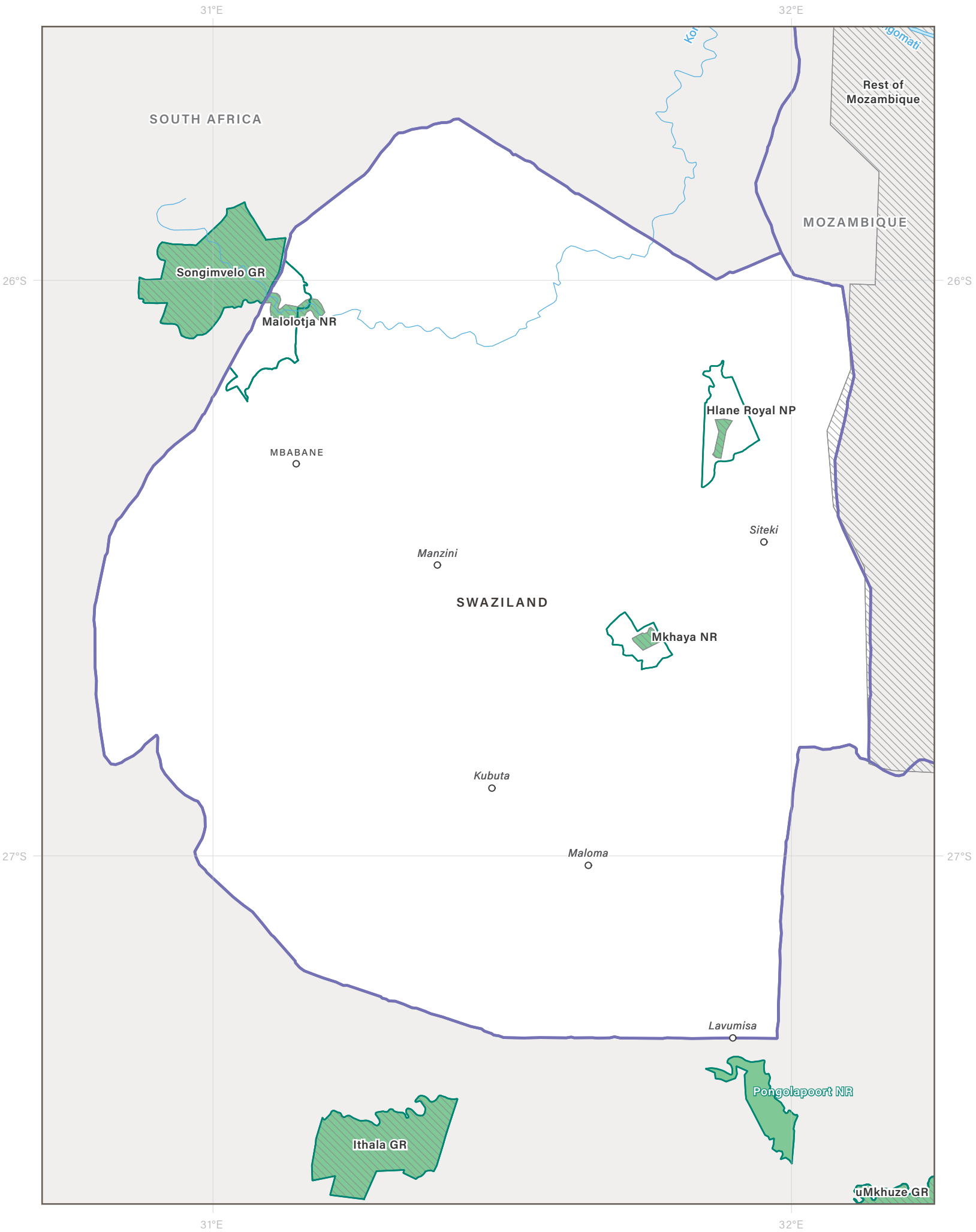
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Swaziland



0 10 20 30 40 50 60km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

Int'l Boundaries		ELEPHANT RANGE	
Rivers & Lakes		Known	
Towns		Possible	
Protected Areas		Doubtful	
Input Zones		Sighting	

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COUNTRY

Zambia

ESTIMATED TOTAL ELEPHANTS

21,967 ± 4,703

GUESSES

214 - 314

GENERAL STATISTICS

Country Area	752,610 km²
Range Area	170,466 km² (23%)
Protected Range	27%
Information Quality Index (IQI)	0.50
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Zambia has a number of large protected areas, and much of the country is covered by game management areas. However, wildlife densities are generally low. Elephant populations were badly affected by poaching in the late 1970s and poaching for ivory continues to be a problem (Nyirenda et al., 2015). The large size of the national parks and particularly of the game management areas makes it difficult to manage them effectively with limited resources (Lindsey et al., 2014).

The Bangweulu Wetlands are being co-managed by the African Parks Network and North Luangwa National Park is being co-managed by the Frankfurt Zoological Society.

The Zambia Wildlife Act (1998), which established the parastatal Zambia Wildlife Authority, was repealed by the Zambia Wildlife Act (2015), which placed responsibility for wildlife management under the National Parks and Wildlife Department. Zambia published a national policy and action plan for elephant management in 2003 (Ministry of Tourism, 2003).

Trophy hunting of elephants is legal in Zambia. From 2007 to 2012, Zambia increased its annual export quota of elephant hunting trophies from 40 (tusks and other hunting trophies from 20 animals) to 160 (tusks and other trophies from 80 animals) (CITES, n.d.-b). Zambia declared a temporary suspension of elephant hunting in 2013, and the quota declared to CITES in 2013 and 2014 was zero. There appears to be some confusion about whether the suspension had been lifted in late 2014 (Kunda, 2014). The declared quota to CITES for 2015 and 2016 was 160 (CITES, n.d.-b).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Zambia is 21,967 ± 4,703 at the time of the last survey for each area. There may be an additional 214 to 314 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 105,461 km^2, which is 62% of the estimated known and possible elephant range. There remains an additional 38% of the estimated range for which no elephant population estimates are available.

Elephant numbers in Zambia have changed little since the last update. The main changes have been a reduction in guesses from isolated small populations such as West Lunga and Bangweulu. There has been a substantial reduction in numbers in Sioma Ngwezi National Park but this makes up a small proportion of the national population.

A country wide aerial survey was carried out in 2015 as part of the Great Elephant Census, covering the four major elephant range areas (DNPW, 2016): the Luangwa Valley, the Kafue ecosystem, the Lower Zambezi Valley and Sioma Ngwezi NP and surrounding game management areas (GMAs). A 2013 countrywide survey was carried out but the results were not released. The previous country-wide survey was carried out in 2008 (Simukonda, 2009), but it is unclear how comparable the methods were to the 2015 survey.

The Luangwa Valley includes South Luangwa National Park, North Luangwa NP, Luambe National Park, Lukusuzi National Park and a number of GMAs. In the 1970s this area held a population of perhaps 100,000 elephants (Caughley & Goddard, 1975), but this was greatly reduced by poaching in the late 1970s and 1980s (Jachmann & Billiouw, 1997). Aerial sample counts have been carried out since the 1970s but they have been inconsistent in coverage and methodology, making comparisons difficult.

An **aerial sample count** was carried out in the Luangwa ecosystem in 2015 as part of the Great Elephant Census (DNPW, 2016). The total estimate was 13,898 ± 3,555 (DNPW, 2016). A series of earlier surveys had appeared to show a decline in numbers, going from 18,634 ± 3592 in 2008 (Simukonda, 2009) to 10,649 ± 2,205 in 2011 and 6,361 ± 1652 in 2012 (DNPW, 2016) so the higher figure in 2015 was unexpected.

The sub-total for North Luangwa NP in 2015 was 4,673 ± 1,788 elephants (DNPW, 2016). This replaces an estimate of 3,235 ± 695 from 2003 (van der Westhuizen, 2003). The estimate for South Luangwa NP in 2015 was 3,302 ± 1,194 (DNPW, 2016) which replaces an estimate of 4,459 ± 695 from 2002 (Dunham & Simwanza, 2002).

There was no estimate for Luambe NP in the AESR 2007, whereas the 2015 survey gave an estimate of 54 ± 77. No elephants were seen in Lukusuzi National Park in the 2015 survey, nor in the preceding 2005 count of the area (Fourie & Ferreira, 2005). West Petauke and Luano GMAs were not covered in the 2015 survey, so a zero estimate from 2009 (WCS Flight Programme, 2009) and guess of 150 from 1996 (Jachmann, 1996) have been retained.

Some changes have been made to the range map for the Luangwa ecosystem on the basis of these surveys. The southern GMA of West Petauke has been changed from known range to **possible range** as has much of the eastern part of the ecosystem.

Kafue National Park and adjoining GMAs hold the country's second largest elephant population. The 2015 **aerial sample count** gave an estimate of 6,689 ± 1,418 (4,813 ± 2,265 in the NP and 1,876 ± 2,064 in the surrounding GMAs (DNPW, 2016). These replace a 2004 estimate of 6,306 ± 5,227 in the park only (Simwanza, 2004). The carcass ratio for Kafue NP was only 1% in 2008 and increased to 7% by 2015 (DNPW, 2016) giving some cause for concern, despite the apparent stability of the population. Minor changes have been made to the range map (Beattie, pers. comm., 2015).

The 2015 survey gave an estimate for the Lower Zambezi system, comprising the Lower Zambezi National Park and surrounding GMAs, of 973 ± 589 for the park and 153 ± 172 for the surrounding GMAs (DNPW, 2016). This replaces a 2003 estimate of 1,477 ± 744 for the park, and 45 ± 53 for the GMAs (Dunham, 2004). Another count in 2008 gave an estimate of 1,298 ± 438 (Simukonda, 2009). The elephants in Lower Zambezi NP are confined to a fairly small area along the Zambezi River below the escarpment and the area of known range has been reduced on the basis of sightings from aerial surveys and mortality records (Stevenson, pers. comm., 2015).

Sioma Ngwezi National Park is surrounded by GMAs in the south-west close to the Namibian and Angolan borders. The 2015 **aerial sample count** gave an estimate of 48 ± 78 for the park and a zero estimate for the GMAs (DNPW, 2016). This replaces an estimate of 385 ± 371 from 2005 (Chase & Griffin, 2005). There were also aerial sample counts in 2008 (Simukonda, 2009), 2009 and 2013 (Chase et al., 2013) which gave estimates of 2,433 ± 2,210, 400 (no confidence limits given) and 133 ± 149, respectively. The carcass ratio increased dramatically from 3% to 85% between 2008 and 2015 (DNPW, 2016) indicating either high levels of poaching and/or a seasonally varying population. Elephants move between Sioma Ngwezi, Namibia and Botswana (Chase et al., 2013).

There is a small population of elephants in the Mosi-oa-Tunya National Park next to Victoria Falls. An **aerial total count** of 31 in 2008 (Simukonda, 2009) replaces a guess of 306 from 2006 (Chase, 2006). No elephants were observed in the adjoining Kazungula ecosystem in an **aerial sample count** in 2008 (Simukonda, 2009). This area had not previously been surveyed.

There are only five resident elephants (Willems, pers. comm., 2016) in the Bangweulu Wetlands, contributing to an **informed guess** of 45 for the entire Bangweulu/Kasanka/Lavusha Manda system close to the DRC border. This replaces a series of old guesses amounting to 144 from the 1990s (Blanc et al., 2007). The area of **known range** has been increased.

There is a small isolated elephant population on the north bank of Lake Kariba, in the Kotakota area. An estimate of 19 animals from 1991 has been retained from the AESR 2007 (Tembo, pers. comm., 1993).

There are about 100 elephants in Nsumbu National Park (Tanganyika ecosystem) on the southern shores of Lake Tanganyika. In the past this was thought to be connected to the elephant population in Katavi and there was an annual migration to the southern region of the DRC but this has not

taken place since 2007, after a major poaching incident on the border. The elephants are now restricted to part of the park and the area of **known** and **possible range** has been reduced accordingly (Zytkow, pers. comm., 2016).

West Lunga National Park is in the far west, close to the Angolan border. There were estimated to be over 500 elephants in 1996, but numbers appear to have dropped considerably since then. There were sightings of 21 individuals in 2014 as well as a number of other scattered recordings (Tilbury, pers. comm., 2015; ZAWA & WWF, 2014). The area of **known range** has been expanded to the area of these sightings.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	85	—	—	—	0 %	107
Aerial Sample Counts	21,761	4,704	—	—	45 %	75,884
Informed Guesses	121	—	45	145	16 %	27,780
Degraded Data	—	—	169	169	1 %	1,691
Totals 2015	**21,967**	**4,703**	**214**	**314**		
Totals 2006	**22,251**	**5,891**	**870**	**870**		
Assessed Range					62 %	105,461
Unassessed Range					38 %	65,005
Total Range					100 %	170,466

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+933	±7,405	-56	-56	43 %	73,313
New Population	+54	±76	0	0	6 %	9,745
Different Technique	-275	0	0	0	0 %	75
Different Area	-1,025	±1,408	0	0	4 %	6,823
New Guess	+29	±92	-592	-492	8 %	13,814
Totals	-284	±7,539	-648	-548	61 %	105,461

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	107	0	107
Direct Sample and Reliable Dung	65,184	10,700	75,884
Informed Guesses	16,765	11,015	27,780
Other Guesses	17	1,674	1,691
Unassessed Range	10,602	54,403	65,005
Totals	92,674	77,793	170,466

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bangweulu System	NG	O	D	2015	45		Willems, pers. comm., 2016	1	15,115	30.2˚E	12.0˚S
Chete and Sekula Islands	RS	AT	A	2008	54		Simukonda, 2009	4	32	27.5˚E	17.4˚S
Kafue Ecosystem											
Kafue Game Management Areas	RS	AS	B	2015	1,876	2,064	DNPW, 2016	1	22,800	25.9˚E	15.3˚S
Kafue National Park	RS	AS	B	2015	4,813	2,265	DNPW, 2016	1	22,230	25.9˚E	15.3˚S
Kotakota Game Ranch	-	AT	E	1991	19		Tembo, pers. comm., 1993	4	15	28.0˚E	16.8˚S
Lower Zambezi											
Lower Zambezi National Park	RS	AS	B	2015	973	589	DNPW, 2016	2	1,145	29.7˚E	14.0˚S
Lower Zambezi Game Management Areas	RS	AS	B	2015	153	172	DNPW, 2016	2	1,383	29.5˚E	15.7˚S
Luangwa Ecosystem											
Luambe National Park	NP	AS	B	2015	54	77	DNPW, 2016	3	344	29.7˚E	14.0˚S
Luangwa Game Management Areas	RS	AS	B	2015	5,869	3,108	DNPW, 2016	1	16,754	32.2˚E	12.4˚S
Luano	-	O	E	1996	150		Jachmann, 1996	1	8,930	29.6˚E	14.8˚S
Lukusuzi National Park	RS	AS	B	2015	0		DNPW, 2016	2	2,610	29.7˚E	14.0˚S
North Luangwa National Park	RS	AS	B	2015	4,673	1,788	DNPW, 2016	2	4,676	29.7˚E	14.0˚S
South Luangwa National Park	RS	AS	B	2015	3,302	1,194	DNPW, 2016	2	8,646	29.7˚E	14.0˚S
West Petauke Game Management Area	DA	AS	D	2009	0		WCS Flight Programme, 2009	2	8,143	32.1˚E	12.6˚S
Tanganyika Ecosystem	NG	O	D	2016	100	100*	Zytkow, pers. comm., 2016	2	7,082	30.0˚E	8.8˚S
West Lunga National Park	NG	O	D	2014	21		Tilbury, pers. comm., 2016	2	1,684	24.8˚E	12.8˚S
West Zambezi											
Kazungula Landscape	NP	AS	B	2008	0		Simukonda, 2009	2	5,112	29.8˚E	14.2˚S
Mosi-oa-Tunya National Park	DT	AT	A	2008	31		Simukonda, 2009	4	67	25.8˚E	17.9˚S
Sioma Ngwezi National Park	RS	AS	B	2015	48	78	DNPW, 2016	2	4,482	29.7˚E	14.0˚S
West Zambezi	NP	O	D	2015	0		WWF Zambia, 2016	2	7,143	23.7˚E	17.0˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

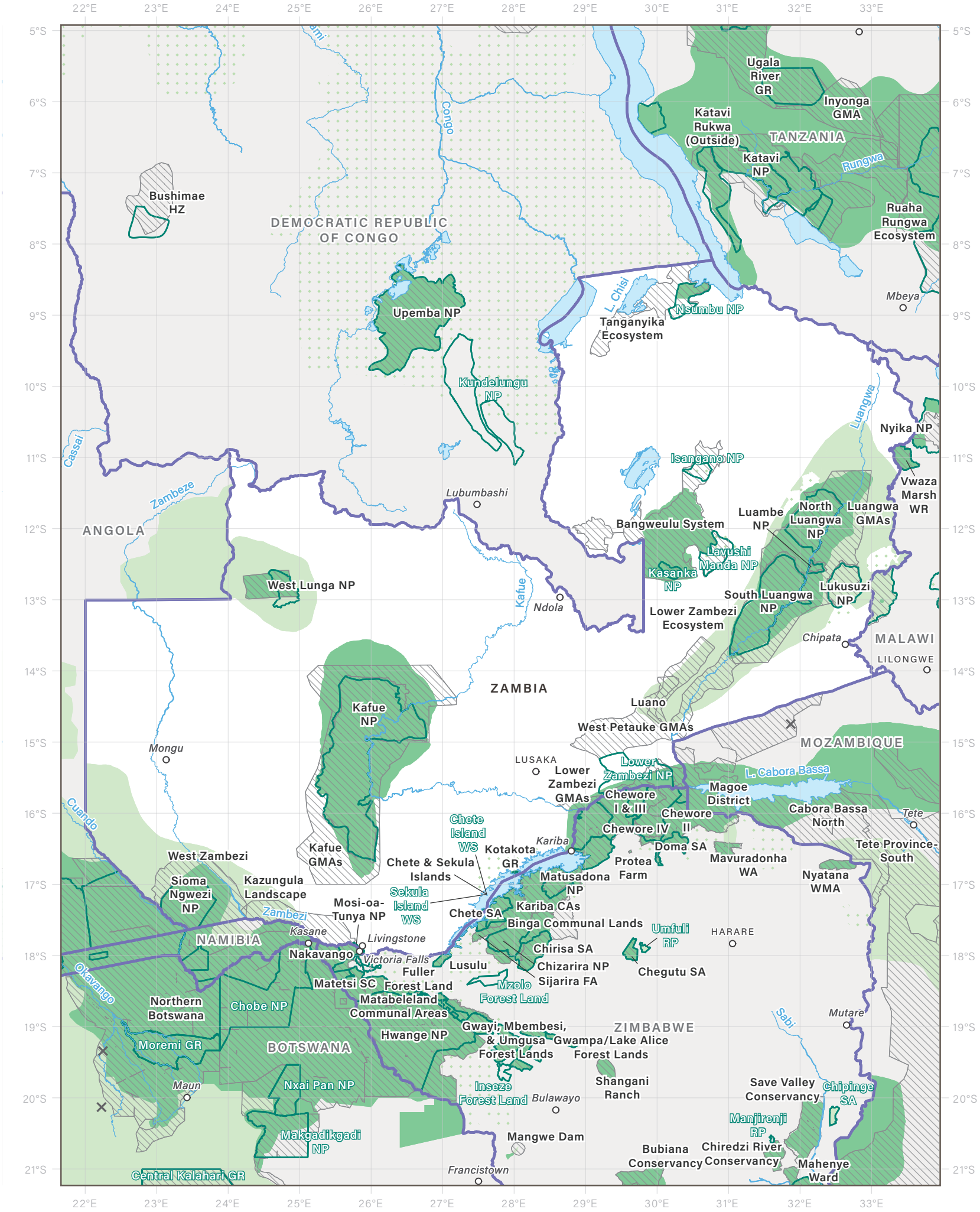
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Zambia



0 80 160 240 320 400 480km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Zimbabwe

ESTIMATED TOTAL ELEPHANTS

82,630 ± 8,589

GUESSES

1,635 - 1,805

GENERAL STATISTICS

Country Area	390,580 km²
Range Area	81,228 km² (21%)
Protected Range	61 %
Information Quality Index (IQI)	0.86
CITES Appendix	II
Listing Year	1997

CURRENT ISSUES

Poaching of elephants for ivory has escalated in the past ten years and has become a major problem in Zimbabwe. A worrying recent development has been the emergence of poisoning as a poaching technique. Just over 100 elephants were killed in a single cyanide poisoning incident in Hwange National Park in late 2013 (Muboko et al., 2014). The impact of poaching has been highest in the north of the country, particularly in the Sebungwe Region to the south of Lake Kariba, and the Lower Zambezi Region (Dunham et al., 2015c). Although elephant numbers have increased in Gonarezhou National Park, it too experienced an increase in poaching in 2015 (Dunham & van der Westhuizen, 2015).

Concern has been expressed about the impact of high numbers of elephants on vegetation and other biodiversity in Zimbabwe's protected areas. Despite the increase in poaching, this remains a problem in protected areas such as Hwange NP, where the provision of artificial water supplies has led to high elephant densities (ZPWMA, 2015).

Zimbabwe published a national elephant management plan covering the period 2015 to 2020 (ZPWMA, 2015).

In 2008, Zimbabwe undertook an approved one-off sale of 3,764 kg of ivory to Japan and China, at a price of USD $487,162 (Wijnstekers, 2011).

Zimbabwe's annual declared export quota of elephant trophies remains unchanged since 2007 at 1,000 (tusks as hunting trophies from 500 animals) (CITES, n.d.-b). In 2015, the US Fish and Wildlife Service removed its 'non-detriment' finding, thus banning the import of elephant trophies into the USA (USFWS, 2015a).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Zimbabwe is 82,630 ± 8,589 at the time of the last survey for each area. There may be an additional 1,635 to 1,805 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 78,839 km^2, which is 97% of the estimated known and possible elephant range. There remains an additional 3% of the estimated range for which no elephant population estimates are available.

There has been a decline of just over 10,000 elephants from surveyed populations since the AESR 2007 and an increase of about 1,000 in guesses, mostly from previously unsurveyed areas in North West Matabeleland. Although there have been large losses from the Sebungwe and Lower Zambezi populations, these have been partially compensated by increases in Gonarezhou and North West Matabeland.

The major populations of the Lower Zambezi Valley (including Mana Pools National Park), Sebungwe (including Matusadona and Chizarira National Parks), North-west Matabeleland (including Hwange and Zambezi National Parks) and the south-east Lowveld (including Gonarezhou NP) were surveyed in 2014 using **aerial sample counts** (including block counts in hilly areas) as part of the Great Elephant Census.

The estimate from the Lower Zambezi Valley in 2014 was 11,656 ± 2,259 (Dunham et al., 2015c). The previous comparable estimate was 19,297 ± 2,527 in 2001 (Mackie, 2002). The 2014 figure replaces an estimate from the AESR 2007 of 19,981 ± 2,392 from 2003 (Dunham, 2004). This survey was less comparable than the 2001 one because it covered a slightly smaller area. There was an approximately 40% decline in the 13 years between 2001 and 2014. The observed carcass ratio of 6% is not as high as one would expect given the rate of population reduction and might suggest that the level of poaching has reduced in recent years. The corridor between the Mavuradonha Wilderness Area and the rest of the Zambezi Valley range has been changed to **possible range** (Packenham quoting Varden, pers. comm., 2016).

