Jaguar 2030

Conservation Roadmap for the Americas

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Foreword

Jaguars and humans have co-existed for millennia. Apex predator across much of the western hemisphere, the jaguar has been an important part of indigenous cultures and cosmologies in the Americas for centuries. The jaguar has been revered as an omnipotent animal and spirit of the jungles and forests.

Today, more than at any time in history, the fate of the jaguar rests in human hands. Threatened by habitat loss, direct persecution, and decimation of prey populations, jaguars and people struggle to coexist. Where expanding human populations overlap with jaguar populations, there is a persistent loss of jaguars. Jaguars may be killed directly by rural people defending their cattle, or struck by vehicles as they try to traverse increasingly fragmented habitat. Poaching for jaguar body parts appears to be on the rise and hunting of prey species is, in many areas, unsustainable. Only about 50% of the species' original range—which formerly extended in an unbroken swath from the southern United States to Argentina—remains intact. And jaguar populations are declining.

In the past three decades, conservationists and their many partners have made significant, but patchy, progress in protecting jaguars and other biodiversity across jaguar range countries. Conservation approaches have focused on protecting individual sites, but these must now be expanded to account for larger landscape dynamics over the jaguar's extensive range.

In March 2018, in an important step towards the goal of stabilizing and recovering jaguar populations throughout their range, a High-level Forum was held at the United Nations Headquarters in New York. At the Forum, representatives from 14 jaguar range countries were joined by more than 50 experts from leading conservation organizations to jump start region-wide cooperation for jaguar conservation. This remarkable gathering of dozens of partners, including high-level government representatives, has given us confidence in our collective ability to conserve the jaguar and, with it, our shared cultural and natural heritage.

With the twin aims of guiding conservation of jaguars and their habitat across range countries and stimulating broader engagement, and with participation and coordination by governments and by the international community as a whole, we have developed and herein present the Jaguar 2030 Conservation Roadmap for the Americas. Building on the positive impetus generated by the Forum, the Roadmap lays further groundwork for a comprehensive strategy to ensure that jaguars do not fall into the downward spiral faced in recent years by other big cats, most notably the tiger. The Roadmap builds on previous range-wide priority-setting exercises that have identified core jaguar populations, concentrated within 'Jaguar Conservation Units' (JCUs), as well as 'Jaguar Corridors' connecting these core populations and thereby allowing for dispersal and genetic exchange. The Roadmap lays out a set of complementary and mutually reinforcing Pathways—including priority actions and targets at regional, national, and landscape levels—that will converge on the Jaguar 2030 objective: To strengthen the Jaguar Corridor across the range countries by securing 30 priority jaguar landscapes by 2030, reducing jaguar-human conflict in human-dominated landscapes, and increasing security and connectivity of core protected landscapes, thus meeting globally significant biodiversity goals.

Following the Roadmap and its distinct Pathways will require the involvement of national and sub-national governments, local communities, the private sector, national and international non-governmental organizations (NGOs), and other partners in planning, information gathering, and implementation of conservation and mainstreaming activities. Working with the people who live with jaguars will be especially critical as landscapes change and human populations continue to expand across Latin America. In addition to environmental education, this will include working with indigenous and local communities through participatory approaches to issues like land use planning, jaguar-friendly livelihood alternatives, and human-jaguar conflict. In the last 20 years, on-the-ground programs have demonstrated the efficacy of community and local government engagement in critical habitat, where local partners become active conservationists, working with their families and neighbors to find ways to coexist with carnivores and functioning as eyes on the ground against illegal activities.

The jaguar's resilience in the face of change gives present day environmental management great hope that, by protecting habitat and improving domestic animal husbandry and agricultural practices, the species can stage a dramatic comeback. While deteriorating, the jaguar's situation is not yet close to that of the tiger, snow leopard, or lion. However, the situation could worsen quickly as, for example, the supply of tiger parts for illegal international trade

diminishes and demand turns to the parts of other big cats—lions, leopards, and increasingly, jaguars. Other drivers of jaguar decline include rapidly-expanding infrastructure, industry, and agriculture. Thus, effective land use planning and implementation of activities that reduce impacts on jaguars and other wildlife are crucial.

Our cooperation in developing the Jaguar 2030 Conservation Roadmap bodes well for the future. Countries are eager to undertake the ambitious task of protecting jaguars in the wild. Through common efforts, we will foster collaboration among jaguar range countries, and facilitate exploration and promotion of additional regional and global biodiversity conservation opportunities, featuring the jaguar as an icon of sustainable development and international cooperation in the Americas.

Having witnessed three decades of decline in the world's big cat populations, we are beginning to understand the unique context of the jaguar in the carnivore conservation world. Thus far, the jaguar has survived despite challenges. But now it needs our united effort to move forward and persist into the future. Together, we have a unique opportunity to protect this apex predator throughout its range. With great faith and resolve, herein we present important next steps toward that ambitious goal.

The interest in continuing to guide these regional efforts around a common vision to conserve the jaguar and its habitat was reaffirmed at the First High-Level Conference of the Americas on Illegal Wildlife Trade, where representatives of more than 20 governments and Organizations of Regional Economic Integration, meeting in Lima (Peru) in early October 2019, agreed to declare the jaguar as an emblematic species of the Americas, due to its importance in maintaining the integrity and functionality of ecosystems, as well as for representing a spiritual and cultural icon of many peoples throughout its range, and as a symbol of the fight against illegal wildlife trade.

Executive Summary

The jaguar is the third largest cat in the world—after tigers and lions—and both the largest cat and top apex predator in most of the Western Hemisphere. Jaguars play an important role in the structure and function of the ecosystems in which they live, from northern Mexico to northern Argentina. They are a critical component of healthy, functioning animal and plant communities, and have significant umbrella effects for biodiversity conservation. A jaguar-focused conservation strategy can serve as an effective umbrella for a suite of co-occurring mammalian species. Jaguars are also a valuable indicator of healthy ecosystems. As such, they constitute a foundation not only for wildlife conservation but also for human well-being.

Unfortunately, jaguar populations are seriously threatened by habitat loss and fragmentation, killing for trophies and illegal trade in body parts, proactive or retaliatory killings associated with livestock depredation, fear for human safety, and competition with human hunters for wild prey. The core threats have placed substantial pressure on the species and continue to cause a decrease in overall numbers throughout most of the jaguar's range.

Loss and degradation of valuable habitat is the number one threat to the jaguar. The species has lost approximately 50% of its historic range, with an estimated 7 million km^2 of tropical and sub-tropical habitat remaining. Expanding agriculture and cattle ranching are the main drivers of habitat loss across jaguar range. In many areas, a fast-moving agricultural frontier based mainly on cultivation of oil palm, soy, citrus, sugar cane, and bananas, is the leading proximate cause of habitat loss. Large-scale infrastructure development is an important driver of habitat loss and degradation, posing additional threats to the long-term genetic connectivity of jaguar populations.

Another major threat to jaguars is direct killing. The primary drivers of human-induced mortality includes actual or suspected attacks on livestock, along with fear of attacks on people. Sport and trophy hunting remain widespread, and hunting is apparently increasing due to demand for jaguar parts for trade. The dimensions of the emerging threat posed by resumed trade are not yet fully understood, but recent reports suggest that international wildlife trade in jaguar parts is increasing.

Ecosystems that support jaguars are of immense economic value. While a comprehensive economic valuation of these services is not yet available, a rapid estimate of the economic value of some prominent ecosystem services generated from jaguar habitat in Brazil alone exceeds $4 billion a year. Such services include hydropower generation, livestock and agriculture, and tourism in the Amazon basin and Pantanal.

Core jaguar populations, or strongholds, are connected via a series of biological and genetic corridors into a single, large-scale ecological unit: the Jaguar Corridor. The model has been successful in accelerating knowledge of jaguar distribution and the challenges the species faces, while also advancing conservation tools employed to 'hold ground', or secure core populations.