The 2014 estimate for Sebungwe was 3,407 ± 1,215 (Dunham et al., 2015b) which replaces an estimate of 15,024 ± 2,133 from a 2006 survey (Dunham et al., 2006a). The observed carcass ratio of 30% indicates an unsustainably high offtake of elephants. There were almost no elephants left in the communal areas, with the main surviving sub-populations in Matusadona and Chizarira National Parks and the Chirisa Safari Area. Wildlife scouts reported 70-100 elephants in Kavira Forest Land at the western end of Sebungwe (M. Sebele pers. comm. in Dunham et al., 2015b).

The 2014 estimate for North-west Matabeleland was 53,991 ± 7,711 (Dunham et al., 2015a), which replaces an estimate of 49,310 ± 7,051 from 2001 (Dunham & Mackie, 2002). There was no significant difference between the totals although the increased carcass ratio of 7% from 3% in 2001 is a worrying sign. Other aerial sample counts were carried out in 2006 and 2007 but they were not

suitable for comparative purposes (Dunham et al., 2007; Dunham et al., 2006b). Since the 2014 Botswana survey was carried out a month earlier than the north-west Matabeleland survey there is a possibility of double-counting or missing animals that had moved from Hwange into Botswana. There was a surprisingly large number of elephants seen in the Ngwasho/Sepako stratum in Botswana adjoining the southern half of Hwange NP (estimate 11,744) (Chase et al., 2015) and evidence from radio-tracking shows that elephants do move out of Hwange into adjoining areas of Botswana (Chamaillé-Jammes, pers. comm., 2016; Ferguson & Chase, 2010).

Elephant range in North-west Matabeleland has probably increased. Water hole counts and scout reports indicated 308 elephants in the Fuller Forest Land, 165 in Gwaai, Bembezi and Umguza Forest Lands (which has been marked as new **known range**) and 150 in Gwampa/Lake Alice Forest Reserves (M. Sebele pers. comm in Dunham et al., 2015a) which are all recorded as **new populations**. I. Du Preez (pers. comm. in Dunham et al., 2015a) reported an **informed guess** of 36 elephants in the privately owned Stanley & Livingstone Game Reserve (Nakavango).

The estimate for Gonarezhou NP from the 2014 survey was 11,120 ± 2,709 (Dunham & van der Westhuizen, 2015). This replaces an estimate of 4,987 ± 1,577 from a comparable 2001 survey. Another survey in 2009 gave an estimate of 9,123 ± 1,898 (Dunham et al., 2010). The elephant population of Gonarezhou NP is continuing to increase, and is at its highest level since surveys started in 1980. There was a relatively low carcass ratio of 4%. There are limited movements of elephants from Gonarezhou into adjoining parts of Mozambique, and one radio-collared elephant moved from Kruger to Gonarezhou (Henley, 2011).

The 2014 survey of the south east Lowveld included some neighbouring areas. No elephants were observed in the Malapati Safari Area immediately south-west of Gonarezhou but there was an estimate of 332 ± 519 in the Mahenye communal land to the north-east of Gonarezhou, which replaces a zero estimate from the 2001 survey. The 2014 survey gave an estimate of 1,585 ± 1,295 for the Savé Valley Conservancy. This replaces an estimate of 527 ± 310 (Dunham, 2003). There is no statistical difference between the two results. Aerial total counts were carried out in 2013 and 2015 (Jooste & Lenton, 2015; Joubert & Joubert, 2013), which did not cover the entire area: 1,538 and 1,490 elephants were counted respectively. Sengwe, further to the south-west, adjoining the northern boundary of Kruger National Park in South Africa, was not counted in the 2014 survey, but there was an estimate of 35 ± 99 in 2013 (Dunham et al., 2013). In the Malilangwe Conservancy 272 elephants were counted using a helicopter in 2013 (Clegg, 2013). This replaces an estimate of 116 from an aerial total count in 2001 (Dunham, 2002). There was an estimate of 55 in 2014 for the Chiredzi River Conservancy (Warth in Dunham & van der Westhuizen, 2015) compared to 28 in 2001 (Dunham, 2002). Although Chipinge Safari Area is marked as possible elephant range, this is now highly unlikely.

There are a number of small isolated populations in other parts of Zimbabwe, which have updated estimates for 2014. There is an informed guess of 150 elephants for Chegutu Safari Area (Mwale, pers. comm. in Dunham, 2015), formerly Hartley Safari Area, west of Harare and this replaces a guess of 100 from 2001 (Dunham & Mackie, 2002). Some 30 elephants reportedly move from the Nyatana Wildlife Management Area in the north east of the country into Mozambique and this replaces a guess of 150 from 2001 (Dunham & Mackie, 2002).

NUMBERS AND DISTRIBUTION
CONT.

Some 20 bull elephants were photographed, and there was a further unverified report of 40 elephants, near Mangwe Dam in the vicinity of Home Farm and Greystone Ranches, across the border from Francistown in Botswana (Robertson and Winch, pers. comm. in Dunham, 2015) replacing a guess of three from 2002 (Dunham & Mackie, 2002). A helicopter total count enumerated 174 elephants on Shangani Ranch near Bulawayo (Edwards, pers. comm. in Dunham, 2015) and this replaces a guess of 60 from 2001 (Dunham & Mackie, 2002).

There was a **total aerial count** of 212 elephants in 2014 in the Zimbabwe section of the Mapungubwe Transfrontier Conservation Area which includes Tuli Safari Area, Sentinel, Nottingham and River Ranches (Selier & Page, 2015). This replaces an estimate of 82 from 2001 (Dunham & Mackie, 2002).

There were **informed guesses** in 2014 of 500-600 in Bubye Valley (Leathem & English pers. comm. in Dunham, 2015), and 100 on Bubiana Conservancy (Drummond pers. comm. in Dunham, 2015) in the south of Zimbabwe, replacing guesses of 53 and 50 respectively (Dunham & Mackie, 2002). An old estimate of ten elephants in the Mambali Communal Lands on the Botswana border has been retained from the AESR 2007 (Dunham & Mackie, 2002). A report of 54 elephants on Nuanetsi Ranch is recorded as a **new population**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	484	—	—	—	1 %	819
Aerial Sample Counts	82,126	8,589	—	—	81 %	65,502
Informed Guesses	20	—	527	567	5 %	3,777
Other Guesses	—	—	1,091	1,221	10 %	8,399
Degraded Data	—	—	17	17	0 %	342
Totals 2015	**82,630**	**8,589**	**1,635**	**1,805**		
Totals 2006	**93,122**	**7,068**	**534**	**625**		
Assessed Range					97 %	78,839
Unassessed Range					3 %	2,389
Total Range					100 %	81,228

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	-10,320	±11,124	0	0	79 %	63,868
New Population	0	0	+713	+713	6 %	4,563
Different Technique	+7	±99	-145	-145	4 %	3,370
Different Area	+20	0	-3	+36	0 %	33
New Guess	-182	0	+519	+559	8 %	6,662
Data Degraded	-17	0	+17	+17	0 %	0
Totals	-10,492	±11,124	+1,101	+1,180	97 %	78,839

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	819	0	819
Direct Sample and Reliable Dung	65,375	127	65,502
Informed Guesses	3,745	32	3,777
Other Guesses	8,741	0	8,741
Unassessed Range	1,533	857	2,389
Totals	80,213	1,016	81,228

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Chegutu Safari Area	NG	O	E	2014	150		Dunham, 2015	2	445	29.6˚E	17.9˚S
Greater Mapungubwe											
Tuli, Maramani, Sentinel, Nottingham	RS	AT	A	2014	212		Selier & Page, 2015	2	1,192	29.4˚E	22.0˚S
Lower Zambezi Valley											
Chewore II	RS	AS	B	2014	594	333	Dunham et al., 2015c	2	1,058	29.9˚E	16.1˚S
Chewore I & III	RS	AS	B	2014	2,709	851	Dunham et al., 2015c	2	1,773	29.9˚E	16.1˚S
Chewore IV	RS	AS	B	2014	0		Dunham et al., 2015c	3	472	29.9˚E	16.1˚S
Doma Safari Area	RS	AS	B	2014	153	194	Dunham et al., 2015c	2	991	29.9˚E	16.1˚S
Mavuradonha Wilderness Area	RS	AS	B	2014	0		Dunham et al., 2015c	2	652	29.9˚E	16.1 S
Mukwiche Area	RS	AS	B	2014	0		Dunham et al., 2015c	3	337	29.9˚E	16.1 S
Protea Farm	-	O	E	2001	7		Dunham & Mackie, 2002	4	14	29.6˚E	16.5˚S
Rest of Zambezi valley	RS	AS	B	2014	8,200	2,029	Dunham et al., 2015c	1	11,720	29.9˚E	16.1 S
Mambali Communal Lands	-	AT	E	2001	10		Dunham & Mackie, 2002	2	327	28.4˚E	21.5˚S
Mangwe Dam	DA	O	D	2014	20	40*	Dunham, 2015	3	291	28.1˚E	20.7˚S
Northwest Matabeleland											
Fuller Forest Land	NP	O	D	2014	308		Dunham, 2015	3		25.9˚E	18.1˚S
Gwaai, Bembesi, and Umguza Forest Lands	NP	O	D	2014	165		Dunham, 2015	2	1,442	28.0˚E	19.3˚S
Gwampa/Lake Alice Forest Lands	NP	O	E	2014	150		Dunham, 2015	2	860	28.5˚E	19.1˚S
Hwange National Park	RS	AS	B	2014	45,846	6,244	Dunham et al., 2015a	1	15,168	26.4˚E	18.8˚S
Matabeleland Communal areas	RS	AS	B	2014	2,201	3,062	Dunham et al., 2015a	2	3,075	26.4˚E	18.8˚S
Matetsi Safari Complex	RS	AS	B	2014	4,843	2,968	Dunham et al., 2015a	1	4,384	26.4˚E	18.8˚S
Nakavango	NP	O	E	2014	36		Dunham, 2015	3		25.8˚E	18.0˚S
Ngamo & Sikumi Forest Areas	RS	AS	B	2014	1,101	993	Dunham et al., 2015a	2	2,332	26.4˚E	18.8˚S
Nyatana Wildlife Management Area	NG	O	E	2014	30		Dunham, 2015	2	651	32.5˚E	16.7˚S
Sebungwe											
Binga Communal Lands	RS	AS	B	2014	86	162	Dunham et al., 2015b	2	2,201	28.2˚E	17.4˚S
Chete Safari Area	RS	AS	B	2014	278	222	Dunham et al., 2015b	2	1,242	28.2˚E	17.4˚S
Chirisa Safari Area	RS	AS	B	2014	1,200	755	Dunham et al., 2015b	2	1,530	28.2˚E	17.4˚S
Chizarira National Park	RS	AS	B	2014	747	767	Dunham et al., 2015b	2	2,096	28.2˚E	17.4˚S
Kariba Communal Areas	RS	AS	B	2014	411	364	Dunham et al., 2015b	2	3,198	28.2˚E	17.4˚S
Kavira Forest Land	NG	O	E	2014	70	30*	Dunham et al., 2015b	2	287	27.0˚E	18.1˚S
Lusulu	RS	AS	B	2014	0		Dunham et al., 2015b	2	537	28.2˚E	17.4˚S

ELEPHANT ESTIMATES (CONT.)

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Matusadona National Park	RS	AS	B	2014	669	251	Dunham et al., 2015b	2	1,366	28.2˚E	17.4˚S
North Gokwe Communal Lands	RS	AS	B	2014	0	21	Dunham et al., 2015b	2	3,096	28.2˚E	17.4˚S
Sijarira Forest Area	RS	AS	B	2014	16		Dunham et al., 2015b	3	261	28.2˚E	17.4˚S
Shangani Ranch	NG	O	E	2014	174		Dunham, 2015	2	628	29.3˚E	19.6˚S
Southeast Lowveld											
Bubiana Conservancy	NG	O	E	2014	100		Dunham, 2015	2	1,772	29.8˚E	21.1˚S
Bubye Valley Conservancy	NG	O	E	2014	500	100*	Dunham, 2015	1	2,895	30.1˚E	21.5˚S
Chiredzi River Conservancy	DT	O	E	2014	55		Dunham, 2015	2	895	31.6˚E	20.8˚S
Gonarezhou National Park	RS	AS	B	2014	11,120	2,709	Dunham & van der Westhuizen, 2015	1	4,941	31.9˚E	21.5˚S
Mahenye Ward	RS	AS	B	2014	332	519	Dunham & van der Westhuizen, 2015	3	221	31.9˚E	21.5˚S
Malapati Safari Area	RS	AS	B	2014	0		Dunham & van der Westhuizen, 2015	3	177	31.9˚E	21.5˚S
Malilangwe Conservancy	RS	AT	A	2013	272		Clegg, 2013	3	425	31.9˚E	21.1˚S
Matibi II Communal Lands	-	AS	E	1996	0		Davies et al., 1996	3	400	31.7˚E	21.5˚S
Nuanetsi Ranch	NP	O	D	2014	54		Dunham, 2015	2		30.8˚E	21.6˚S
Save Valley Conservancy	RS	AS	B	2014	1,585	1,295	Dunham & van der Westhuizen, 2015	2	3,496	32.1˚E	20.4˚S
Sengwe Communal Land	DT	AS	B	2013	35	99	Dunham et al., 2013	2	2,488	31.8˚E	21.6˚S

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

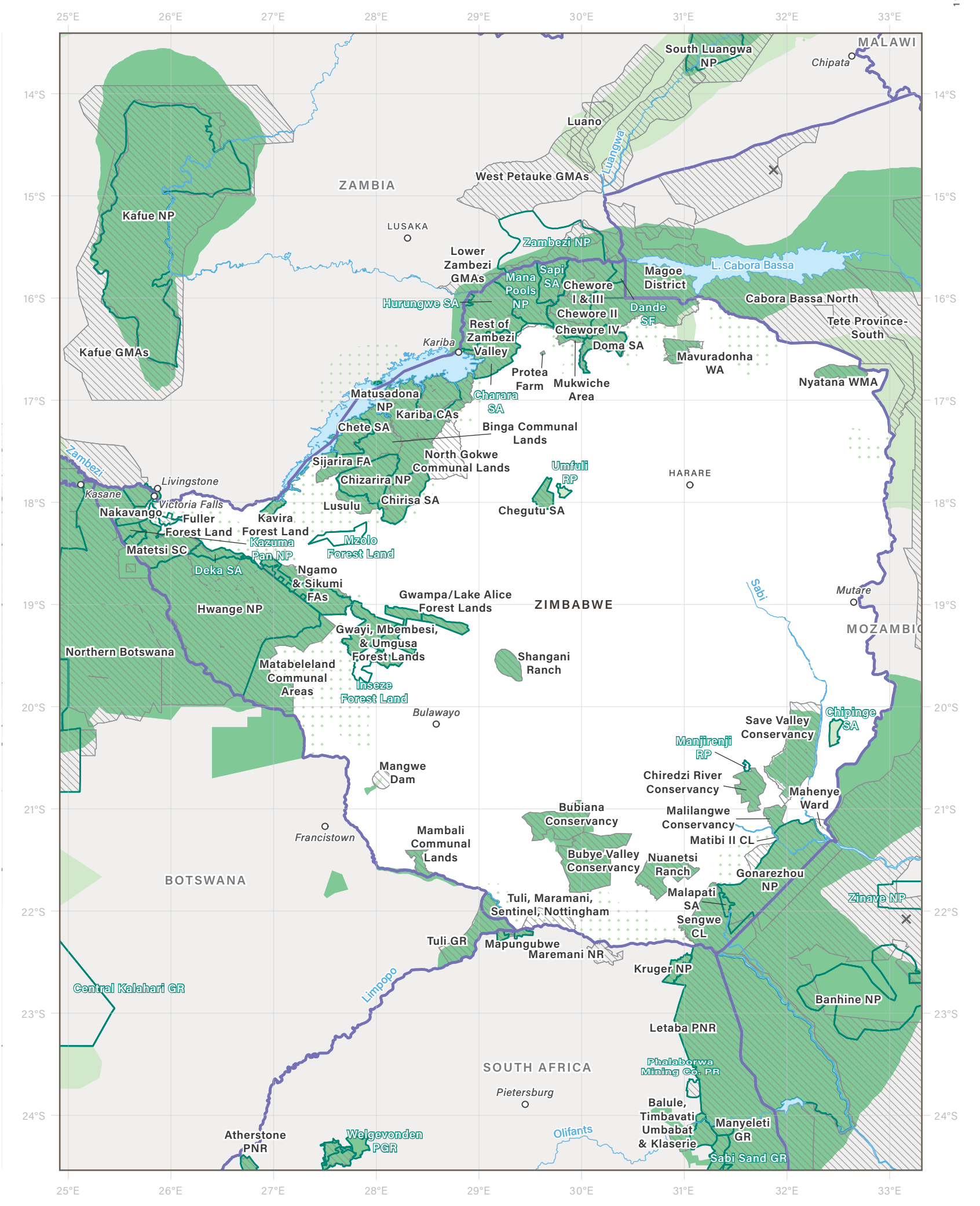
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Zimbabwe



0 50 100 150 200 250 300km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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West

REGION

West Africa

ESTIMATED TOTAL ELEPHANTS

11,489 ± 2,583

GUESSES

2,886 - 3,376

GENERAL STATISTICS

Region Area	5,096,660 km²
Range Area	142,500 km² (3%)
Protected Range	70 %
Information Quality Index (IQI)	0.48

CURRENT ISSUES

West Africa's elephant populations are mostly small, fragmented and isolated. With growing human populations and increasing infrastructure development, many countries in West Africa are experiencing increased pressure on natural areas from mining, logging and rapid transformation of land to agriculture. These challenges are particularly acute in those countries that have recently emerged from civil strife (GEF, 2010; Mallon et al., 2015).

The AESR 2016 provides more information than previous status reports on countries known to have small, isolated and highly vulnerable populations, with some stark results. Although numbers are small relative to continental levels, West Africa reported losing twelve populations of elephants since the AESR 2007: one each in Cote d'Ivoire, Ghana, Guinea Bissau, Sierra Leone and Togo; two in Guinea and five in Nigeria. It is surprising, however, that there is recent evidence for the continued survival of a number of populations that were already at a very low level 10-20 years ago.

The transboundary "WAP" complex ("W" National Park, Arly National Park and Pendjari National) straddles the border between Benin, Burkina Faso, Niger, continues to hold the region's largest population which has great significance as one of West Africa's few populations with potential long-term viability.

West Africa has 18 MIKE sites. While reporting rates vary, three sites (Comoé National Park in Côte d'Ivoire, Babban Rafi Forest in Niger, and Kéran NP in Togo) have not reported any elephant carcasses since MIKE started in 2002 and about half the remaining 15 sites did not report any carcasses in 2015. While small populations, such as those prevalent in West Africa, cannot be

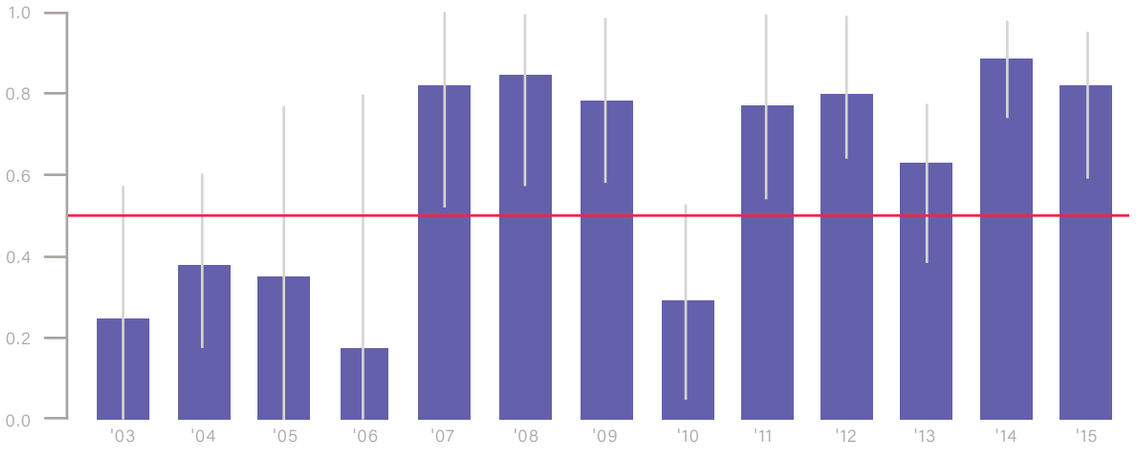


FIGURE 1: *West African PIKE trends with 95% confidence intervals (CITES Secretariart, 2016)*

expected to yield large numbers of carcasses, there have been apparent examples of under-reporting (CITES Secretariat, 2016). Figure 1 provides the most recent PIKE figures for West Africa. The low level of reporting of data for West African MIKE sites in 2015 is cause for concern, in terms of both the regularity of reporting and data quality, which makes reliable inferences on trends impossible for the region.

The Strategy for the Conservation of West African Elephants (African Elephant Specialist Group, 2005b) is now outdated as is the series of national level plans that followed its development. The third wave of planning is currently underway using the framework provided by the African Elephant Action Plan (AEAP) which was adopted by CITES in 2010 (African elephant range states, 2010). Niger was the first country to produce a national plan under the AEAP in 2010 (Direction de la Faune, de la Chasse et des Aires Protégées, 2010), and Liberia is scheduled to initiate their process in 2016 as part of the Elephant Protection Initiative.

In recent analyses of seizure data prepared for CITES, a number of countries in West Africa have been identified as having a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Nigeria has been requested to prepare and implement a National Ivory Action Plan. Further details are provided in the country summaries.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed within the last ten years in West Africa is 11,489 ± 2,583 at the time of the last survey for each area. There may be an additional 2,886 to 3,376 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 102,850 km², which is 72% of the estimated known and possible elephant range. There remains an additional 28% of the estimated range for which no population estimates are available.

The overall number of elephants in West Africa appears to have increased since 2006. The 2015 survey of the WAP complex supported by the Great Elephant Census (Bouché et al., 2015), produced an estimate of 8,953 ± 2,486 compared to 4,592 for the "WAPOK" complex in 2003 (WAPOK is the WAP complex plus parts of Togo) (Bouché et al., 2004b). The latest data for Togo's portion of

this population indicates that its contribution is negligible. The apparent growth in population, the region's largest, is the major contributor to the overall increase in the region since the AESR 2007.

The proportion of elephant range for which elephant estimates are available currently stands at 72%, an increase from 66% in the previous report. The overall quality of information, as measured by the IQI, has increased from 0.44 to 0.48.

At the national level, population estimates for both Benin and Burkina Faso suggest increases in the WAP complex. Estimates for Côte d'Ivoire, Ghana, Guinea Bissau, Senegal, Sierra Leone and Togo have stayed more or less constant with some higher and lower guesses, while estimates for Guinea, Mali and Nigeria have declined since 2006. Guinea is now reduced to a single small population. Niger's few remaining elephants are thought to still move in and out of the country as part of the WAP complex. Information on Liberia's elephants has been substantially improved in this report, adding a small number to guesses originating from 1989/90. Some of the previous numbers, primarily guesses, for Côte d'Ivoire, Ghana, and Nigeria remain unchanged in this report but have become degraded data due to age.

A substantial update of the West African elephant range has been completed for this report, and this has the effect of reducing the total range (known and possible) from 176,000 km^2 to approximately 143,000 km^2, but the percentage of known range has increased from 71% to 79%. The 2015 Great Elephant Census survey of the WAP complex resulted in the addition of areas of known range in Benin and Burkina Faso but more areas were moved to possible and doubtful range. In Côte d'Ivoire, Ghana, Guinea, Guinea Bissau, Niger, Sierra Leone and Togo, many areas of previously known range have been changed to possible and doubtful range. Range loss has been particularly severe in Côte d'Ivoire. In Liberia, the area of known range has been increased with improved access to information following many years of war. In Mali, small areas of doubtful range have been removed, and sightings and data from collared elephants have provided information to refine the range of the Gourma elephants. In Nigeria, two small areas have been moved to known range, but far more has been changed to possible range and even doubtful range.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	401	—	—	—	3 %	4,338
Aerial Sample Counts	8,936	2,527	—	—	14 %	20,362
Ground Sample Counts	893	507	—	—	1 %	990
Reliable Dung Counts	906	181	—	—	4 %	5,227
Other Dung Counts	0	—	103	227	1 %	1,705
Informed Guesses	353	—	430	796	29 %	41,057
Other Guesses	—	—	1,449	1,449	12 %	17,735
Degraded Data	—	—	905	905	8 %	11,436
Totals 2015	**11,489**	**2,583**	**2,886**	**3,376**		
Totals 2006	**7,862**	**375**	**3,745**	**4,053**		
Assessed Range					72 %	102,850
Unassessed Range					28 %	39,649
Total Range					100 %	142,500

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+146	0	-105	-55	1 %	791
New Population	0	0	+47	+50	5 %	7,698
Different Technique	+4,874	±2,582	-83	-83	17 %	23,892
Different Area	-90	±127	-286	-212	2 %	2,727
New Guess	-987	±320	-249	-85	36 %	50,737
Population Lost	-129	±167	-318	-358	0 %	0
Data Degraded	-187	±36	+187	+118	0 %	0
No Change	0	±76	0	0	12 %	17,004
Totals	+3,627	±2,611	-807	-625	72 %	102,850

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	2,628	1,710	4,338
Direct Sample and Reliable Dung	26,578	0	26,579
Informed Guesses	38,433	2,624	41,057
Other Dung Counts	1,646	59	1,705
Other Guesses	14,992	12,699	27,691
Unassessed Range	28,597	10,723	39,784
Totals	112,874	27,816	141,153

ELEPHANT ESTIMATES

COUNTRY	# OF ELEPHANTS		GUESSES		RANGE			PFS	IQI
	ESTIMATE	± 95% CL	MIN	MAX	AREA (km²)	% REGIONAL	% ASSESSED		
Benin	2,984	1,460	0	0	9,112	6 %	99 %	3	.66
Burkina Faso	6,850	2,123	67	69	15,110	11 %	80 %	3	.61
Cote D'ivoire	189	135	647	652	14,578	10 %	92 %	2	.18
Ghana	994	67	238	288	15,181	11 %	50 %	2	.37
Guinea	0	0	64	138	1,557	1 %	78 %	3	0
Guinea Bissau	0	0	7	7	1,346	1 %	100 %	3	0
Liberia	124	99	1,425	1,425	28,950	20 %	45 %	2	.03
Mali	253	0	51	51	25,495	18 %	100 %	2	.83
Niger	0	0	17	17	2,333	2 %	100 %	3	0
Nigeria	94	0	169	463	20,088	14 %	56 %	2	.09
Senegal	1	0	9	14	1,090	1 %	100 %	3	.07
Sierra Leone	0	0	135	155	1,353	1 %	64 %	3	0
Togo	0	0	74	114	6,307	4 %	65 %	3	0
Total	11,489	2,583	2,286	3,376	142,500	100 %	72 %	2	.48

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

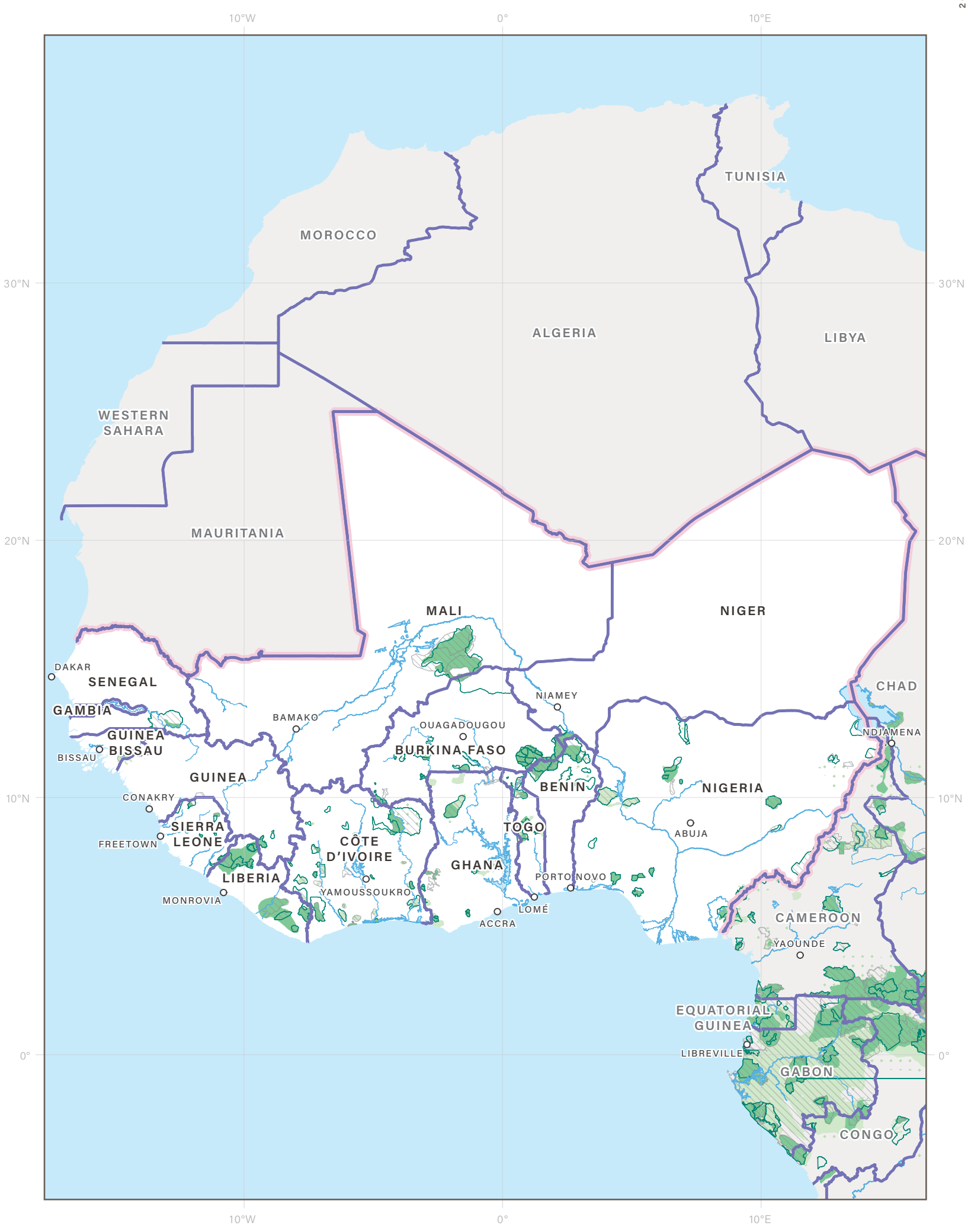
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

West Africa



0 200 400 600 800 1000 1200km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Benin

ESTIMATED TOTAL ELEPHANTS

2,984 ± 1,460

GUESSES

0 - 0

GENERAL STATISTICS

Country Area	112,620 km²
Range Area	9,112 km² (8%)
Protected Range	100%
Information Quality Index (IQI)	0.66
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Elephants in Benin are now almost completely confined to the northern border region adjoining Burkina Faso and Niger. The group of protected areas in this region are known collectively as the WAP complex (Parc W, Arly National Park and Pendjari National Park), with Pendjari NP, Parc W du Benin and hunting zones within Benin.

The relatively high density of elephants in Pendjari NP has had an impact on the vegetation including baobab trees and borassus palms (Salako et al., 2016).

Benin's national strategy for elephant conservation was developed and published in 2005 (Ministère de l'Agriculture, de l'Elevage et de la Pêche, 2005).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Benin is 2,984 ± 1,460 at the time of the last survey for each area. This estimate applies to 9,112 km², which is all of the estimated known and possible elephant range.

There has been an increase in recorded estimates at a national level, although this increase results from comparison of surveys using different techniques, so may not represent a true increase in numbers.

An **aerial sample count** conducted in the Benin, Burkina Faso, and Niger WAP complex in 2015 (Bouché et al., 2015), showed the main elephant concentrations in Benin to be in the Pendjari

NUMBERS AND DISTRIBUTION
CONT.

NP, in Parc W and in the Mekrou Hunting Zone. The estimate for Pendjari NP was 1,632 ± 1,394, which replaces an estimate of 788 from a total count conducted in 2003 (Bouché et al., 2004). No elephants were seen in the central part of Pendjari NP, with most elephants occurring along the border with Burkina Faso. The estimate for Parc W du Benin NP in 2015 was 462 ± 174, compared to 56 from the 2003 total count (Bouché et al., 2004b). The estimate for the Konkombri Hunting Zone was 87 ± 87 in 2015, with Mekrou Hunting Zone having an estimate of 803 ± 390 in the same survey. In the AESR 2007 these areas were combined as Atakora, and there was a 2003 total count of 343 (Bouché et al., 2004b). On the basis of the 2015 survey, two areas of **doubtful range** have been changed to **known range**.

An aerial total count of parts of Parc W du Benin NP and the Djona Hunting Zone was also carried out in 2012 (Bouché, 2012a) and a foot survey of Parc W, Pendjari NP and adjoining hunting zones was carried out in 2013 (Bouché et al., 2013a). However, since these surveys did not cover the entirety of any protected areas, it is not possible to use their results for comparative purposes.

The 2003 and 2015 surveys used different techniques and were not directly comparable but there was a striking increase in estimates. It cannot be explained by movements from the other two WAP countries, since the estimate for the entire area, including the other countries, increased from 4,592 in 2003 to 8,953 ± 1,253 in 2015. There seems to have been little opportunity for elephants to have been compressed into these protected areas from other parts of the range, since there were not thought to be significant numbers outside the WAP complex even in 2003. It has been suggested that the population may have increased after 2003 but declined in recent years, as indicated by the high carcass ratio of 10% recorded across the WAP complex (Bouché et al., 2015). However it is also possible that the 2003 result was an underestimate, or that 2015 was an overestimate, or both.

According to Bouché (pers. comm., 2015) it is unlikely that any elephants remain in the forests of Alibori Supérieur, Goungoun and Trois Rivières and they have been changed to **doubtful range**. Another area to the north of the Djona Hunting Zone has also been changed to **doubtful range** (Bouché, pers. comm., 2015).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	2,984	1,460	—	—	99 %	8,997
Degraded Data	—	—	0	0	0 %	0
Totals 2015	**2,984**	**1,460**	**0**	**0**		
Totals 2006	**1,223**	**0**	**0**	**0**		
Assessed Range**					99%	8,997
Unassessed Range					1 %	115
Total Range					100 %	9,112

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Technique	+1,761	±1,460	0	0	99 %	8,997
Data Degraded	0	0	0	0	0 %	0
Totals	+1,761	±1,460	0	0	99 %	8,997

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	8,997	0	8,997
Unassessed Range	110	0	115
Totals	9,108	0	9,112

***This country is known to have 100% assessed range. Differences in table values exist due to minor variations between map layers.*

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Djona Hunting Zone	DT	AS	B	2015	0		Bouché et al., 2015	1	1,216	2.3˚E	11.4˚N
Goungoun Classified Forest	-	AT	E	2003	0		Bouché et al., 2004b	1	806	3.2˚E	11.5˚N
Konkombri Hunting Zone	DT	AS	B	2015	87	86	Bouché et al., 2015	2	217	2.3˚E	11.4˚N
Mekrou Hunting Zone	DT	AS	B	2015	803	390	Bouché et al., 2015	1	1,073	2.3˚E	11.4˚N
Pendjari Biosphere Reserve	DT	AS	B	2015	1,632	1,394	Bouché et al., 2015	1	1,977	1.8˚E	11.3˚N
W du Bénin National Park	DT	AS	B	2015	462	174	Bouché et al., 2015	1	5,872	1.8˚E	11.3˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

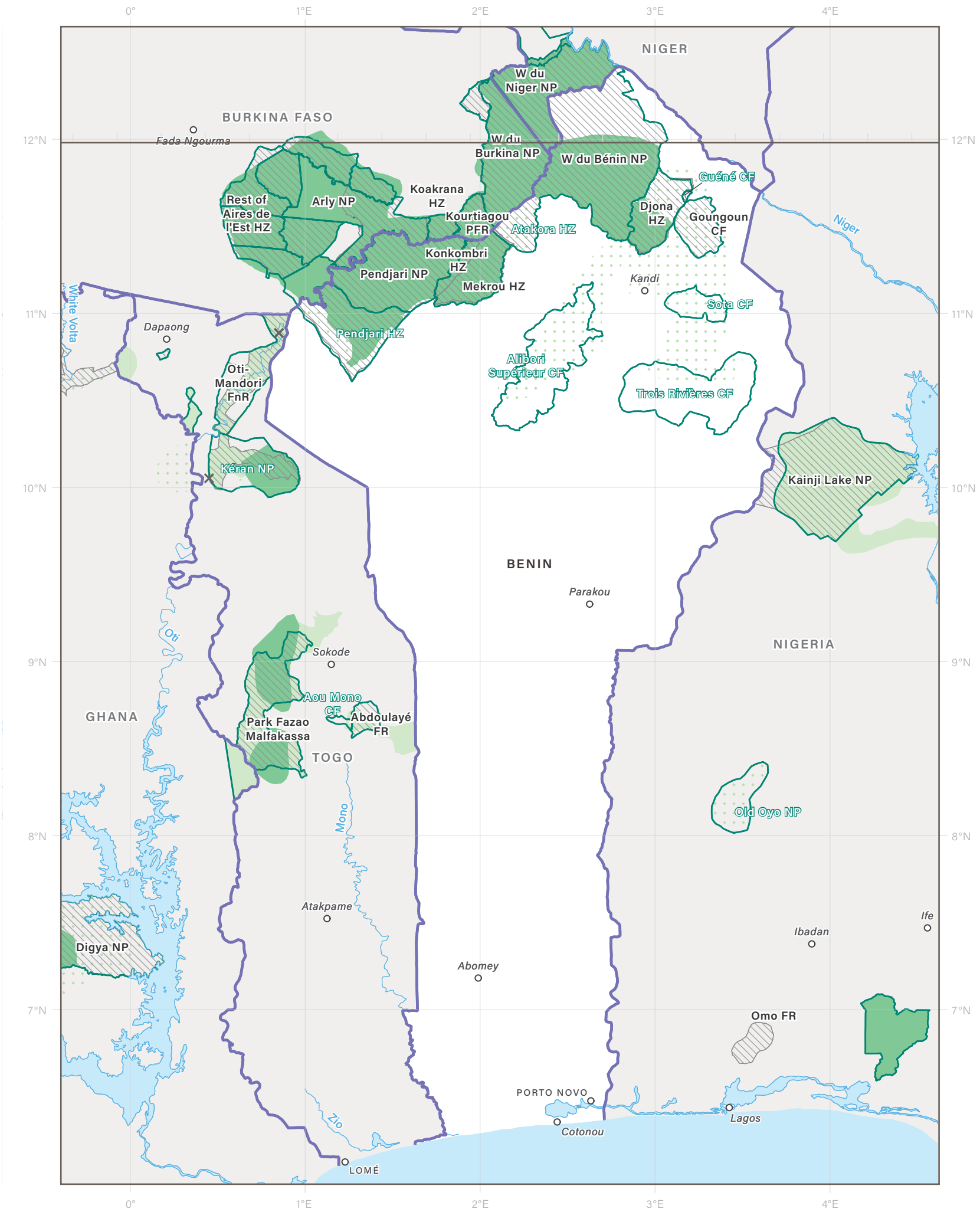
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Benin



0 30 60 90 120 150 180km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Burkina Faso

ESTIMATED TOTAL ELEPHANTS

6,850 ± 2,123

GUESSES

67 - 69

GENERAL STATISTICS

Country Area	274,200 km^2
Range Area	15,110 km^2 (6%)
Protected Range	95%
Information Quality Index (IQI)	0.61
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Burkina Faso hosts the largest population of elephants in West Africa, most inhabiting the trans-frontier WAP complex, which includes Parc W du Burkina, Arly NP and surrounding hunting zones in Burkina Faso. Since 2012, Burkina Faso has experienced a new wave of elephant poaching. While few elephants (13 to 20 per year) were poached during the previous decade, the number of carcasses increased to 50 to 86 per year in the last ten years (DFC, 2015). During the 2015 survey of the WAP complex, 76% of the observed carcasses were recorded in the Burkina Faso portion of the complex (Bouché et al., 2015). This is occurring in the context of strong socio-political change and associated insecurity in the country.

Burkina Faso published an elephant management strategy in 2003 (Belemsobgo et al., 2003), which is outdated.

In 2015, a new law formally established Arly National Park and nearly doubled the area of the former "Arly National Park", which had been a park in name but not status (Conseil National de Transition, 2015).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed over the last ten years in Burkina Faso is 6,850 ± 2,123 at the time of the last survey for each area. There may be an additional 67 to 69 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 12,149 km², which is 80% of the estimated known and possible range. There remains an additional 20% of range for which no elephant population estimates are available.

The increase of just over 2,000 in recorded estimates at a national level is a result of the increased numbers recorded in the WAP complex.

The WAP complex was covered in an **aerial sample count** in 2015 (Bouché et al., 2015). Most of the 3,969 elephants estimated were in the hunting blocks around Arly, with 985 ± 400 in Arly NP, and 1,099 ± 1,276 in Parc W du Burkina. Elephants were found throughout the area, and the area of **known range** has been increased to include the whole of Parc W du Burkina. There was a high carcass ratio of 11% suggesting that the population has been affected by poaching. These results replace estimates from an aerial total count conducted in 2003 (Bouché et al., 2004b) of 2,119 in the hunting blocks, 422 for Arly NP and 740 for Parc W. A total count of Parc W was carried out in 2012 (Bouché, 2012a). This covered only part of the Burkina Faso sector of the park. A ground sample count covering most of the WAP complex was carried out in 2013 (Bouché et al., 2013a) but because of incomplete coverage neither of these surveys were directly comparable.

A **ground sample count** of Nazinga Game Ranch, on the border with Ghana, estimated 893 ± 507 elephants in 2012 (Bouché, 2012b). This replaces an estimate of 583 elephants of a larger area from an aerial total count conducted in 2003 (Bouché et al., 2004a). At least 34 elephants are known to have been lost to poaching in the Nazinga area between 2010 and 2015 (DFC, 2015).

Elephants may occasionally move between Nazinga, Kaboré Tambi NP and Zabré, on the Volta River next to the border with Ghana, but there are no longer resident elephants, so this area has been changed to **doubtful range** (Bouché, pers. comm., 2015).

An aerial total count conducted in the Mouhoun Protected Area Complex in 2013 recorded five elephants in the Deux Balé protected area, which forms part of the complex. However, between 2007 and 2012, between 35 and 40 elephants were seen and photographed from the ground in Deux Balé, and it is believed that these elephants still survived in 2013 (Bouché et al., 2013b). This new **guess** replaces an aerial sample count estimate of 541 from 2002 (Belemsobgo, 2002). There was no evidence of elephants in other parts of the complex, which had large numbers of domestic livestock. Therefore the other areas in the complex have been changed to **doubtful range**. During the course of the 2013 **aerial total count** elephant signs were seen in the Mare aux Hippopotames Biosphere Reserve, but no animals were found. This is therefore considered a minimum estimate of one elephant, and the area is marked as **known range**. This replaces an estimate of 46 from an aerial total count in 2005 (Bouché, 2005).

There is an updated **guess** of 18-20 elephants from the Bontioli Partial and Total Faunal Reserve on the Ghana border to the south of the Mouhoun complex (Bouché, 2007a), which replaces a

NUMBERS AND DISTRIBUTION
CONT.

guess of 50 (Chardonnet, pers. comm., 1998). Based on Bouché (pers. comm., 2015), this has been changed from possible to **known range**, while the area outside the reserve has been changed to **doubtful range**.

Fifteen elephants have been reported from the Niangoloko forest north-west of Comoé-Léraba (Karama, pers. comm., 2016). This has been added as a **new population**. These elephants are believed to move to the Comoé-Léraba forest. The existing guess for Comoé- Léraba of three animals (Bouché, 2005) has been retained.