Jaguar conservation units, or JCUs, and the individual corridors connecting them work together to maintain the viability of populations. A network of core populations and connecting corridors is the only way to ensure the persistence of a single, interconnected meta-population. Core populations generally occur in relatively intact habitat. JCUs are most often found within protected areas such as national parks, reserves, and sanctuaries. At a minimum, JCUs tend to have a high percentage of their area in landscapes with some form of restricted human use.

In the overall scheme of jaguar conservation, both JCUs and corridors are key for long-term conservation efforts. Securing jaguars throughout the Jaguar Corridor requires working both within core areas—including protected areas—and the productive landscapes within which jaguars are sometimes required to cross. However, successful conservation also requires working at scales beyond those delineated by humans. These include: landscape level; national level; and transboundary and regional levels.

At the landscape level, expanding and elevating the effectiveness of protected areas are key to securing jaguar strongholds. Many 'protected' areas across the jaguar range, however, are protected in name only, with little capacity to deter poaching, logging, agricultural incursions, illegal mining, or other threats. Thus, there is a need to build capacity for managing and patrolling through training, infrastructure, and equipment. In the human-dominated landscapes that connect core populations, high-potential linkage corridors can be identified, land-use characterized,

and actions applied that enable jaguar movement through those lands despite the pressures. Such efforts help to ensure the integrity of corridors and ameliorate human-jaguar conflict.

An important, even essential, complement to work taking place at the landscape level includes efforts to establish a national-level approach to jaguar conservation. Several countries have found it useful to develop national action plans for jaguar conservation. Actions needed at the national level include: identification of core jaguar populations; recognition of connective corridors between core jaguar populations; implementation of protective measures to secure core populations; and implementation of conflict mitigation measures in human-dominated corridors.

Coordination of effort among range countries is a crucial component of jaguar conservation and habitat restoration. Coordination needs to occur at two distinct, yet complementary, levels: (i) regional level, including range-wide vision development, action planning (including goal setting), harmonization of monitoring and evaluation protocols, and sharing of experience; and (ii) transboundary cooperation among subsets of countries, which involves landscape-level cooperation within and between JCUs and corridors, but can also extend up to national-level protocols and agreements.

Jaguar 2030 objective

To strengthen the Jaguar Corridor across the range countries by securing 30 priority jaguar landscapes by 2030, stimulating sustainable development, reducing jaguar-human conflict in human-dominated landscapes, and increasing the security and connectivity of core protected landscapes, thus meeting globally significant biodiversity goals

A final, cross-cutting challenge is that of sustainable financing. In order to protect core jaguar populations in JCUs, a key part of this challenge involves ensuring the adequacy and sustainability of protected area financing systems. In addition to the ongoing costs of managing protected area systems, costs are associated with conserving jaguars across productive landscapes. In some cases, such costs may be surprisingly low, as policy actions eliminate externalities and other inefficiencies. Where real costs occur (e.g., related to infrastructure), there are strong arguments for ensuring that such costs are internalized into private and public sector investment decision making.

Jaguar 2030 is a range-wide effort that unites range country governments, non-governmental and inter-governmental organizations, local communities, and the private sector around a shared vision to conserve jaguars and their valuable ecosystems. The jaguar range countries and partners unanimously agree to the shared objective of Jaguar 2030. With support from interested organizations, each country agrees to work together to counter the multiple threats to jaguars, including habitat loss and fragmentation, livestock conflict, and the growing trafficking of jaguar parts—helping to preserve the natural and cultural heritage that jaguars represent for many Latin American cultures.