Elephants from Gourma in Mali have occasionally come south into Burkina Faso to a maximum of 20 km from the border (Wall et al., 2013).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	5,952	2,063	—	—	60 %	9,032
Ground Sample Counts	893	507	—	—	6 %	990
Informed Guesses	5	—	49	51	7 %	1,022
Other Guesses	—	—	15	15	0 %	40
Degraded Data	—	—	3	3	7 %	1,065
Totals 2015	**6,850**	**2,123**	**67**	**69**		
Totals 2006	**4,474**	**320**	**200**	**200**		
Assessed Range					80 %	12,149
Unassessed Range					20 %	2,961
Total Range					100 %	15,110

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	0	0	+15	+15	0 %	40
Different Technique	+2,961	±2,124	0	0	66 %	10,022
New Guess	-582	±320	-151	-149	7 %	1,022
Data Degraded	-3	0	+3	+3	0 %	0
Totals	+2,376	±2,148	-133	-131	73 %	12,149

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	10,022	0	10,022
Informed Guesses	1,022	0	1,022
Other Guesses	1,105	0	1,105
Unassessed Range	2,958	3	2,961
Totals	15,107	3	15,110

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bontioli Partial & Total Faunal Reserve	NG	O	D	2007	18	2*	Bouché, 2007a	2	420	3.1˚W	10.8˚N
Comoé-Leraba Classified Forests	-	AT	E	2005	3		Bouché, 2005	1	1,204	4.6˚W	9.9˚N
Mare aux Hippotames Biosphere Reserve	NG	O	D	2013	1		Bouché et al., 2013b	2	192	4.2˚W	11.6˚N
Mouhoun Protected Area Complex	NG	O	D	2013	35		Bouché et al., 2013b	1	1,976	3.3˚W	11.6˚N
Nazinga Ecosystem	DT	GS	B	2012	893	507	Bouché, 2012b	1	970	1.5˚W	11.1˚N
Niangoloko forest	NP	O	E	2015	15		Karama, pers. comm., 2016	2	82	4.9˚W	10.2˚N
WAP complex											
Arly National Park	DT	AS	B	2015	985	400	Bouché et al., 2015	1	1,223	1.8˚E	11.7˚N
Koakrana Hunting Zone	DT	AS	B	2015	0		Bouché et al., 2015	2	265	1.2˚E	11.7˚N
Kourtiagou Partial Faunal Reserve	DT	AS	B	2015	0		Bouché et al., 2015	2	485	1.2˚E	11.7˚N
Rest of Aires de l'Est Hunting Areas	DT	AS	B	2015	3868	1,570	Bouché et al., 2015	1	5,312	1.2˚E	11.7˚N
W du Burkina National Park	DT	AS	B	2015	1099	1,276	Bouché et al., 2015	1	2,511	1.2˚E	11.7˚N
Zabré Department	NG	O	D	2013	0		Bouché, pers. comm., 2015	2	600	0.6˚W	11.1˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

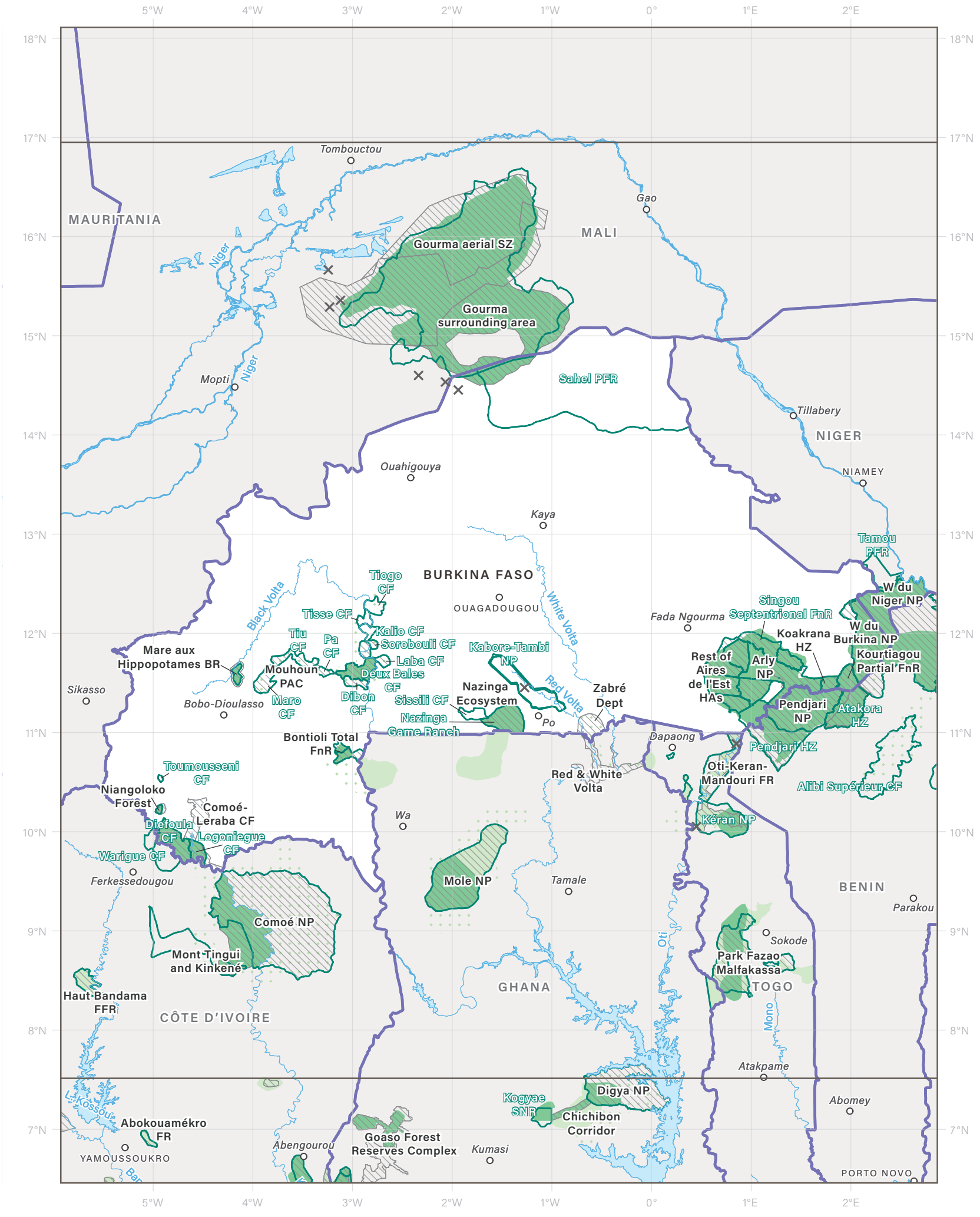
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Burkina Faso



0 60 120 180 240 300 350km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Côte d'Ivoire

ESTIMATED TOTAL ELEPHANTS

189 ± 135

GUESSES

647 - 652

GENERAL STATISTICS

Country Area	322,460 km^2
Range Area	14,578 km^2 (5%)
Protected Range	72 %
Information Quality Index (IQI)	0.18
CITES Appendix	I
Listing Year	1994 (year of accession)

CURRENT ISSUES

Côte d'Ivoire has suffered from civil unrest and violence in recent years, and this has affected conservation efforts. The civil war, which started in 2002, split the country between the rebel-held north and the government-controlled south. A power-sharing deal in 2007 presented the prospect of peace, but a 2010 presidential poll led to further violence (International Crisis Group, 2011). This lack of stability has meant that little attention has been paid to conservation and protected areas (Koné, 2013). Wildlife in protected areas is threatened by hunting, the encroachment of cocoa plantations on protected area boundaries in the forest zone, and expansion of illegal cocoa farming within parks and reserves (Bitty et al., 2015).

Most of Côte d'Ivoire's elephant population is found in small fragments of forest. Some of these populations have survived for a surprisingly long time, but there are many for which there is no recent information, and a number of these are likely to have disappeared. There is only one forest population in Taï National Park which is estimated to have more than a hundred elephants, and the status of elephants in Comoé National Park, the country's largest protected area, is unclear.

Following the invasion of Marahoué National Park by people fleeing post-election violence in 2010-11, 12 elephants moved into farming areas near the city of Daloa and were responsible for the deaths of three people. As a result, four male elephants were translocated from Daloa to Azagny National Park on the coast in January 2014, and a further two died during the exercise (McPherson,

2014). The population of Marahoué NP is now recorded as lost, having previously been one of the country's largest elephant populations.

Côte d'Ivoire published its national strategy for elephant management in 2004, covering a time period from 2005 to 2014 (Ministère des Eaux et Forêts, 2004).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Côte d'Ivoire is 189 ± 135 at the time of the last survey for each area. There may be an additional 647 to 652 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 13,334 km^2, which is 92% of the estimated known and possible elephant range. There remains an additional 8% of the estimated range for which no elephant population estimates are available.

There has been almost no change in the population estimates, because an apparent increase in numbers in Taï NP from a survey using a different technique is matched by the loss of the Marahoué NP population. Total guesses have been reduced, mostly as a result of populations being lost.

Taï NP in the southwest, close to the Liberian border, holds what is probably the largest remaining elephant population in the country. A **dung count** conducted there in 2010 gave an estimate of 189 (54-324) elephants (Baofo & Nandjui, 2011). This replaces an estimate of 53 ± 26 from a DNA survey (Eggert, 2004b).

Comoé NP, which lies in the northern savanna zone, is the largest protected area in the country. An aerial sample count of the park and some surrounding areas was carried out in 2010 (N'Goran et al., 2010). Although some signs were seen from the air, no actual elephants were observed. However, the sampling intensity was low, and elephants are thought to concentrate in gallery forests where they would be difficult to see from an aircraft. A researcher who worked in Comoé NP between 2014 and 2015 estimated at least 100 elephants in the park (Lapuente, pers. comm., 2016), concentrated in the west close to the Komoé river, and this **informed guess** replaces an informed guess of 10-20 elephants from 2002 (Fischer, 2005). There were also at least another 20 elephants in the neighbouring areas of Mont Tingui and Kinkené (Lapuente, pers. comm., 2016). The area in the east of the park has been changed to **doubtful** range, as has the area between Comoé NP and the Burkina Faso border.

Most other estimates remain unchanged from the AESR 2007 report but many are now more than ten years old, and have therefore become degraded data. Continued records of crop-raiding indicate that elephants remain widespread, albeit in small numbers. An **informed guess** of 15-20 for the Beki Bossematié Classified Forest from 2013 (Lapuente, pers. comm., 2016) replaces a guess of 35 from 1993 (Theuerkauf et al., 2001). A **guess** of two elephants in Mont Sangbé National Park in 2013 (Lapuente, pers. comm., 2016) replaces a guess of 47 (Lauginie et al., 2001). There were still elephants in Mont Péko in 2012 (Sissler-Beinvenu, pers. comm., 2016), but probably fewer than the guess of 40 from 2000 (Kobon, pers. comm., 2002) which has not been replaced because this confirmation of presence did not include an estimate of new numbers.

NUMBERS AND DISTRIBUTION
CONT.

The elephant population of Marahoué NP, which had an estimate of 159 ± 53 from a genetic dung count in 2002 (Eggert, 2004a), was lost in about 2010 after the park was almost completely settled by local people. In early 2013, no evidence of elephants was found in a survey covering 506 km of transects (Sissler-Beinvenu, pers. comm., 2016). Marahoué NP has been changed to **doubtful range**. Since it is not clear whether all the elephants from neighbouring Daloa were translocated, this has been added as a point record, where an unknown number of elephants may remain.

Prior to the translocation of elephants from Daloa, there were almost no elephants left in Azagny NP. Whereas there had been an estimate of 65-117 in 2003 (Nandjui, 2003) no evidence of human-elephant conflict was found on the periphery of the park for the two years prior to 2013 and only a few signs of the presence of elephants inside the park. Local hunters said that there were only three surviving elephants, compared to 9-10 in 2010 (Sissler-Beinvenu, pers. comm., 2016).

Crop raiding has been reported from three widely separated sites in the south of the country and these have been added as point records (Bakayoko, 2015; Kan, 2015; La Dépêche d'Abidjan, 2015).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Reliable Dung Counts	189	135	—	—	12 %	1,750
Informed Guesses	0	—	138	143	32 %	4,647
Other Guesses	—	—	2	2	3 %	427
Degraded Data	—	—	507	507	45 %	6,510
Totals 2015	**189**	**135**	**647**	**652**		
Totals 2006	**188**	**0**	**767**	**777**		
Assessed Range					92 %	13,334
Unassessed Range					8 %	1,244
Total Range					100 %	14,578

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	0	0	+20	+20	10 %	1,430
Different Technique	+147	±135	-11	-11	12 %	1,750
New Guess	-47	0	+10	+5	25%	3,644
Population Lost	-83	0	-76	-76	0 %	0
Data Degraded	-16	0	+16	+16	0 %	0
Totals	+1	±135	-41	-46	47 %	13,334

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	1,750	0	1,750
Informed Guesses	4,647	0	4,647
Other Guesses	905	6,032	6,937
Unassessed Range	194	1,049	1,244
Totals	7,497	7,081	14,578

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Abokouamékro Faunal Reserve	-	GT	E	2000	11		Kobon, pers. comm., 2002	2	135	5.1˚W	6.9˚N
Azagny National Park	NG	O	D	2013	3		Sissler-Bienvenu, pers. comm., 2016	2	218	4.9˚W	5.2˚N
Beki Bossematié Classified Forest	NG	O	D	2013	15	5*	Lapuente, pers. comm., 2016	2	389	3.5˚W	6.6˚N
Bolo Forest	-	O	E	1989	5		Merz & Hoppe-Dominik, 1991	2	88	5.8˚W	5.2˚N
Comoé National Park	NG	O	D	2015	100		Merz & Hoppe-Dominik, 1991	1	11,665	3.7˚W	9.1˚N
Davo Forest	-	O	E	1989	20		Merz & Hoppe-Dominik, 1991	2	126	6.1˚W	5.8˚N
Djambamakrou Forest	-	O	E	1989	30		Merz & Hoppe-Dominik, 1991	2	274	3.2˚W	6.4˚N
Duekoué Forest	-	O	E	1997	6		Kobon, pers. comm., 2002	1	536	7.1˚W	6.7˚N
Fresco Classified Forest	-	O	E	1998	60		Ministère des Eaux et Forêts, 2004	2	2,229	5.8˚W	5.1˚N
Go-Bodienou Forest	-	O	E	1989	20		Merz & Hoppe-Dominik, 1991	1	600	5.0˚W	5.4˚N
Goin-Cavally Classified Forest	-	O	E	1989	70		Merz & Hoppe-Dominik, 1991	1	1,890	7.8˚W	6.2˚N
Haut Bandama Fauna & Flora Reserve	-	O	E	2002	20		Bouché, 2002	1	1,300	5.7˚W	8.5˚N
Haut Sassandra Classified Forest	-	O	E	1997	30		Kobon, pers. comm., 2002	1	1,024	7.0˚W	7.2˚N
Keregbo Forest	-	O	E	1989	30		Merz & Hoppe-Dominik, 1991	2	213	3.8˚W	7.5˚N
Marahoué National Park	PL	O	D	2014	0		Sissler-Beinvenu, pers. comm., 2016	1	1,010	6.0˚W	7.1˚N
Mont Péko National Park	-	O	E	2000	40		Kobon, pers. comm., 2002	2	340	7.3˚W	7.0˚N
Mont Sangbé National Park	NG	O	E	2013	2		Lapuente, pers. comm., 2016	1	950	7.3˚W	8.0˚N
Mont Tingui and Kinkené	NP	O	D	2015	20		Lapuente, pers. comm., 2016	1	515	4.2˚W	8.8˚N
Niegré Classified Forest	-	O	E	1989	50		Merz & Hoppe-Dominik, 1991	1	1,056	6.2˚W	5.4˚N
Okromodou Forest	-	O	E	1989	50		Merz & Hoppe-Dominik, 1991	1	945	5.6˚W	5.3˚N
Scio Classified Forest	-	O	E	1989	30		Merz & Hoppe-Dominik, 1991	1	1,338	7.8˚W	6.8˚N
Songan Tamin Mabi Yaya Classified Forest	-	O	E	1993	20		Theuerkauf et al., 2001	1	1,698	3.4˚W	5.9˚N
Taï National Park	DT	DC	B	2010	189	135	Boafo & Nandjui, 2011	1	1,495	7.1˚W	5.7˚N
Tené Forest	-	O	E	1998	5		Kobon, pers. comm., 2002	3	4	5.4˚W	6.5˚N
Tiapleu Forest	-	O	E	1989	10		Merz & Hoppe-Dominik, 1991	2	380	8.2˚W	7.5˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

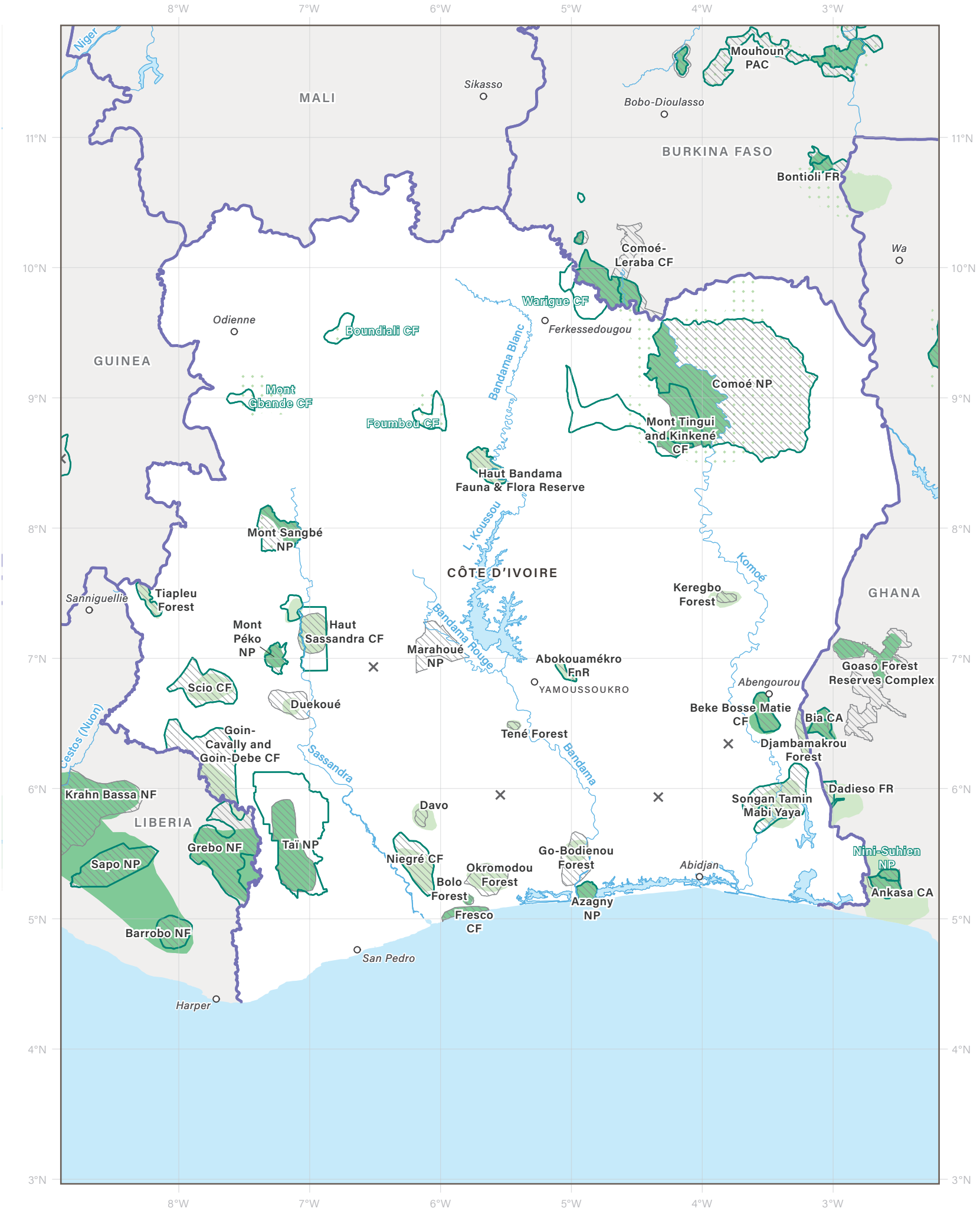
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Côte d'Ivoire



0 40 80 120 160 200 240km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Ghana

ESTIMATED TOTAL ELEPHANTS

994 ± 67

GUESSES

238 - 288

GENERAL STATISTICS

Country Area	238,540 km^2
Range Area	15,181 km^2 (6%)
Protected Range	47 %
Information Quality Index (IQI)	0.37
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Ghana has a small number of elephant populations in savanna and forest habitats. As a result of habitat fragmentation and human population density, elephants are becoming increasingly restricted to protected areas. A new approach to anti-poaching in Ghana's protected areas was introduced in 2004. This focused on adaptive management and patrol management, as well as increasing ranger numbers in some areas, and had the effect of reducing poaching levels (Jachmann, 2008).

Several studies have been carried out on crop raiding by elephants on the periphery of the Kakum Conservation Area. These have shown the efficacy of pepper-grease fences (Wiafe & Sam, 2014) and also that elephants damage oil palms less than plantain, cocoa and cassava (Dakwa et al., 2016).

A survey of retail outlets selling ivory in Accra in 2010 found very few items, attributed to a clampdown by the authorities in November 2008 on the main curio market, where several hundred kilos of ivory items were confiscated and dealers were fined and imprisoned (Martin, 2010).

Some of Ghana's most important elephant areas have not been surveyed in many years, leading to a degradation of many estimates, and one population is now recorded as lost.

Ghana's national elephant conservation strategy was published in 2000 (Wildlife Division, 2000).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Ghana is 994 ± 67 at the time of the last survey for each area. There may be an additional 238 to 288 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 7,609 km², which is 50% of the estimated known and possible elephant range. There remains an additional 50% of the range for which no population estimates are available.

There has been little change recorded in elephant numbers since the publication of the AESR 2007. This is because most populations have not been recently surveyed, and there has been little change in those that have been surveyed.

The main forest populations are in Bia National Park and Conservation Area, Goaso Forest Reserves Complex, Dadieso Forest Reserve, Ankasa Conservation Area and Kakum Conservation Area, with Mole and Digya National Parks holding the only surviving savanna populations.

Dung counts of Bia NP and Resource Reserve were carried out in 2007 and 2009, giving estimates of 135 (114-156) elephants in 2007 (Danquah et al., 2009), and 146 (98-172) elephants in 2009 (Danquah & Oppong, 2014). The latter replaces an estimate of 115 ± 29 from 2004 (Sam et al., 2006) reported in the AESR 2007. This population is now considered to be isolated within the protected area (Danquah & Oppong, 2013) and surrounding areas of **possible range** have been removed from the map. However, improved protection allowed elephants to expand their range within Bia NP from 2007 (Danquah, 2009).

There are other forested areas to the north and east of Bia known as the Goaso Forest Reserves Complex. The Goaso elephant population has suffered major declines in both numbers and range, and is currently confined to a few of the reserves in the northern portion of the block. A **dung count** carried out in 2009 gave an estimate of 90 ± 41 (Danquah et al., 2009). This replaces an estimate of 72 from 2004 (Sam, 2004). The area of **known range** has been reduced (Danquah & Oppong, 2013).

There have been no new surveys in the Dadieso Forest Reserve to the south of Bia, and therefore the informed guess of seven from 2002 (Ayesu, 2003) has been retained from the AESR 2007 but is now degraded. The range has been changed to **possible range**.

The Ankasa Conservation Area is further south, close to the coast. A **dung count** carried out in 2009 gave an estimate of 56 (31-81) (Danquah, 2009). This replaces an estimate of 21 for 2001 (Danquah et al., 2001).

No new surveys have been carried out in the Kakum Conservation Area, so the estimate of 164 ± 36 from 2004 (Danquah, 2004) has been retained, but degraded to a guess, as the estimate is more than ten years old. An acoustic survey of Kakum CA was carried out in 2000, but the results were not published until 2010 (Thompson et al., 2010). This study estimated 294 elephants (259–329), and an extended acoustic model, estimating the frequency with which elephants are silent when present, yielded an estimate of 350 elephants (315–384).

NUMBERS AND DISTRIBUTION
CONT.

Digya National Park and the Chichibon Corridor are in a forest-savanna mosaic. No recent surveys have been carried out in Digya NP so the estimate of 357 ± 54 from 2006 has been retained (Kumordzi & Danquah, 2007). Crop-raiding by elephants is still a problem in the Chichibon Corridor (Nutsuakor et al., 2015) and the old guess of 12-15 (Sam & Wilson, 1994) from 1994 has been retained.

An aerial survey of northern Ghana in 2006 showed no signs of elephants in the Red and White Volta areas (Bouché, 2007b), so this area has been changed to **doubtful range** and the population is recorded as a **population lost**. Other areas in the north-west have no recent records and have been downgraded to **possible range**.

No new counts have been carried out in Mole National Park, in the northern savanna zone, so the estimate of 401 from an aerial total count in 2006 (Bouché, 2006) has been retained.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	401	—	—	—	29 %	4,338
Reliable Dung Counts	593	68	—	—	13 %	1,956
Other Dung Counts	0	—	56	106	3 %	498
Informed Guesses	0	—	0	0	0 %	0
Degraded Data	—	—	183	183	5 %	816
Totals 2015	**994**	**67**	**238**	**288**		
Totals 2006	**968**	**178**	**281**	**281**		
Assessed Range					50 %	7,609
Unassessed Range					50 %	7,573
Total Range					100 %	15,181

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Repeat Survey	+146	0	-105	-55	5 %	791
Different Technique	+90	±41	-72	-72	5 %	790
Population Lost	-46	±167	0	0	0 %	0
Data Degraded	-164	±36	+164	+164	0 %	0
No Change	0	±76	0	0	40 %	6,027
Totals	+26	±191	-13	+37	50 %	7,609

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Aerial or Ground Total Counts	2,628	1,710	4,338
Direct Sample and Reliable Dung	1,956	0	1,956
Other Dung Counts	439	59	498
Other Guesses	676	140	816
Unassessed Range	763	6,809	7,573
Totals	6,463	8,718	15,181

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Ankasa Conservation Area	RS	DC	C	2009	56	25	Danquah, 2009	2	704	2.6˚W	5.3˚N
Bia Conservation Area	RS	DC	B	2009	146	26	Danquah & Oppong, 2014	5	306	3.1˚W	6.5˚N
Chichibon Corridor	-	O	E	1994	12	3*	Sam & Wilson, 1994	2	290	0.7˚W	7.3˚N
Dadieso Forest Reserve	-	O	E	2002	7		Ayesu, 2003	2	195	3.0˚W	6.0˚N
Digya National Park	-	DC	B	2006	357	54	Kumordzi & Danquah, 2007	1	3,478	0.3˚W	7.4˚N
Goaso Forest Reserves Complex	DT	DC	B	2007	90	41	Danquah et al., 2009	1	2,035	3.0˚W	6.7˚N
Kakum Conservation Area	-	DC	E	2004	164	36	Danquah, 2004	2	366	1.3˚W	5.5˚N
Mole National Park	-	AT	A	2006	401		Bouché, 2006	1	4,504	1.9˚W	9.6˚N
Red & White Volta Ecosystem	PL	O	D	2006	0		Bouché, 2007b	1	1,106	0.5˚W	10.7˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

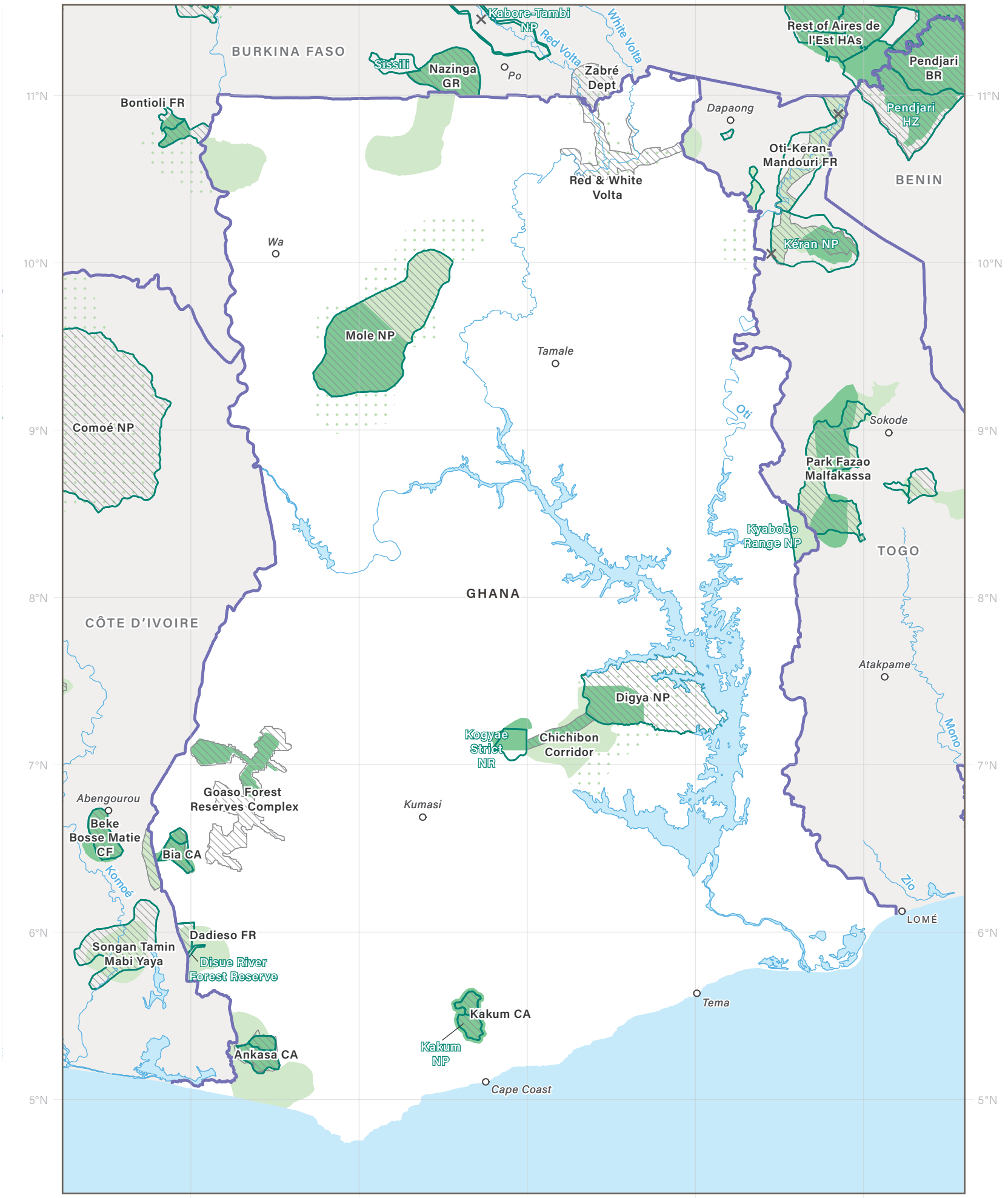
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Ghana



0 30 60 90 120 150 180km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE
Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Guinea

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

64 - 138

GENERAL STATISTICS

Country Area	245,860 km²
Range Area	1,557 km² (1%)
Protected Range	78 %
Information Quality Index (IQI)	0.0
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Ziama Strict Nature Reserve is believed to hold Guinea's single remaining elephant population. The area is under pressure from growing human populations and increased cultivation at the edges of the reserve. Crop raiding by elephants is a continuing problem (Ministère de l'Agriculture, de l'Elévage, de l'Environnement, des Eaux et des Forêts, 2007). Law enforcement improved in 2015 with support from Fauna and Flora International (Mollon, pers. comm., 2016).

Ouré Kaba, a population referred to in the AESR 2007, is recorded as lost. Guinea published a national elephant management strategy in 2007 (Ministère de l'Agriculture, de l'Elévage, de l'Environnement, des Eaux et des Forêts, 2007).

NUMBERS AND DISTRIBUTION

There have been no surveys carried out in Guinea in the last 10 years to the standards required for generating an estimate. There may be 64 to 138 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 1,207 km², which is 78% of the estimated known and possible elephant range. There remains an additional 22% of the estimated elephant range for which no elephant population estimates are available.

The Wild Chimpanzee Foundation (WCF) surveyed a number of forest areas in Guinea between May 2009 and May 2011. Signs of elephants were only observed in Ziama Strict Nature Reserve. Elephants had long been absent from Ziama Strict Nature Reserve and surrounding forests until 1996, when it is thought they arrived from neighbouring Liberia (Sagnah & Sagnah, 2000). It is

believed that movement across this border continues, and it is possible that these elephants also move as far as Côte d'Ivoire (Mollon, pers. comm., 2016). The absence of elephant signs in the Mt. Nimba area, however, during the WCF surveys suggest that these movements, if they occur, are intermittent.

The **dung count** of Ziama SNR gave a new estimate of 64 - 138 (Wild Chimpanzee Foundation, 2012). This replaces an estimate of 214 ± 79 from 2004 (Barnes & Nandjui, 2005). However, based on the distribution of elephants and the abundance of their signs, Fauna & Flora International staff members working in the area feel that this estimate is too low and there are probably still around 200 elephants in the area (Mollon, pers. comm., 2016). Elephants are found throughout the reserve, although at lower densities around the two settlements in the east, and the hilly country in the west (Wild Chimpanzee Foundation, 2012). Therefore the range has been changed to include the whole reserve. There is recent evidence of elephants moving from Ziama SNR towards the Simandou range, about 50 km north-east, with a small group possibly resident around the Pic de Fon (Mollon, pers. comm., 2016).

The WCF found no signs of elephants in the Ouré Kaba area, on the border with Sierra Leone. Therefore this area has been removed from the range map, and recorded as a **lost population**. In the AESR 2007, the area of Sansalé in the northwest, on the border with Guinea Bissau, had an estimate of zero (Sagnah, pers. comm., 1998) and was recorded as a lost population. The corresponding area of **doubtful range** has now been removed. There has been no information from the Corubal-Dulombi cross-border population in more than 10 years, so this has been changed to **possible range**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Other Dung Counts	0	—	64	138	78 %	1,207
Informed Guesses	0	—	0	0	0 %	0
Totals 2015	**0**	**0**	**64**	**138**		
Totals 2006	**214**	**78**	**57**	**57**		
Assessed Range					78 %	1,207
Unassessed Range					22 %	350
Total Range					100 %	1,557

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Area	-214	±79	+27	+101	78 %	1,207
Population Lost	0	0	-57	-57	0 %	0
Totals	-214	±79	-30	+44	78 %	1,207

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Other Dung Counts	1,207	0	1,207
Unassessed Range	8	0	350
Totals	1,215	0	1,557

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Ouré Kaba	PL	O	D	2007	0		Ministère de l'Agriculture, de l'Elévage, de l'Environnement, des Eaux et des Forêts, 2007	1	691	11.7˚W	10.1˚N
Ziama	DA	DC	C	2011	64	37	Wild Chimpanzee Foundation, 2012	1	1,171	9.3˚W	8.2˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

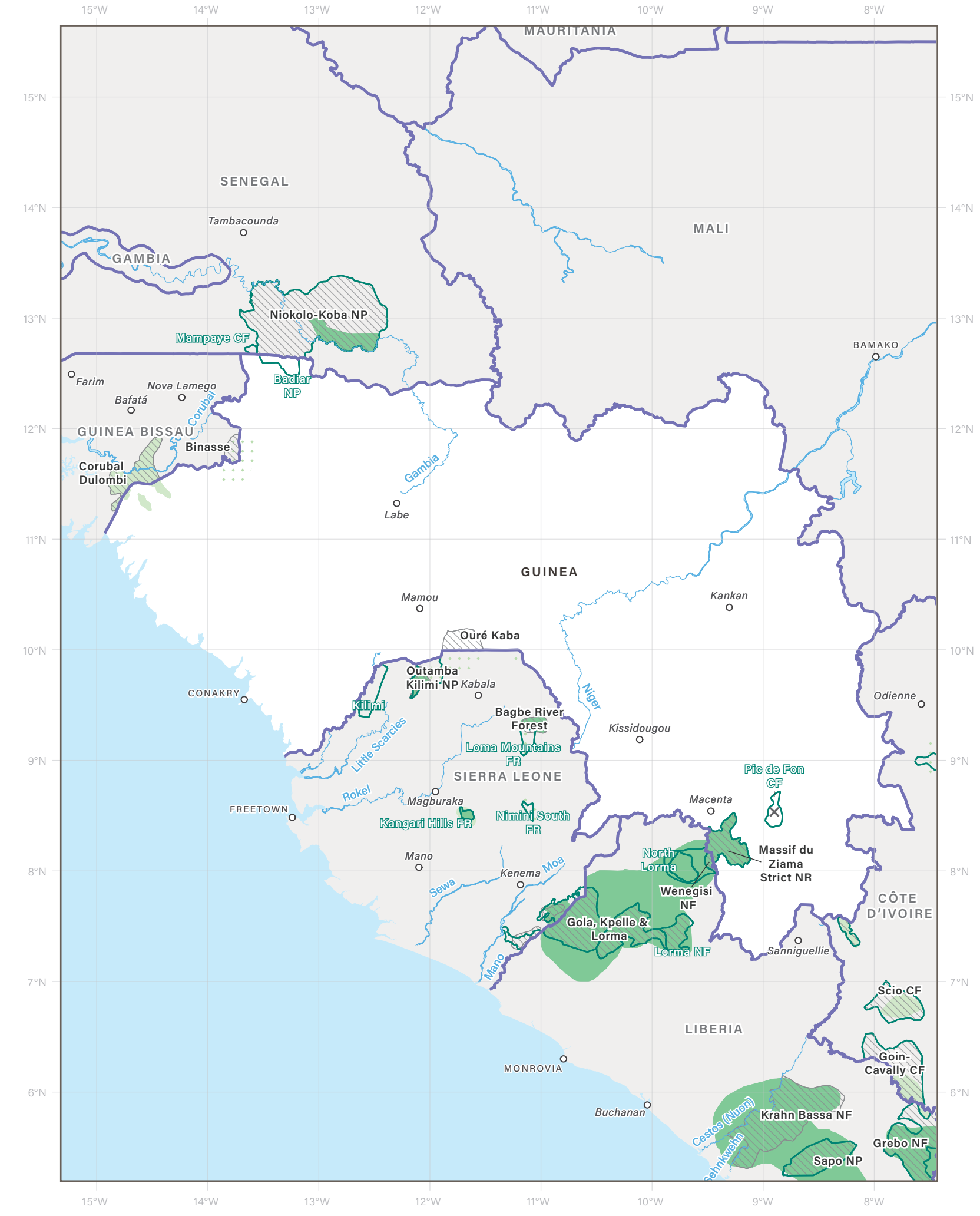
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Guinea



0 50 100 150 200 250 300km

Int'l Boundaries	
Rivers & Lakes	
Towns	
Protected Areas	
Input Zones	

ELEPHANT RANGE

Known	
Possible	
Doubtful	
Sighting	×

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Guinea Bissau

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

7 - 7

GENERAL STATISTICS

Country Area	36,120 km²
Range Area	1,346 km² (4%)
Protected Range	0 %
Information Quality Index (IQI)	0.00
CITES Appendix	1
Listing Year	1990

CURRENT ISSUES

Only a handful of elephants were reported from Guinea Bissau more than ten years ago (Brugière et al., 2006). It is believed that a small number may still survive (Brugière, pers. comm., 2016; Goedmakers, pers. comm., 2016) but their future is very uncertain.

Guinea-Bissau published its national elephant action plan in 2000 (Ministère de l'Agriculture et Développement Rurale, 2000).

NUMBERS AND DISTRIBUTION

There have been no surveys carried out in Guinea Bissau in the last ten years to the standards required for generating an estimate. There may be seven elephants in areas not systematically surveyed. This guess likely represents a minimum number, and actual numbers could be higher. This number applies to 1,346 km², which is the entirety of the estimated known and possible elephant range.

There have been no changes to numbers or distribution since the AESR 2007. A study of elephant distribution based on interviews with hunters concluded that only a small elephant population remained in the south-east of Guinea Bissau (Brugière et al., 2006) with a minimum of seven elephants in the Corubal-Dulombi area, and that no more than 20 elephants remained in the country. Given the absence of recent information, the range area has been downgraded to **possible range**, while the estimate has been degraded due to age.

NUMBERS AND DISTRIBUTION CONT.

In 2006 it was believed that elephants from the Corubal Dulombi area still moved seasonally across the border to Guinea (Brugière et al., 2006), but there is no recent information on whether this is still the case.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Degraded Data	—	—	7	7	100 %	1,346
Totals 2015	**0**	**0**	**7**	**7**		
Totals 2006	**0**	**0**	**7**	**20**		
Assessed Range					100 %	1,346
Unassessed Range					0 %	0
Total Range					100 %	1,346

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Population Lost	0	0	0	0	0 %	0
Data Degraded	0	0	0	-13	0 %	0
Totals	0	0	0	-13	0 %	1,346

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Binasse Area	PL	O	E	2004	0		Brugière, et al., 2006	1	330	13.8˚W	11.8˚N
Corubal Dulombi Area	-	O	E	2004	7	13*	Brugière, et al., 2006	1	1,342	14.7˚W	11.6˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

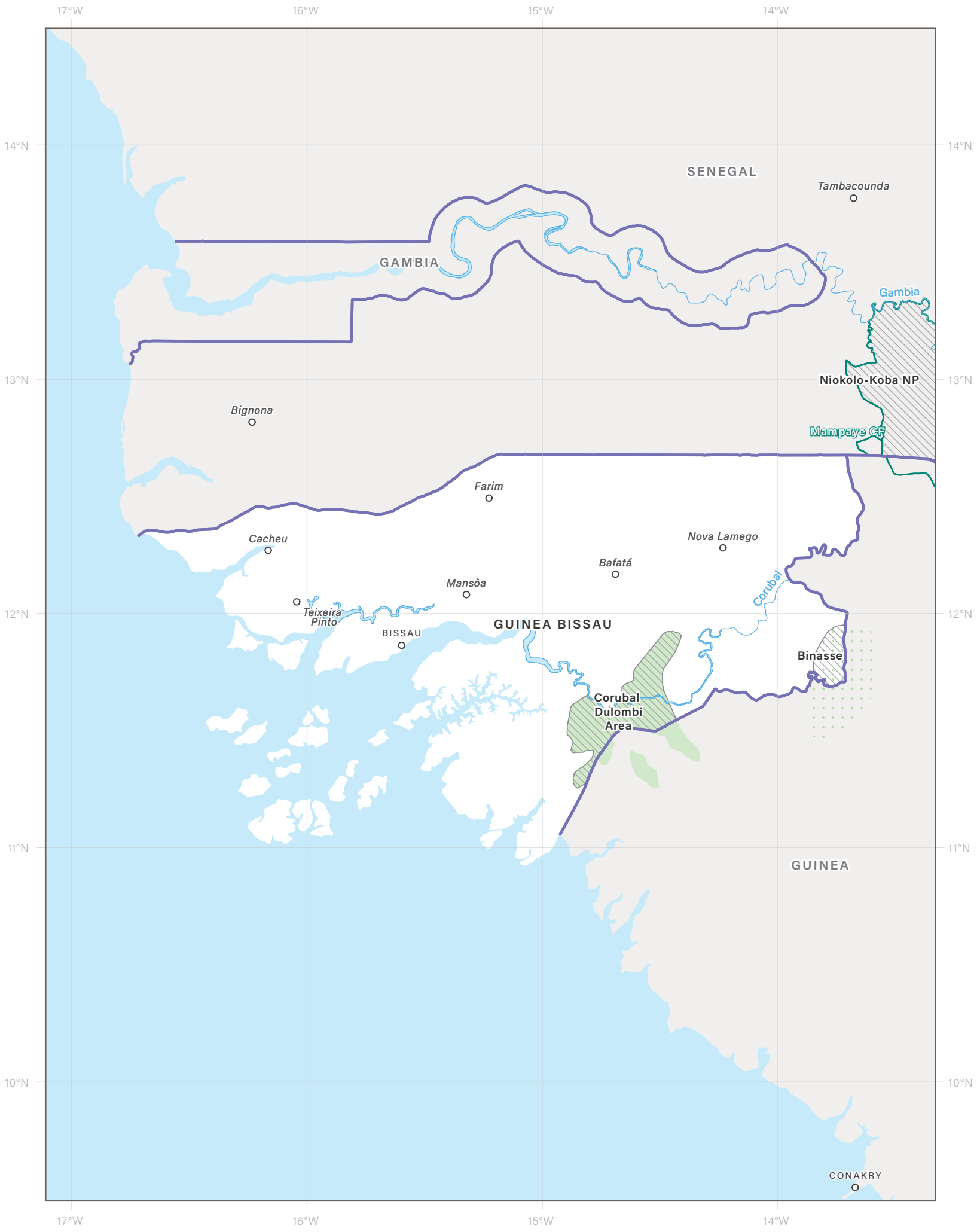
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Guinea Bissau



0 20 40 60 80 100 120km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Liberia

ESTIMATED TOTAL ELEPHANTS

124 ± 99

GUESSES

1,425 - 1,425

GENERAL STATISTICS

Country Area	111,370 km^2
Range Area	28,950 km^2 (26%)
Protected Range	34 %
Information Quality Index (IQI)	0.03
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Liberia is the most densely forested country in West Africa, with two large forest blocks in the west and east of the country, including approximately 40% of the remaining Upper Guinea forest (Tweh et al., 2015). Economic development in Liberia after the end of the civil war in 2003 has led to a rapid expansion of oil palm plantations and logging concessions, meaning that natural forests are once again under great threat (Tweh et al., 2015; Wilcove & Koh, 2010).

Sapo National Park is the only national park in Liberia (Tweh et al., 2015). It is threatened by illegal farming, hunting, logging, and mining. About 5,000 illegal settlers were removed from the park in 2005 (Blanc et al., 2007). Following the eviction, Sapo NP was again occupied and by early 2010, an estimated 18,000 settlers were thought to be resident, primarily carrying out artisanal gold mining. Efforts made by the government to remove them were largely successful, and by October 2010, most were thought to have left the park voluntarily (Fauna & Flora of Liberia, 2015).

There is no current action plan or strategy for the management of African elephants in Liberia, but an elephant management planning process under the Elephant Protection Initiative is scheduled to begin in 2016.

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Liberia is 124 ± 99 at the time of the last survey for each area. There may be an additional 1,425 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 13,057 km^2, which is 45% of the estimated known and possible elephant range. There remains an additional 55% of the estimated range for which no elephant population estimates are available.

There has been an increase in the estimates for Liberia, because of a new survey for Sapo NP, which replaced a lower quality dung count, previously recorded as a guess.

There are four areas of known or possible elephant range in Liberia, divided between two major forest blocks in the east and west of the country. Only Sapo NP has been surveyed in recent years. However, recent elephant records were compiled from various conservation partners (FDA, FFI, MPI EVA, MIKE, RSPB, SCNL, WCF), and this allowed a new elephant range map to be drawn (Vogt & Forster, pers. comm., 2016). As a result the area of **known range** has considerably increased due to improved information; previously most areas were shown as possible range.

There is a transfrontier population between Gola Forest in Sierra Leone and Gola, Kpelle and Lorma forests in western Liberia. In the AESR 2007 this was marked as possible range. However, camera trapping has revealed that elephants still occur on both sides of the border (Tubbs, pers. comm., 2015) and this area has been recorded as **known range**. A new **guess** of 400 (Freeman, pers. comm., 2016) replaces one of 500 elephants from 1990 (Anstey & Dunn, 1991).

There is a small population of elephants in the Wenegisi National Forest, perhaps 50 individuals (Freeman, pers. comm., 2016), which is an extension of the larger population of Ziama in neighbouring Guinea. This new **guess** updates one of 33 from 1990 (Anstey & Dunn, 1991).

A **dung count** carried out in Sapo NP in 2009 gave an estimate of 124 (25-223) elephants (Boafo, 2010). This replaces an estimate of 313 ± 304 from a dung count conducted in 1989 (Barnes & Dunn, 2002). There are also believed to be elephants in the adjoining Krahn Bassa National Forest, with a **guess** of 550 (Freeman, pers. comm., 2016), which replaces a similar guess of 500 from 1990 (Anstey & Dunn, 1991).

For the Grebo National Forest, in the extreme south-east of the country on the Côte d'Ivoire border, there is a **guess** of 300 elephants, and for the nearby Barrobo National Forest, a **guess** of 125. These replace guesses of 230 and 100 respectively, both from 1990 (Anstey & Dunn, 1991). It is no longer considered likely that elephants move between Grebo and Cote d'Ivoire. Many of the classified forests in Cote d'Ivoire close to the border with Liberia have been heavily forested or degraded (Chatelain et al., 2010).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Reliable Dung Counts	124	99	—	—	5 %	1,520
Other Guesses	—	—	1,425	1,425	40 %	11,537
Totals 2015	**124**	**99**	**1,425**	**1,425**		
Totals 2006	**0**	**0**	**1,676**	**1,676**		
Assessed Range					45 %	13,057
Unassessed Range					55 %	15,893
Total Range					100 %	28,950

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Area	+124	±99	-313	-313	5 %	1,520
New Guess	0	0	+62	+62	40 %	11,537
Totals	+124	±99	-251	-251	45 %	13,057

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	1,520	0	1,520
Other Guesses	11,537	0	11,537
Unassessed Range	15,788	105	15,893
Totals	28,844	105	28,950

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Barrobo National Forest	NG	O	E	2015	125		Freeman, pers. comm., 2016	2	640	8.0˚W	4.9˚N
Gola, Kpelle & Lorma National Forest	NG	O	E	2015	400		Freeman, pers. comm., 2016	1	4,255	10.4˚W	7.5˚N
Grebo National Forest	NG	O	E	2015	300		Freeman, pers. comm., 2016	1	2,510	7.6˚W	5.5˚N
Krahn Bassa National Forest	NG	O	E	2015	550		Freeman, pers. comm., 2016	1	5,142	8.8˚W	5.8˚N
Sapo National Park	DA	DC	B	2009	124	99	Boafo, 2010	1	630	8.5˚W	5.3˚N
Wenegisi National Forest	NG	O	E	2015	50		Freeman, pers. comm., 2016	2	130	9.5˚W	8.1˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

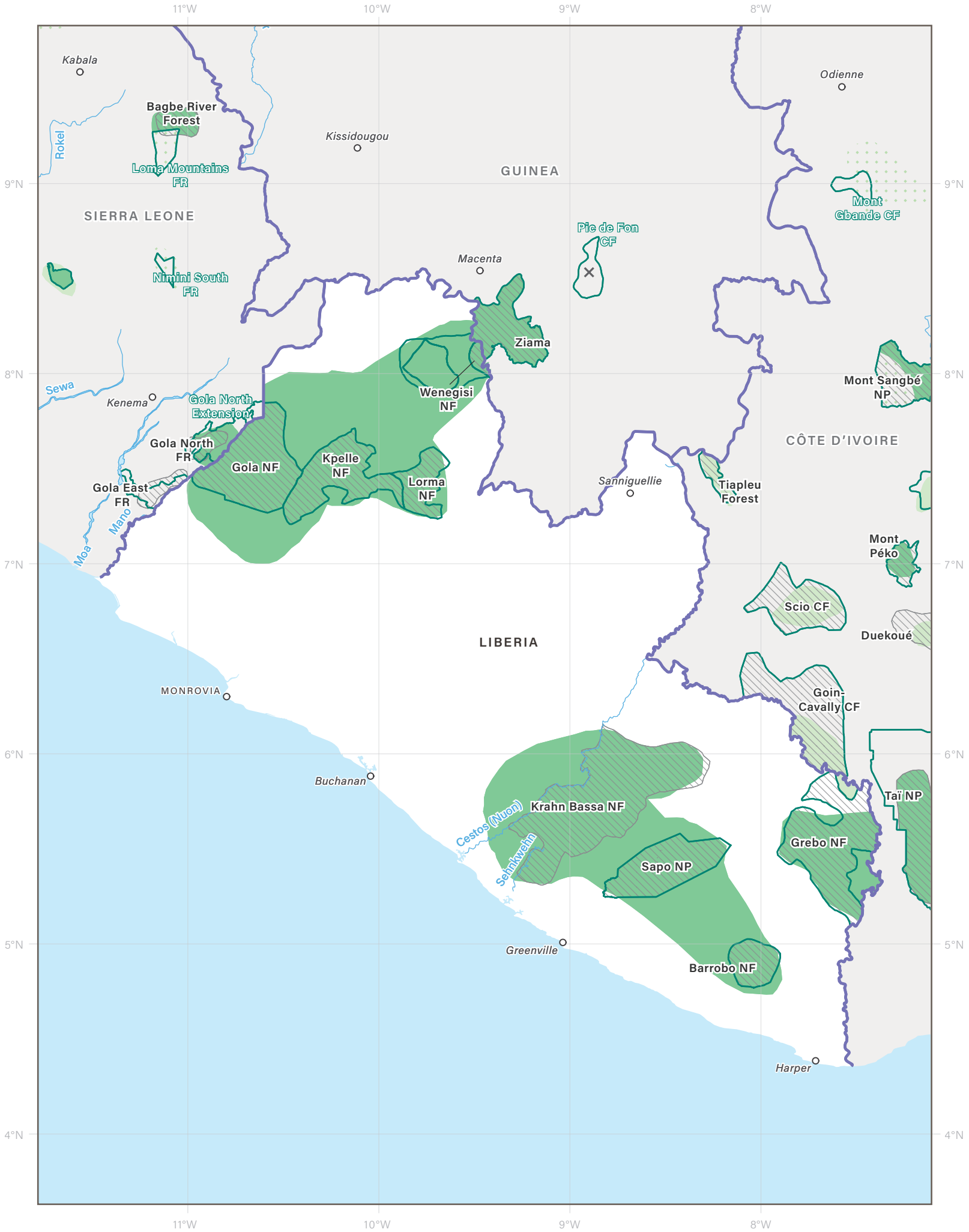
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Liberia



0 30 60 90 120 150 180km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Mali

ESTIMATED TOTAL ELEPHANTS

253 ± 0

GUESSES

51 - 51

GENERAL STATISTICS

Country Area	1,240,000 km^2
Range Area	25,495 km^2 (2%)
Protected Range	89%
Information Quality Index (IQI)	0.83
CITES Appendix	I
Listing Year	1994 (year of accession)

CURRENT ISSUES

Elephants in Mali are largely confined to Gourma, an arid area in the Sahel north of the border with Burkina Faso, where the elephants live alongside pastoralists. They are the continent's most northerly elephants, and together with Namibia's Kunene elephants, the most adapted to arid conditions. They move long distances in a circular migration pattern with individual home ranges being the largest recorded in Africa (Wall et al., 2013).

Until 2012 agricultural expansion was seen as the main threat to the Gourma elephant population, since there was little poaching and local pastoralists tolerated the elephants. This changed when the area was occupied by jihadists, and the first cases of poaching occurred. Although the government has re-established partial control of the area, the jihadists are still active, and general insecurity has allowed poaching to continue (Canney, pers. comm., 2016a). Twenty elephants were known to have been poached between January 2012 and January 2015, with an upsurge in the first half of 2015, during which period 64 were killed. By the end of 2015 the total had risen to 103 elephants killed since 2012 (Canney, pers. comm., 2016a). In addition, at least 36 elephants died of thirst and starvation in 2010 as a result of pressure from high numbers of livestock in the elephants' dry season range (Canney & Ganame, 2012).

Mali published an elephant conservation plan in 1991, although this is now out of date (Direction Nationale des Eaux et Forets, 1991).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Mali is 253 at the time of the last survey. There may be an additional 51 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 25,495 km^2, which is the entire estimated elephant range in Mali.

The Gourma elephants move over a large area and are difficult to survey using conventional techniques. A reconnaissance aerial count was carried out in June 2015, which gave an estimate of 253 elephants (Dias et al., 2015). A low wing aircraft, which is not ideal for survey work, was used and the count was carried out two months later than planned, by which time the elephants had dispersed and some were known to have been missed. Subsequently, an additional 51 elephants, were recorded from the ground (Ganame, pers. comm., 2015) and these have been added, giving a total of 304. This is lower than the previous individual registration study which recorded 498 elephants in 2004-2005 (Hema et al., pers. comm., 2006), and the aerial survey of 2007 which gave an estimate of 344 elephants (Bouché, 2007c).

Nine elephants were fitted with GPS collars and tracked between 2008 and 2010 (Wall et al., 2013). They moved over a larger area than those collared in 2000-2001. This range change is shown in the revised range map. Elephants, particularly bulls, sometimes move further beyond the main range, and these movements are shown as point records. The Gourma elephants move about 20 km into northern Burkina Faso as part of their regular migration (Wall et al., 2013).

Elephants are occasionally seen in southwestern Mali and believed to come from Côte d'Ivoire or western Burkina Faso (Dakouo, pers. comm., 2004; Nomoko, 2006) although they are said to be less frequent since the end of the civil war in Côte d'Ivoire (Canney, pers. comm., 2016b).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Informed Guesses	**253**	**—**	**51**	**51**	100 %	25,495
Totals 2015	**253**	**0**	**51**	**51**		
Totals 2006	**357**	**0**	**141**	**297**		
Assessed Range					100 %	25,495
Unassessed Range					0 %	0
Total Range					100 %	25,495

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Guess	-104	0	-90	-246	100 %	25,495
Totals	-104	0	-90	-246	100 %	25,495

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	25,495	0	25,495
Unassessed Range	0	0	0
Totals	25,495	0	25,495

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Gourma aerial survey zone	NG	O	D	2015	253		Dias et al., 2015	1	15,125	2.4˚W	15.4˚N
Gourma surrounding area	NG	O	D	2015	51		Ganame, pers. comm., 2015	1	1,287,763	3.5.˚W	17.4˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

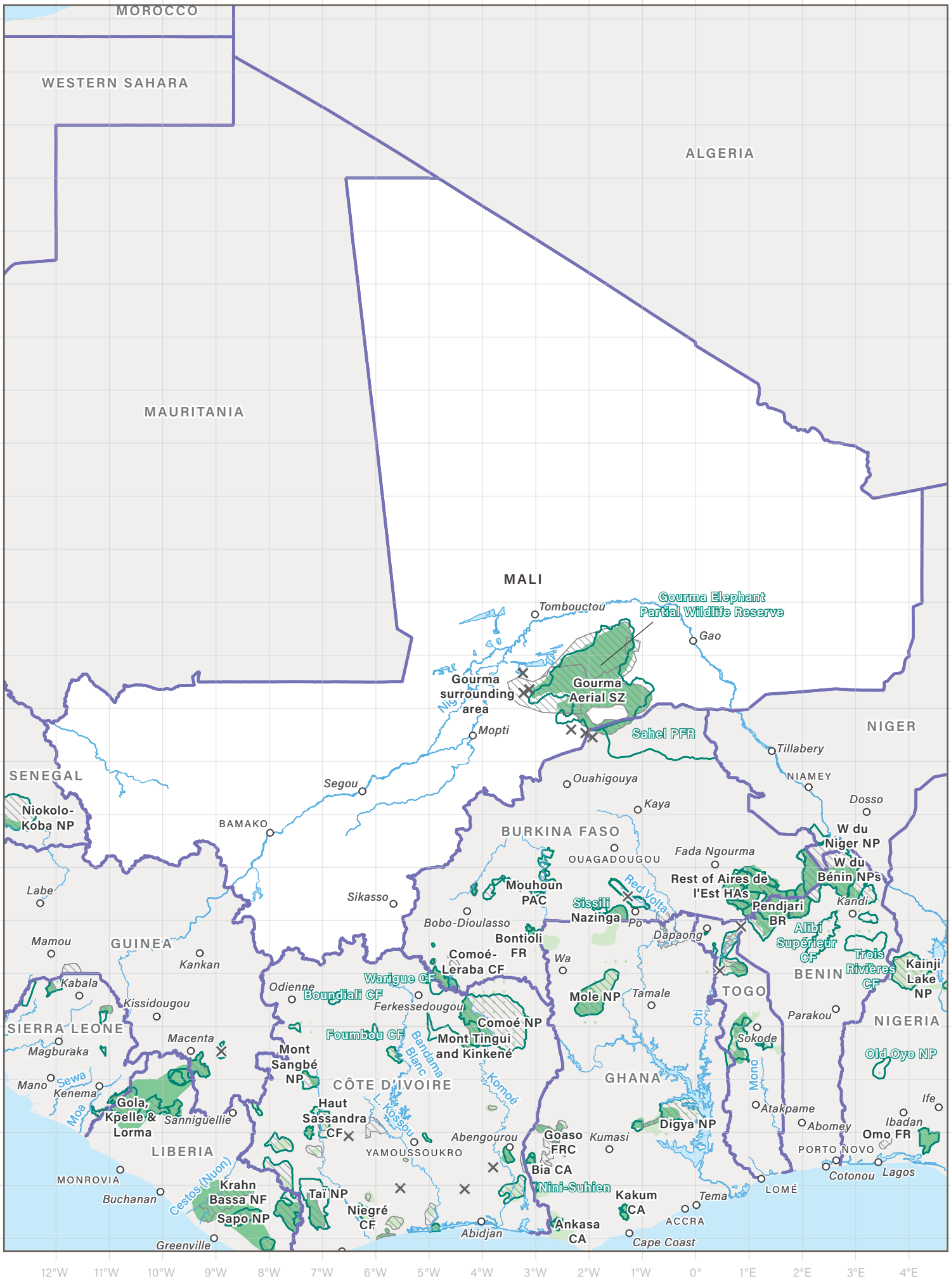
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Mali



ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

COUNTRY

Niger

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

17 - 17

GENERAL STATISTICS

Country Area	1,267,000 km²
Range Area	2,333 km² (0.2%)
Protected Range	100%
Information Quality Index (IQI)	0.00
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Only one elephant population is known to occur in Niger, forming part of the WAP transfrontier population. It is possible that elephants also occur on the Nigerian border, but there is no recent information.

Niger published a strategy and action plan for the sustainable management of elephants in 2010 (Direction de la Faune, de la Chasse et des Aires Protégées, 2010).

NUMBERS AND DISTRIBUTION

There is a zero estimate for the only survey carried out in Niger in the last ten years to the standards required for generating an estimate. There may be 17 elephants in areas not systematically surveyed. This number applies to 2,333 km², which is all of the estimated known and possible elephant range in Niger.

The reduction in the estimated national population since the AESR 2007 is a result of no elephants being seen in the aerial sample count of the WAP complex in 2015, but it is possible that more elephants do come into Niger on occasion.

Parc W du Niger National Park is located in the southwest region of the country and is part of the WAP transfrontier complex. An **aerial sample count** of the complex was carried out in 2015, but no elephants were seen within the Niger portion of Parc W du Niger NP (Bouché et al., 2015). This is likely to be a result of sampling error or a consequence of a small number of elephants moving between countries rather than loss of the population, since a total aerial count conducted in 2012

NUMBERS AND DISTRIBUTION
CONT.

gave a count of 136 elephants within the park and three outside (Bouché, 2012a). Additionally, a ground count in 2013 gave an estimate of 380 ± 61 (Bouché et al., 2013a).

The second, much smaller, population used to occur in the northern part of the Babban Rafi forest, which extends into Nigeria (Direction de la Faune, 1991). There is no recent information on these elephants so the estimate of 17 elephants (Issa, pers. comm., 2005) has been retained but degraded. The range has been changed to **doubtful range** in view of the lack of recent information.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Sample Counts	0	0	—	—	100 %	2,333
Degraded Data	—	—	17	17	0 %	0
Totals 2015	**0**	**0**	**17**	**17**		
Totals 2006	**85**	**0**	**17**	**17**		
Assessed Range					100 %	2,333
Unassessed Range					0 %	0
Total Range					100 %	2,333

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Different Technique	-85	0	0	0	100 %	2,333
Data Degraded	0	0	0	0	0 %	0
Totals	-85	0	0	0	100 %	2,333

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Direct Sample and Reliable Dung	2,333	0	2,333
Unassessed Range	0	0	0
Totals	2,333	0	2,333

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Babban Rafi Forest	-	O	E	2005	17		Issa, pers. comm., 2005	1	430	7.0˚E	13.1˚N
W du Niger National Park	DT	AS	B	2015	0		Bouché et al., 2015	1	2,294	2.4˚E	12.3˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

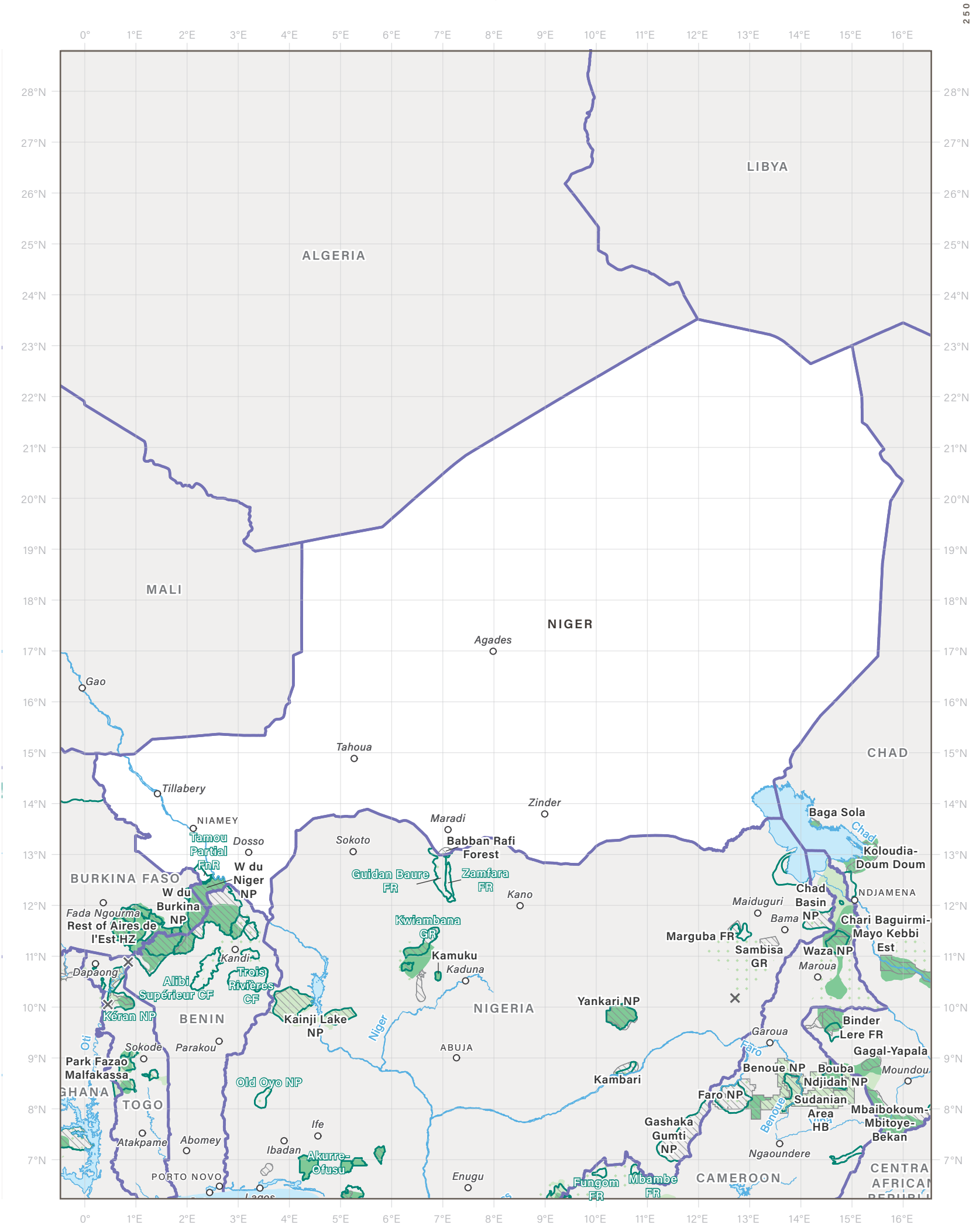
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Niger



0 100 200 300 400 500 600km

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

AfESG

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COUNTRY

Nigeria

ESTIMATED TOTAL ELEPHANTS

94 ± 0

GUESSES

169 - 463

GENERAL STATISTICS

Country Area	923,770 km^2
Range Area	20,088 km^2 (2%)
Protected Range	78%
Information Quality Index (IQI)	0.09
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Nigeria's elephants live in small, relict populations, some in forests in the south of the country and others in savannas in the north. The only relatively well-protected population is in Yankari National Park in central eastern Nigeria, but poaching continues to be a threat even there (Dunn, pers. comm., 2015). Yankari NP is managed by the Wildlife Conservation Society under contract from the Bauchi State Government.

Five populations have been reported as lost.

Nigeria published an elephant conservation plan in 1991 (Natural Resources Conservation Council, 1991), which is now out of date.

In recent analyses of ivory seizure data in ETIS, prepared for CITES, Nigeria has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016). Nigeria was requested by the CITES Standing Committee, at its 65th meeting, to prepare a National Ivory Action Plan. Nigeria has submitted a National Ivory Action Plan and a first progress report (CITES, n.d.-a).

NUMBERS AND DISTRIBUTION

The estimated number of elephants in areas surveyed in the last ten years in Nigeria is 94 at the time of the last survey for each area. There may be an additional 169 to 463 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 11,281 km^2, which is 56% of the estimated known and possible elephant range. There remains an additional 44% of the range for which no elephant population estimates are available.

There has been a reduction in the estimated numbers since the AESR 2007 because the survey of Yankari NP has been treated as an informed guess with a minimum number observed, rather than as a total count. There has been a corresponding increase in guesses.

An aerial total count of Yankari NP was carried out in 2011 in which 361 elephants were observed. However, there was a possibility that some groups were counted twice so the minimum estimate was 82, the size of the largest group. The central part of the park where the elephants are concentrated is thickly wooded, and elephants may have been missed (Bergl et al., 2011). This **informed guess** of 82-361 elephants replaces the previous aerial total count estimate of 348 from 2006 (Omondi et al., 2006). Since at least 50 elephants had been killed since the previous survey, it seems unlikely that the numbers have increased (Bergl et al., 2011). The AESR 2007 only showed **known range** in the east of the park, but more recent information from rangers and two satellite-collared elephants have revealed that elephants occur throughout the area. Poaching in Yankari NP is removing 10-20 animals per year, which would be unsustainable for this size of population (Dunn, pers. comm., 2015).

It is believed that elephants no longer occur in Kambari, south of Yankari NP (Dunn, pers. comm., 2015), so this has been recorded as a **lost population.**

An aerial survey of Sambisa Game Reserve and Marguba Forest Reserve in 2006 found no elephants and heavy human settlement (Omondi et al., 2006). Since there have been no recent records in this area and this was the main base for the Boko Haram insurgents, it seems likely that elephants no longer exist here; these populations are now recorded as **lost populations**. However, there may still be a small group of elephants to the south of Sambisa GR, in Adamawa State (Awi, 2007) and this is shown by a point record. It is believed that elephants no longer cross into the Chad Basin area and Chad Basin National Park from Waza National Park in Cameroon (Saidu, pers. comm., 2015) so these areas have been changed to **doubtful range** and the Chad Basin National Park has been recorded as a **lost population.**

Gashaka Gumti National Park is separated by less than 10 km from Faro National Park in neighbouring Cameroon. Elephants have not been seen in the park for ten years (Sommer, pers. comm., 2016) so this has been recorded as a **lost population**.

Elephants still occur in the forests along the Cameroon border in the Cross River state, including the Okwangwo (Dunn et al., 2014) and Oban Divisions of the Cross River National Park (Abanyam & Imong, 2015) and the Mbe Mountains (Dunn et al., 2014), forming a cross-border population with Korup National Park in Cameroon (Tooze, 1994). However, no surveys have been carried out in this area since 1998 (Obot et al., 1998) and the estimate of 74 from the AESR 2007 has been retained.

NUMBERS AND DISTRIBUTION
CONT.

A small population of elephants has survived in the swamp forests of Andoni Island, in the Niger Delta. Ijeomah & Esaen (2011) provided photographs of elephant dung taken in 2010 and it is believed that there are still between two and 14 individuals (Pronatura, n.d.). This **guess** updates a guess of six to ten from 2002 (Mshelbwala, pers. comm., 2002). There is another relict population in the Taylor Creek Reserve on the main Niger River. Blench & Dendo (2007) expressed doubt about the continued survival of this population; however, elephant signs were observed in 2012 (Akani et al., 2014) and the estimate of 25 from the AESR 2007 has been retained (Thouless, 1993).

There are some small elephant populations in forests in the south west of Nigeria, including Omo Forest Reserve north-east of Lagos where there were sightings in 2015 and the estimate of 30 from the AESR 2007 has been retained (Mshelbwala, 1998). However, it is believed that they have been extirpated from the adjoining Oluwa Forest Reserve (Ikemeh, 2009), which was not recorded as a population in the AESR 2007.

There have also been recent sightings of a minimum of 12 elephants from the Okomu Game Sanctuary (Saidu, pers. comm., 2015) and this estimate replaces a guess of 40 from 1991 (Natural Resources Conservation Council, 1991). Ikemeh (2009) recorded the presence of elephants in the Akure Ofusu and Idanre Forest Reserves and these have been added as **known range**. Elephant signs were found in a small portion of the Ifon Game Reserve in 2007 (Adeleke et al., 2007) with a guess of 5-8 individuals. There was previously no estimate for this population so this has been added as **known range**.

The Old Oyo National Park, which was previously recorded as possible range, was not mentioned in Ikemeh's (2009) study of elephants in south-west Nigeria, so it has been changed to **doubtful range**.

Kainji Lakes National Park is close to the Benin border. In the AESR 2007 it was recorded as possible range with no estimate. Meduna et al. (2009) stated that all the elephants had left the park and gone to Benin as a result of disturbance from illegal grazing. However, some were seen in 2014 (Saidu, pers. comm., 2015). Seven elephants were observed to the west of Kainji Lakes NP in 2013 (Isikhuemen, pers. comm., 2016) and this has been entered as a **guess** and a **new population**.

There is a small elephant population to the north-west of Kaduna in the north-central part of the country. This range includes the Kamuku National Park, Mando Forest Reserve, Alawa Game Reserve and Kwiambana Game Reserve (Amusa et al., 2015). There are estimated to be 26 elephants (Saidu, pers. comm., 2015) and the population is highly mobile (Amusa et al., 2013) especially because there is little water in the protected areas. This **guess** replaces one of 80-120 from 1993 (Hurst, pers. comm., 1994).

There used to be a population in the transboundary region with Niger around Babban Rafi, but there has been no recent information from here so this has been changed to **doubtful range**.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Aerial Total Counts	0	—	—	—	0 %	0
Informed Guesses	94	—	33	327	22 %	4,495
Other Guesses	—	—	7	7	29 %	5,731
Degraded Data	—	—	129	129	5 %	1,054
Totals 2015	**94**	**0**	**169**	**463**		
Totals 2006	**348**	**0**	**380**	**480**		
Assessed Range					56 %	11,281
Unassessed Range					44 %	8,807
Total Range					100 %	20,088

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Population	0	0	+12	+15	31 %	6,227
New Guess	-254	0	-98	+189	20 %	3,999
Population Lost	0	0	-125	-165	0 %	0
Data Degraded	0	0	0	-56	0 %	0
Totals	-254	0	-211	-17	51 %	11,281

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	4,281	215	4,495
Other Guesses	259	6,527	6,786
Unassessed Range	7,305	1,502	8,807
Totals	11,844	8,244	20,088

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Andoni Island	NG	O	D	2011	2	12*	Ijeomah & Esaen, 2011	2	215	7.5˚E	4.5˚N
Chad Basin National Park	PL	O	D	2015	0		Saidu, pers. comm., 2015	1	2,160	14.4˚E	11.7˚N
Cross River National Park	-	DC	E	1998	74	56	Obot et al., 1998	1	239	9.2˚E	6.3˚N
Gashaka Gumti	PL	O	E	2010	0		Sommer, pers. comm., 2016	1	5,960	11.7˚E	7.5˚N
Ifon Game Reserve	NP	O	D	2007	5	3*	Adeleke et al., 2007	2	283	5.8˚E	7.1˚N
Kainji Lake National Park	NP	O	E	2013	7		Isikhuemen, pers. comm., 2016	1	5,340	4.3˚E	10.0˚N
Kambari	PL	O	D	2015	0		Dunn, pers. comm., 2015	2	2,000	10.6˚E	8.8˚N
Kamuku	NG	O	D	2015	26		Saidu, pers. comm., 2015	1	2,855	6.6˚E	11.0˚N
Marguba Forest Reserve	PL	AT	A	2006	0		Omondi et al., 2006	2	710	12.7˚E	11.5˚N
Okomu Game Sanctuary	NG	O	D	2015	12		Saidu, pers. comm., 2015	2	1,082	5.1˚E	6.3˚N
Omo Forest Reserve	-	O	E	1994	30	20*	Mshelbwala, 1998	2	1,300	3.6˚E	6.8˚N
Sambisa Game Reserve	PL	AT	A	2006	0		Omondi et al., 2006	2	647	13.4˚E	11.3˚N
Taylor Creek	-	O	E	1993	25		Thouless, 1993	2	145	6.4˚E	5.2˚N
Yankari National Park	NG	O	D	2011	82	279*	Bergl et al., 2011	1	2,244	10.4˚E	9.8˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

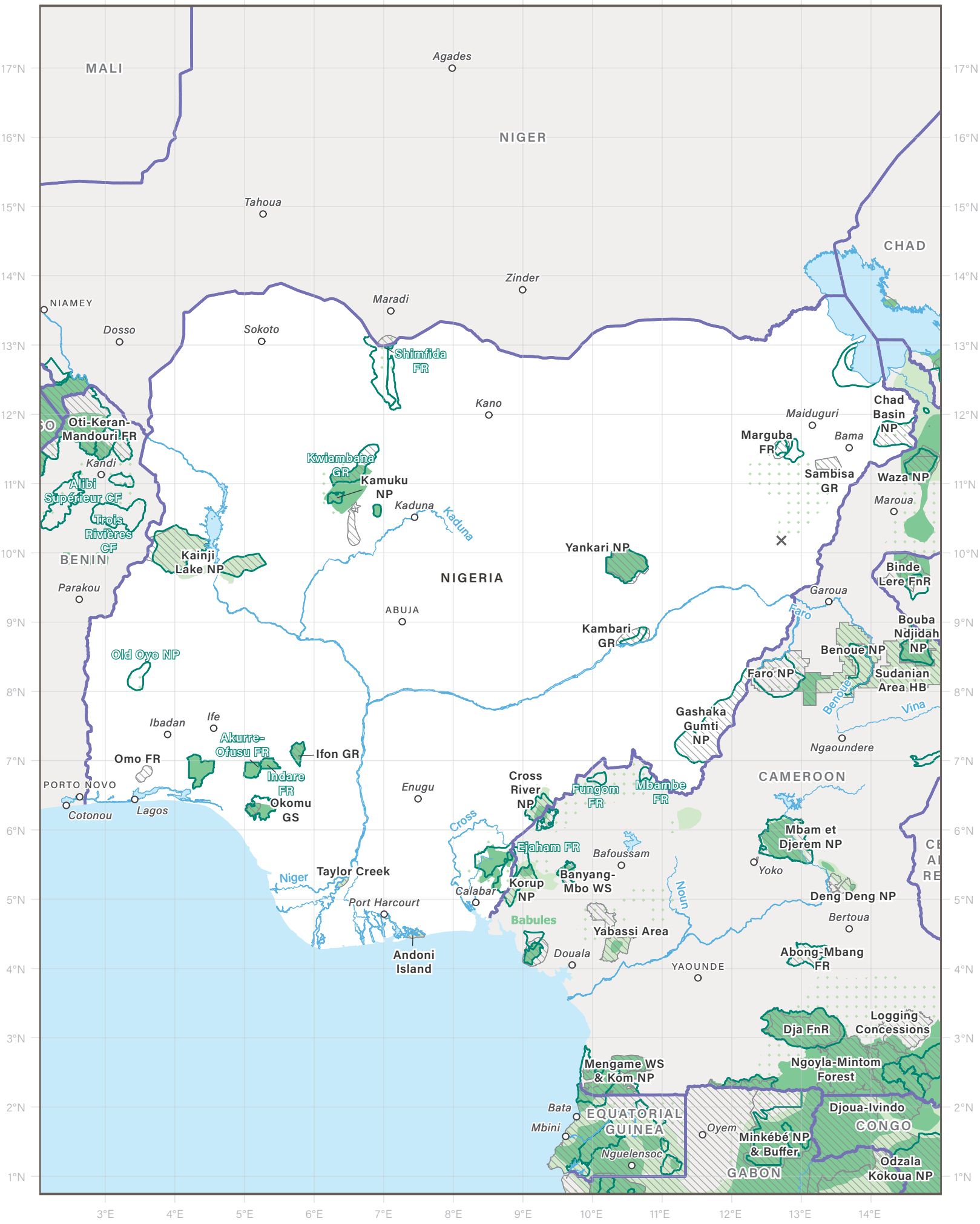
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Nigeria



0 80 160 240 320 400 480km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Senegal

ESTIMATED TOTAL ELEPHANTS

1 ± 0

GUESSES

9 - 14

GENERAL STATISTICS

Country Area	196,190 km²
Range Area	1,090 km² (1%)
Protected Range	100%
Information Quality Index (IQI)	0.07
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

Niokolo Koba National Park is the last place where elephants are known to occur in Senegal, the westernmost elephant range state, but the park is in a serious state of deterioration. Illegal activity is widespread, including cattle grazing, commercial timber exploitation and wildlife poaching. It was added to the UNESCO list of World Heritage Sites in Danger in 2007 and remains on the list (UNESCO World Heritage Centre, n.d.). Emergency funding for anti-poaching was provided by the Rapid Response Facility in 2011 (UNESCO World Heritage Centre, 2011). Under these circumstances it is remarkable that such a small and isolated elephant population has managed to survive for so long.

Senegal published an elephant conservation plan in 1991, although this is now out of date (Direction des Parcs Nationaux du Senegal, 1991).

NUMBERS AND DISTRIBUTION

There was known to be at least one elephant in Senegal in 2013. There may be an additional 9 to 14 elephants. Together, this estimate and guess apply to 1,090 km², which is the entirety of the estimated known and possible elephant range in Senegal.

It is thought that there may be 10-15 elephants still in Niokolo Koba NP, with evidence of continued presence from camera trap photos in the Mount Assirik area of the park in 2013 and a few sightings of a small group (c. 10) in 2012 (Henschel, pers. comm., 2015). This **informed guess** replaces a guess of 1-10 individuals from 2006 (Renaud et al., 2006).

NUMBERS AND DISTRIBUTION CONT.

It is unlikely that elephants move between Niokolo-Koba NP and neighbouring Guinea, as there have been no records of elephant presence on the Guinea side since the early 1990s (Litoroh et al., 2002).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Informed Guesses	1	—	9	14	100 %	1,090
Totals 2015	**1**	**0**	**9**	**14**		
Totals 2006	**1**	**0**	**0**	**9**		
Assessed Range					100 %	1,090
Unassessed Range					0 %	0
Total Range					100 %	1,090

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Guess	0	0	+9	+5	100 %	1,090
Totals	0	0	+9	+5	100 %	1,090

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	1,090	0	1,090
Unassessed Range	0	0	0
Totals	1,090	0	1,090

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Niokolo-Koba National Park	NG	O	D	2012	10	5*	Henschel, pers. comm., 2015	1	8,282	13.0˚W	13.0˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

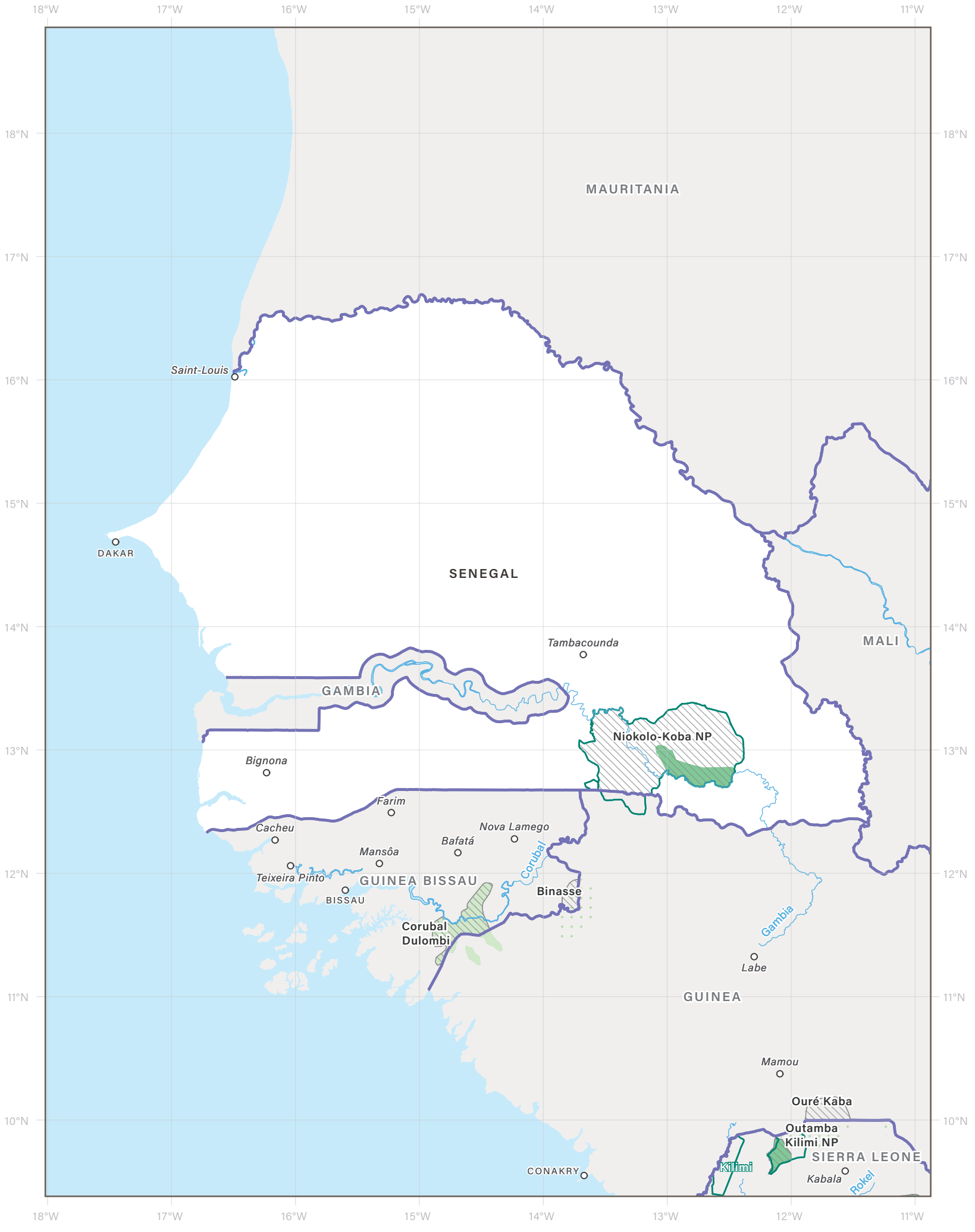
[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Senegal



0 50 100 150 200 250 300km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

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COUNTRY

Sierra Leone

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

135 - 155

GENERAL STATISTICS

Country Area	71,740 km^2
Range Area	1,353 km^2 (2%)
Protected Range	58%
Information Quality Index (IQI)	0.00
CITES Appendix	I
Listing Year	1994 (year of accession)

CURRENT ISSUES

There is little information about the current status of the few elephants remaining in Sierra Leone, and it is believed that the civil war of 1991-2001 had a severe impact on them (Lindsell et al., 2011). Agence Presse Francaise (AFP, 2009) reported in November 2009 that the last elephants in Sierra Leone had been wiped out by poaching. This report has been widely circulated and repeated in news items as recently as 2013. This was not correct; several small populations still survive, although they are under pressure from poaching, mining and logging (Ballweg et al., 2013).

The Gola East Forest Reserve population has been recorded as lost.

Sierra Leone published an elephant conservation plan in 1991, although this is now out of date (Ministry of Agriculture, 1991).

NUMBERS AND DISTRIBUTION

There have been no surveys carried out in Sierra Leone in the last ten years to the standards required for generating an estimate. There may be 135 to 155 elephants in areas not systematically surveyed in Sierra Leone. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. These guesses apply to 867 km^2, which is 64% of the estimated known and possible elephant range. There remains an additional 36% of the estimated range for which no elephant population estimates are available.

There has been a reduction in the guessed number of elephants in Sierra Leone because of the loss of the Gola East elephant population.

NUMBERS AND DISTRIBUTION
CONT.

There are four areas within Sierra Leone where it is believed that elephants still occur. These are Gola North Forest, Outamba Kilimi National Park, Bagbe River Forest and the Kangari Hills Forest Reserve (Ballweg et al., 2013; Siaka, pers. comm., 2016). These are marked as **known range**, while the Nimini South Forest Reserve, from which there are no recent records, has been changed to **doubtful range**, as has a small unnamed area of range from the AESR 2007 in the north-east corner of the country. The Gola East Forest Reserve population is now presumed extinct, a conclusion confirmed by local hunters who had not seen elephants there since the war (Lindsell et al., 2011), and this has been recorded as a **lost population**.

A dung survey was carried out in Outamba Kilimi National Park in 2012 (Ballweg et al., 2013). Elephants were only found in the western part of the Outamba section of the park, and there was insufficient data to derive a population estimate. Illegal gold mining was said to be an increasing problem. Since no new estimate was given, the estimate of 80-100 from 2006 (Danquah & Nandjui, pers. comm., 2006) has been retained.

Lindsell et al. (2011) carried out biodiversity surveys in the Gola Forest Complex in 2006-2007. This area was believed to have been badly affected by the civil war, and it was confirmed that elephant numbers had declined. However, in the absence of new information on numbers, the guess of 50 elephants from 1987 (Grubb et al., 1998) has been retained. The elephants in Gola North may not be permanently resident in this area but move back and forth across the Moro River between Sierra Leone and Liberia. The distribution of elephants in Gola North has been clarified with records from camera traps, direct observations and elephant signs from 2008 to 2014 (Tubbs, pers. comm., 2015).

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Informed Guesses	0	—	80	100	26 %	357
Other Guesses	—	—	0	0	0 %	0
Degraded Data	—	—	55	55	38 %	510
Totals 2015	**0**	**0**	**135**	**155**		
Totals 2006	**0**	**0**	**195**	**215**		
Assessed Range					64 %	867
Unassessed Range					36 %	486
Total Range					100 %	1,353

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Population Lost	0	0	-60	-60	0 %	0
No Change	0	0	0	0	64 %	867
Totals	0	0	-60	-60	64 %	867

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	357	0	357
Other Guesses	510	0	510
Unassessed Range	369	0	486
Totals	1,236	0	1,353

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE[1]	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS[3]	AREA	MAP LOCATION	
		TYPE[2]	RELIAB.[2]	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Bagbe River Forest	-	O	E	1995	5	45*	Kortenhoven, pers. comm., 2002	1	349	11.1˚W	9.3˚N
Gola East Forest Reserve	PL	O	E	2011	0		Lindsell, 2011	1	287	11.2˚W	7.4˚N
Gola North Forest Reserve	-	O	E	1987	50		Grubb et al., 1998	1	242	10.9˚W	7.6˚N
Outamba Kilimi National Park	-	O	D	2006	80	20*	Nandjui & Danquah, pers. comm., 2006	1	358	12.1˚W	9.7˚N

*RANGE OF INFORMED GUESS

[1] KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

[2] KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3] PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Sierra Leone

0 20 40 60 80 100 120km

- Int'l Boundaries
- Rivers & Lakes
- Towns
- Protected Areas
- Input Zones

ELEPHANT RANGE

- Known
- Possible
- Doubtful
- Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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COUNTRY

Togo

ESTIMATED TOTAL ELEPHANTS

0 ± 0

GUESSES

74 - 114

GENERAL STATISTICS

Country Area	56,790 km^2
Range Area	6,307 km^2 (11%)
Protected Range	75%
Information Quality Index (IQI)	0.00
CITES Appendix	I
Listing Year	1990

CURRENT ISSUES

There are very few elephants remaining in Togo. During civil disturbances from 1990-1992, people were encouraged to settle in the protected areas, and it is believed that the majority of elephants were killed or fled to neighbouring countries at that time (Okoumassou et al., 1998). Some attempts have been made to rehabilitate the parks, but their suitability for elephants is limited because they are now heavily settled (Polo-Akpisso et al., 2015). There is a UNDP project to rehabilitate Kéran National Park (République Togolaise, 2015). Fazao-Malfakassa National Park was being managed by the Franz Weber Foundation, but they withdrew at the end of 2015 (Weber, pers. comm., 2016).

In recent analyses of ivory seizure data in ETIS, prepared for CITES, Togo has been identified as a country with a worrying involvement in illegal ivory trade (CITES Secretariat, 2012; Milliken et al., 2013, 2016).

Togo published its national strategy for elephant management in 2003 (Ministère de l'Environnement et des Ressources Forestières, 2003).

NUMBERS AND DISTRIBUTION

There have been no surveys carried out in Togo in the last ten years to the standards required for generating an estimate. There may be 74 to 114 elephants in areas not systematically surveyed. These guesses likely represent a minimum number, and actual numbers could be higher than those reported. Together, this estimate and guess apply to 4,085 km², which is 65% of the estimated known and possible elephant range. There remains an additional 35% of the estimated range for which no elephant population estimates are available.

There were formerly three main areas of elephant range: in and around Kéran NP and Oti-Mandori Faunal Reserve in the north, the Fazao-Malfakassa massif in the centre of the country, and Fosse aux Lions National Park in the north-west. There has been a small increase in the guessed number of elephants in Fazao-Malfakassa NP, but this is probably the result of increased knowledge, rather than a real increase in numbers.

Twenty nine sightings of elephants were recorded in the Kéran area in the north of Togo between 2011 and 2014 with a maximum of ten individuals in one sighting in 2013 (Polo-Akpisso, pers. comm., 2016b). This replaces a guess of zero from 2004 (Bouché et al., 2004b). The range map has been changed to show the area where these were recorded as **known range**, with the remainder of the previous range changed to **possible range**.

Sixty one sightings and elephant tracks were recorded in Fazao Malfakassa NP from 2012 to 2014, and eight individuals were seen in a group in 2014 (Polo-Akpisso, pers. comm., 2016a). However, former park management believes that there are 60-100 and this has been entered as a **guess** (Weber, pers. comm., 2016), which replaces a previous guess of 61 from 2002 (Okoumassou, pers. comm., 2002). The range map has been changed to show the area where elephants were recorded as **known range**, with the remainder of the previous range changed to **possible**.

There is no recent information from Fosse aux Lions NP. There was an estimate of zero in the AESR 2007, and therefore it is recorded as a **lost population** and changed to **non-range.** There is also no recent information from the Abdoulayé Faunal Reserve to the east of Fazao Malfakassa, so the existing guess of four elephants has been retained but degraded.

Elephants recorded in Oti-Kéran-Mandori are probably visitors from Benin and Burkina Faso.

SUMMARY TOTALS

SURVEY CATEGORY	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
Informed Guesses	0	—	70	110	63 %	3,950
Degraded Data	—	—	4	4	2 %	135
Totals 2015	**0**	**0**	**74**	**114**		
Totals 2006	**4**	**0**	**61**	**61**		
Assessed Range					65 %	4,085
Unassessed Range					35 %	2,222
Total Range					100 %	6,307

INTERPRETATION OF CHANGES IN ESTIMATES FROM PREVIOUS REPORT

REASON FOR CHANGE	ESTIMATES FROM SURVEYS		GUESSES		KNOWN AND POSSIBLE RANGE	
	ESTIMATE	± 95% CL	FROM	TO	PERCENT (%)	AREA (km²)
New Guess	0	0	+9	+49	63 %	3,950
Population Lost	0	0	0	0	0 %	0
Data Degraded	-4	0	+4	+4	0 %	0
Totals	-4	0	+13	+53	63 %	4,085

AREA OF RANGE COVERED BY EACH DATA CATEGORY

DATA CATEGORY	KNOWN RANGE (km²)	POSSIBLE RANGE (km²)	TOTAL RANGE (km²)
Informed Guesses	1,540	2,410	3,950
Unassessed Range	1,102	1,255	2,357
Totals	2,642	3,665	6,307

ELEPHANT ESTIMATES

INPUT ZONE	REASON FOR CHANGE	SURVEY DETAILS			# OF ELEPHANTS		SOURCE	PFS	AREA	MAP LOCATION	
		TYPE	RELIAB.	YEAR	ESTIMATE	± 95% CL			(km²)	LON.	LAT.
Abdoulayé Faunal Reserve	-	O	E	2002	4		Okoumassou, pers. comm., 2002	2	300	1.3˚E	8.7˚N
Fazao Malfakassa National Park	NG	O	D	2015	60	40*	Weber, pers. comm., 2016	1	1,920	0.8˚E	8.7˚N
Fosse aux Lions	PL	O	E	2002	0		Okoumassou, pers. comm., 2002	3	17	0.2˚E	10.8˚N
Oti-Kéran-Mandori Faunal Reserve	NG	O	D	2014	10		Polo-Akpisso, pers. comm., 2016b	1	1,804	0.7˚E	10.4˚N

*RANGE OF INFORMED GUESS

[1]KEY TO REASONS FOR CHANGE

DA: Different Area; DD: Data Degraded; DT: Different Technique; NA: New Analysis; NG: New Guess; NP: New population; PL: Population Lost; RS: Repeat Survey (RS denotes a repeat survey that is not statistically comparable for reasons such as different season);
— : No Change

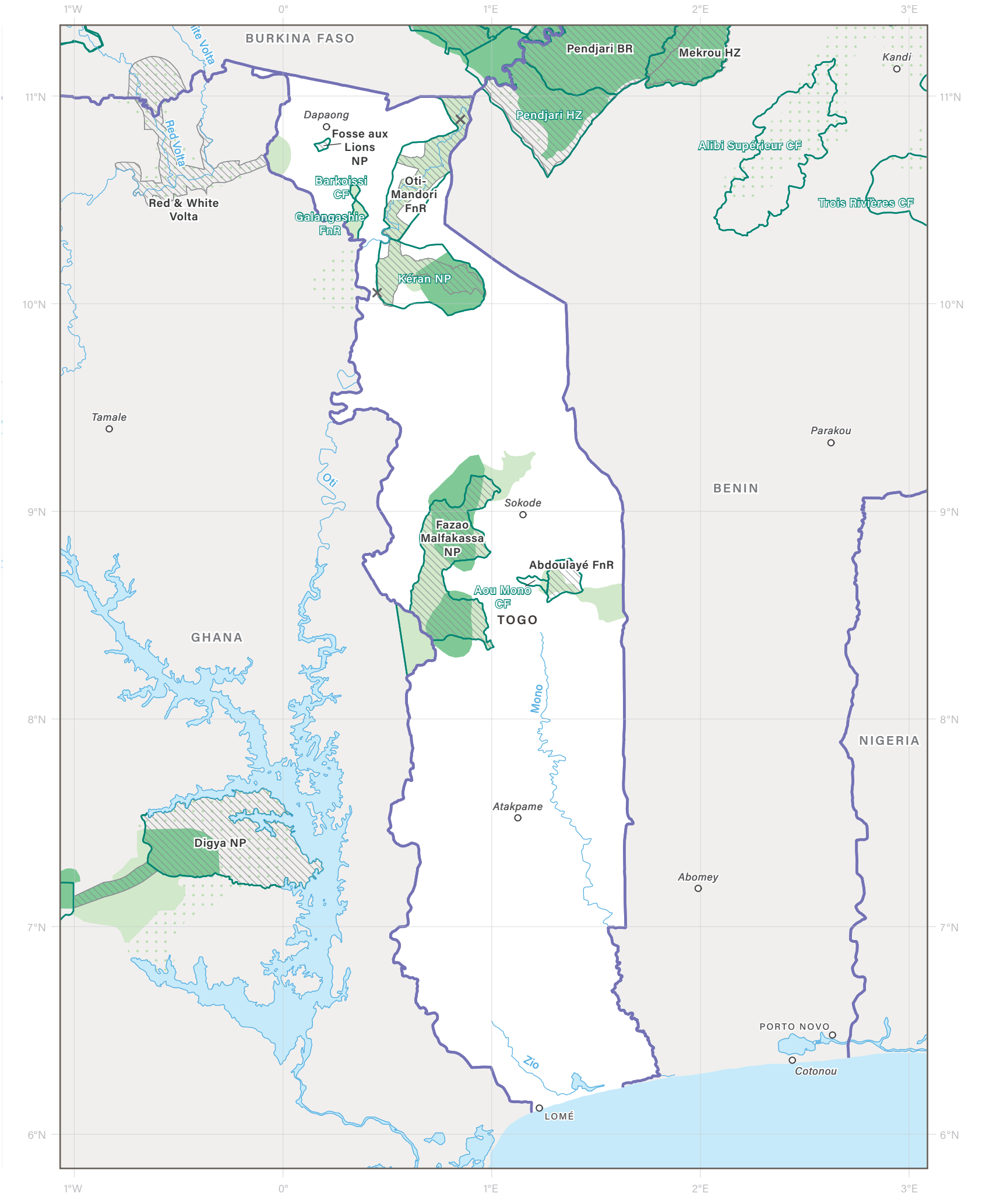
[2]KEY TO SURVEY REPORT

AS: Aerial Sample Count; AT: Aerial Total Count; DC: Dung Count; GD: Genetic Dung Count; GS: Ground Sample Count; GT: Ground Total Count; IG: Informed Guess; IR: Individual Registration; OG: Other Guess. Survey Reliability is keyed A-E (best to worst).

[3]PFS

Priority for Future Surveys (PFS) is ranked from 1 to 5 (highest to lowest). Based on the precision of estimates and the proportion of national range accounted for by the site in question, PFS is a measure of the importance and urgency for future population surveys. All areas of unassessed range have a priority of 1. See Introduction for details on how the PFS is derived.

Togo



0 20 40 60 80 100 120km

Int'l Boundaries
Rivers & Lakes
Towns
Protected Areas
Input Zones

ELEPHANT RANGE

Known
Possible
Doubtful
Sighting

ABBREVIATIONS AND ACRONYMS

See Appendix III for map abbreviations and acronyms.

AfESG

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References, Appendices & Glossary

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Comparable Estimates from Eastern & Southern Africa

REGION	COUNTRY	INPUT ZONE	YEAR	TYPE	ESTIMATE	95 % CL
EASTERN AFRICA	**Kenya**	Kerio Valley	2006	AT	205 ±	0
			2015	AT	311 ±	0
		Laikipia-Samburu Ecosystem	2006	AT	5,447 ±	0
			2015	AT	6,365 ±	0
		Masai Mara National Reserve	2006	AT	1,655 ±	0
			2015	AT	876 ±	0
		Masai Mara Outside	2006	AT	461 ±	0
			2015	AT	532 ±	0
		Mwingi National Reserve	2006	AT	0 ±	0
			2015	AT	0 ±	0
		Nasolot and S. Turkana	2006	AT	285 ±	0
			2015	AT	351 ±	0
		South Kitui National Reserve	2006	AT	0 ±	0
			2015	AT	0 ±	0
		Tsavo National Park	2006	AT	9,021 ±	0
			2015	AT	9,504 ±	0
		Tsavo (Outside)	2006	AT	1,335 ±	0
			2015	AT	1,612 ±	0
	Tanzania	Katavi National Park	2006	AS	4,102 ±	1,615
			2015	AS	3,128 ±	1,944
		Rukwa Game Reserve	2006	AS	1,200 ±	902
			2015	AS	122 ±	131
		Mkomazi Game Reserve	2006	AT	41 ±	0
			2015	AT	59 ±	0
		Moyowosi-Kigosi Game Reserve	2006	AS	9,541 ±	3,657
			2015	AS	1,645 ±	2,389
		Natron Landscape and West Kilimanjaro	2006	AT	70 ±	0
			2015	AT	200 ±	0
		Ruaha Rungwa Ecosystem	2006	AS	35,409 ±	11,507
			2015	AS	14,284 ±	6,123
		Sagara Nyamagoma Ecosystem	2006	AS	4,635 ±	3,028
			2015	AS	503 ±	592
		Selous Mikumi Ecosystem	2006	AS	70,406 ±	24,843
			2015	AS	14,040 ±	3,252

REGION	COUNTRY	INPUT ZONE	YEAR	TYPE	ESTIMATE	95 % CL
Eastern Africa CONT.	**Tanzania** CONT.	Loliondo Game Controlled Area	2006	AT	88 ±	0
			2015	AT	0 ±	0
		Serengeti Ecosystem	2006	AT	1,630 ±	0
			2015	AT	6,087 ±	0
		Lake Manyara	2006	AT	36 ±	0
			2015	AT	104 ±	0
		Tarangire National Park	2006	AT	1,119 ±	0
			2015	AT	3,282 ±	0
		Ugalla East	2006	AS	1,353 ±	837
			2015	AS	146 ±	278
		Ugalla Game Reserve	2006	AS	4,133 ±	1,778
			2015	AS	659 ±	549
	Uganda	Kidepo Valley National Park and Karenga Wildlife Community Area	2006	AT	454 ±	0
			2015	AT	621 ±	0
		Murchison Falls Conservation Area	2006	AS	516 ±	635
			2015	AS	1,352 ±	900
		Queen Elizabeth Conservation Area	2006	AS	2,959 ±	1,476
			2015	AS	2,904 ±	1,800
TOTALS		Totals for Eastern African Sites	2006		156,101 ±	27,964
			2015		68,687 ±	7,896
		Total Difference for Eastern African Sites	9		-87,414 ±	29,057*

REGION	COUNTRY	INPUT ZONE	YEAR	TYPE	ESTIMATE	95 % CL
SOUTHERN AFRICA	**Botswana**	Northern Botswana	2006	AS	153,620 ±	20,818
			2015	AS	129,939 ±	12,501
	Mozambique	Magoe District	2006	AS	1,628 ±	794
			2015	AS	1,051 ±	720
		Niassa Ecosystem	2006	AS	12,477 ±	2,111
			2015	AS	4,441 ±	1,360
	Nambia	Etosha National Park	2006	AS	2,057 ±	598
			2015	AS	2,911 ±	637
		Khaudum-Kavango	2006	AS	3,848 ±	2,292
			2015	AS	4,149 ±	1,864
		Kunene	2006	AS	210 ±	157
			2015	AS	314 ±	154
		Nyae Nyae Conservancy	2006	AS	967 ±	481
			2015	AS	2,264 ±	1,729
		Zambezi Region	2006	AS	8,725 ±	2,206
			2015	AS	13,116 ±	3,413
	South Africa	Kruger National Park	2006	AT	12,427 ±	0
			2015	AT	17,086 ±	0
		Manyeleti Game Reserve	2006	AT	71 ±	0
			2015	AT	222 ±	0

REGION	COUNTRY	INPUT ZONE	YEAR	TYPE	ESTIMATE	95 % CL
Southern Africa CONT.	**Swaziland**	Hlane Royal National Park	2006	IR	13 ±	0
			2015	IR	25 ±	0
		Mkhaya Nature Reserve	2006	IR	15 ±	0
			2015	IR	14 ±	0
	Zambia	Kafue Game Management Areas	2006	AS	959 ±	492
			2015	AS	1,876 ±	1,614
		Kafue National Park	2006	AS	6,306 ±	5,227
			2015	AS	4,813 ±	2,254
		Sioma Ngwezi	2006	AS	385 ±	371
			2015	AS	48 ±	75
		Lower Zambezi Ecosystem	2006	AS	1,477 ±	744
			2015	AS	973 ±	579
		Lower Zambezi Game Management Areas	2006	AS	45 ±	53
			2015	AS	153 ±	172
		Luangwa Game Management Areas	2006	AS	3,962 ±	1,292
			2015	AS	5,869 ±	3,086
		Lukusuzi National Park	2006	AS	0 ±	0
			2015	AS	0 ±	0
		North Luangwa National Park	2006	AS	3,235 ±	695
			2015	AS	4,673 ±	1,770
		South Luangwa National Park	2006	AS	4,459 ±	1,519
			2015	AS	3,302 ±	1,186
		Chete and Sekula Islands	2006	AT	0 ±	0
			2015	AT	54 ±	0
	Zimbabwe	Tuli, Maramani, Sentinel, Nottingham	2006	AT	82 ±	0
			2015	AT	212 ±	0
		Chewore II	2006	AS	1,673 ±	705
			2015	AS	594 ±	310
		Chewore I & III	2006	AS	4,111 ±	881
			2015	AS	2,709 ±	851
		Chewore IV	2006	AS	580 ±	335
			2015	AS	0 ±	0
		Doma Safari Area	2006	AS	336 ±	383
			2015	AS	153 ±	175
		Mavuradonha Wilderness Area	2006	AS	13 ±	26
			2015	AS	0 ±	0
		Mukwiche Area	2006	AS	228 ±	296
			2015	AS	0 ±	0
		Rest of Zambezi valley	2006	AS	15,870 ±	2,224
			2015	AS	8,200 ±	2,029
		Hwange National Park	2006	AS	44,492 ±	5,770
			2015	AS	45,846 ±	6,244
		Matabeleland Communal areas	2006	AS	64 ±	79
			2015	AS	2,201 ±	3,062

REGION	COUNTRY	INPUT ZONE	YEAR	TYPE	ESTIMATE	95 % CL
Southern Africa CONT.	**Zimbabwe** CONT.	Matetsi Safari Complex	2006	AS	4,201 ±	1,670
			2015	AS	4,843 ±	2,968
		Ngamo & Sikumi Forest Areas	2006	AS	553 ±	496
			2015	AS	1,101 ±	993
		Binga Communal Lands	2006	AS	431 ±	373
			2015	AS	86 ±	162
		Chete Safari Area	2006	AS	971 ±	310
			2015	AS	278 ±	222
		Chirisa Safari Area	2006	AS	4,231 ±	1,260
			2015	AS	1,200 ±	755
		Chizarira National Park	2006	AS	3,071 ±	1,117
			2015	AS	747 ±	767
		Kariba Communal Areas	2006	AS	3,715 ±	1,033
			2015	AS	411 ±	364
		Lusulu	2006	AS	33 ±	63
			2015	AS	0 ±	0
		Matusadona National Park	2006	AS	1,925 ±	443
			2015	AS	669 ±	251
		North Gokwe Communal Lands	2006	AS	192 ±	172
			2015	AS	0 ±	0
		Sijarira Forest Area	2006	AS	488 ±	333
			2015	AS	16 ±	17
		Gonarezhou National Park	2006	AS	4,987 ±	1,577
			2015	AS	11,120 ±	2,709
		Mahenye Ward	2006	AS	0 ±	0
			2015	AS	332 ±	441
		Malapati Safari Area	2006	AS	5 ±	9.4
			2015	AS	0 ±	0
		Malilangwe Conservancy	2006	AT	116 ±	0
			2015	AT	272 ±	0
		Save Valley Conservancy	2006	AS	527 ±	310
			2015	AS	1585 ±	1,295
TOTALS		Totals for Southern African Sites	2006		309,781 ±	23,062
			2015		279,868 ±	16,524
		Total Difference for Southern African Sites	9		-29,913 ±	28,371 *

** Statistically Significant Difference*

Information Quality Index & Priorities for Future Surveys

COUNTRY	REGION	PROBABLE FRACTION	ASSESSED RANGE FRACTION	IQI	CHANGE ON PREVIOUS REPORT	CONTINENTAL RANGE FRACTION	PFS
Angola	S	0.67	0.13	0.09	+0.07	10.32 %	1
Botswana	S	0.91	0.56	0.52	-0.09	7.28 %	1
Congo	C	0.18	0.57	0.10	+0.09	4.82 %	1
Democratic Republic of Congo	C	0.16	0.51	0.08	-0.02	7.13 %	1
Gabon	C	0.09	1.01	0.09	+0.06	6.81 %	1
Mozambique	S	0.58	0.82	0.48	+0.16	10.23 %	1
Namibia	S	0.84	0.51	0.43	+0.04	5.24 %	1
South Sudan	E	0.55	0.42	0.23	+0.23	9.89 %	1
Tanzania	E	0.83	0.70	0.58	+0.04	12.45 %	1
Zambia	S	0.81	0.62	0.50	+0.04	5.44 %	1
Cameroon	C	0.69	0.68	0.47	+0.47	2.86 %	2
Central African Republic	C	0.40	0.89	0.35	+0.23	0.79 %	2
Chad	C	0.69	0.46	0.32	+0.21	1.96 %	2
Côte d'Ivoire	W	0.19	0.91	0.18	+0.02	0.47 %	2
Equatorial Guinea	C	0.57	1.00	0.57	+0.57	0.63 %	2
Ethiopia	E	0.47	0.84	0.39	+0.28	0.71 %	2
Ghana	W	0.74	0.50	0.37	+0.03	0.48 %	2
Kenya	E	0.74	0.80	0.59	+0.06	4.17 %	2
Liberia	W	0.08	0.45	0.03	+0.03	0.92 %	2
Mali	W	0.83	1.00	0.83	+0.29	0.81 %	2
Nigeria	W	0.17	0.56	0.09	-0.01	0.64 %	2
South Africa	S	0.69	0.92	0.64	-0.32	0.98 %	2
Uganda	E	0.65	0.79	0.51	+0.10	0.54 %	2
Zimbabwe	S	0.89	0.97	0.86	+0.01	2.59 %	2
Benin	W	0.67	0.99	0.66	-0.33	0.29 %	3
Burkina Faso	W	0.76	0.80	0.61	-0.19	0.48 %	3
Eritrea	E	0.00	1.00	0.00	-0.92	0.17 %	3
Guinea	W	0.00	0.78	0.00	-0.18	0.05 %	3
Guinea Bissau	W	0.00	1.00	0.00	0.00	0.04 %	3
Malawi	S	0.77	0.72	0.55	+0.41	0.25 %	3
Niger	W	0.00	1.00	0.00	-0.83	0.07 %	3
Senegal	W	0.07	1.00	0.07	-0.03	0.03 %	3
Sierra Leone	W	0.00	0.64	0.00	0.00	0.04 %	3
Somalia	E	0.00	0.68	0.00	0.00	0.14 %	3
Togo	W	0.00	0.65	0.00	-0.04	0.20 %	3
Rwanda	E	0.70	0.99	0.70	+0.40	0.03 %	4
Swaziland	S	1.00	1.00	1.00	0.00	0.00 %	5

APPENDIX III

Acronyms & Abbreviations

A

AED	African Elephant Database
AERP	Amboseli Elephant Research Project (Kenya)
AESR	African Elephant Status Report
AfESG	African Elephant Specialist Group
AfRSG	African Rhino Specialist Group
ARF	Assessed Range Fraction
AS	Aerial Sample Count
AT	Aerial Total Count
AVIGREF	Associations villageoises pour la gestion des réserves de faune (Benin)

B

BGP	Big Game Parks of Swaziland
BR	Biosphere Reserve
BtR	Botanical Reserve

C

CA	Conservation Area
CAR	Central African Republic
CARPE	Central African Regional Program for the Environment
CBFP	Congo Basin Forest Partnership
CcA	Concession Area
CEESP	Commission on Environmental, Economic and Social Policy
CF	Classified Forest
CFA	Central Africa Franc
CHA	Controlled Hunting Area
CI	Confidence Interval
CIMU	Conservation Information and Monitoring Unit (Tanzania)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CL	Confidence limit
CMS	Convention on Migratory Species
COMIFAC	Conference of Ministers in Charge of Forests in Central Africa
CR	Community Reserve
CRF	Continental Range Fraction

D

DA	Different Area
DC	Dung Count
DD	Data Degraded
DEFRA	Department for Environment, Food and Rural Affairs (United Kingdom)
DFPN	Direction de la Faune et des Parcs Nationaux (Cameroon)
DNFFB	Direcção Nacional de Florestas e Fauna Bravia (Mozambique)
DRC	Democratic Republic of Congo
DRSRS	Department of Resource Surveys and Remote Sensing (Kenya)
DRWG	Data Review Working Group
DT	Different Technique
DWNP	Department of Wildlife and National Parks (Botswana)

E

EC	Elephant Corridor
ECOPAS	Ecosystèmes Protégés en Afrique Sahélienne (West Africa)
ECOWAS	Economic Community of West African States
ELESMAP	Southern African Elephant Survey and Monitoring Programme
EMOA	Elephant Management and Owners Association (South Africa)
ES	Elephant Sanctuary
ESRI	Environmental Systems Research Institute
EWCO	Ethiopia Wildlife Conservation Organization

F

FFR	Fauna and Flora Reserve
FnR	Faunal Reserve
FR	Forest Reserve

G

GD	Genetic Dung Count
GEMS	Global Environment Monitoring System
GIS	Geographical Information System
GMA	Game Management Area
GmR	Game Ranch
GP	Game Park
GPR	Game Production Reserve
GR	Game Reserve
GRID	Global Resource Information Database
GS	Ground Sample Count
GS	Game Sanctuary
GT	Ground Total Count

H

HA	Hunting Area
HR	Hunting Reserve
HZ	Hunting Zone

I

IFR	Integral Forest Reserve
IG	Informed Guess
INDEFOR	National Institute for Forestry Development (Equatorial Guinea)
INR	Integral Nature Reserve
IQI	Information Quality Index
IR	Individual Registration
IUCN	International Union for Conservation of Nature

J–L

JICA	Japan International Cooperation Agency
KAZA TFCA	Kavango-Zambezi Transfrontier Conservation Area (Southern Africa)
LAT	Latitude
LON	Longitude

M

MET	Ministry of Environment and Tourism (Namibia)
MIKE	Monitoring the Illegal Killing of Elephants

N

NA	New Analysis
NF	National Forest
NG	New Guess
NGO	Non-Governmental Organization
NIR	National Reserve
NM	Natural Monument
NNR	National Nature Reserve
NP	National Park
NP	New Population
NPe	National Park Extension
NPWMA	National Parks and Wildlife Management Authority (Zimbabwe)
NR	Nature Reserve
NRCC	Natural Resources Conservation Council
NS	National Sanctuary

O

OG	Other Guess
ORNL/ GIST	Geographic Information Science and Technology Group at the Oak Ridge National Laboratory (United States of America)

P

PAGEN	Partenariat pour l'Amélioration de la Gestion des Ecosystèmes Naturels (Burkina Faso)
PF	Probable Fraction
PFR	Partial Faunal Reserve
PFS	Priority for Future Surveys
PGR	Private Game Reserve
Pk	Park
PL	Population Lost
PNE	Protected Natural Environment
PNR	Private Nature Reserve
PR	Partial Reserve
PrP	Presidential Park
PRP	Percentage Relative Precision
PrR	Presidential Reserve
PvR	Private Reserve

R

RA	Recreation Area
RC	Reserve Complex
RDBMS	Relational database management system
RNP	Regional Nature Park
RP	Recreation Park
RS	Repeat survey
RyNP	Royal National Park

S

SA	Safari Area
SANParks	South African National Parks
SF	State Forest
SNR	Strict Nature Reserve
SNTC	Swaziland National Trust Commission
SR	Special Reserve
SSC	Species Survival Commission
Sty	Sanctuary

T

TAWIRI	Tanzania Wildlife Research Institute
TFCA	Transfrontier Conservation Area
TFR	Total Faunal Reserve
TRIDOM	Dja-Odzala-Minkébé Tri-National Park

U

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USFWS	United States Fish and Wildlife Service

W

WA	Wilderness Area
WCA	Wildlife Conservation Area
WCMC	World Conservation Monitoring Centre
WCS	Wildlife Conservation Society (United States of America)
WP	Wetland Park
WR	Wildlife Reserve
WS	Wildlife Sanctuary
WWF	World Wide Fund for Nature