Like the jaguar, whose genetic integrity provides evidence of its wide-ranging mobility and connectivity, the Roadmap itself is imagined as steps along a series of Pathways. Here, a set of four complementary and mutually reinforcing Pathways—including priority actions and targets at regional, national, and landscape levels, together with actions aimed at achieving financial sustainability—converge on the 2030 objective. The Pathways are as follows:

- Pathway #1: Range-wide coordination in support of protection, connectivity, scaling up, and enhancing ambition to protect jaguars and their habitat, including the use of existing conventions and treaties (CITES, CMS, CBD) as venues to assess recent advances and plan future progress
- Pathway #2: Development and national-level implementation of range countries' national strategies, including priority JCU strengthening plans, improved national-level enabling environments, and national contributions to transboundary efforts
- Pathway #3: Scaling up of conservation-compatible sustainable development models in JCUs and Corridors, including transboundary landscapes
- Pathway #4: Enhancing the financial sustainability of systems and actions aimed to conserve jaguars and associated ecosystems

Each of the above Pathways is comprised of a series of steps, and each step includes individual actions or activities. The challenges are detailed in Section 1, and the overall framework is described in Section 2.

Taking advantage of the newly energized sense of collaboration across the jaguar range, and with the aim of creating a clear informational baseline for all stakeholders, the Roadmap also provides detailed information regarding jaguars and their range. This includes a set of country profiles (Section 3), transboundary profiles highlighting shared and contiguous JCUs (Section 4) and, finally, a comprehensive listing of baseline actions, organized by individual Pathway (Section 5).

1. The Challenge

The jaguar is the third largest cat in the world—after tigers and lions—and is both the largest cat and top apex predator in most of the Western Hemisphere. Jaguars play an important role in the structure and function of the ecosystems in which they live, from northern Mexico to northern Argentina. Jaguars are a critical component of healthy, functioning animal and plant communities and have significant umbrella effects for biodiversity conservation. A jaguar-focused conservation strategy can serve as an effective umbrella for a suite of co-occurring mammalian species.[1] Jaguars are also a valuable indicator of healthy ecosystems. As such, they constitute a foundation not only for wildlife conservation but also for human well-being.

Jaguar conservation can have wide-ranging benefits for biodiversity conservation which, in turn, is a cornerstone for sustainable development. Jaguar conservation also generates important benefits for ecological stability and human culture when effectively carried out across both natural and human-dominated landscapes.

All 18 current jaguar range countries are included in this Jaguar 2030 Roadmap. In alphabetical order, the range countries are: Argentina; Belize; Bolivia; Brazil; Colombia; Costa Rica; Ecuador; French Guiana; Guatemala; Guyana; Honduras; Mexico; Nicaragua; Panama; Paraguay; Peru; Suriname; and Venezuela. Although two countries, El Salvador and Uruguay, do not currently harbor known jaguar populations and a third, the United States, now only has single digit numbers, the species was historically found in those nations as well. All three countries are encouraged to evaluate this Roadmap and the potential for re-establishing an important part of their natural heritage.

Trends, Threats, and Current Status

During the early 20th century, jaguars were hunted for trophies and to prevent potential predation on livestock. However, jaguar populations began to dramatically decline in the 1960s due to increased hunting for their skins. The commercial skin trade wiped out many local populations and drove overall jaguar numbers to what appeared to be historic lows. In 1963, IUCN drafted a resolution to ban the trade globally. Meanwhile, traders continued to sell jaguar skins on international markets. It was not until 1975 that the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) finally came into force and began to make a difference. Jaguars were listed under Appendix I of CITES and thus protected against international commercial trade.[2, 3]

By the 1970s, scientists were becoming increasingly concerned about the status of the jaguar throughout its range, yet realized that little was known of the species' natural history. The first comprehensive research on jaguars was initiated by George Schaller in the late 1970s.[4] Since then, dozens of significant peer-reviewed publications from field research have been published, along with hundreds of surveys and field studies.

Most early jaguar studies were site-based and focused on jaguar-cattle conflict, with conclusions drawn from radio-telemetry, interview surveys, and field sign. It was not until researchers developed a systematic method of using cameras to identify individual animals that a steady stream of information became available about jaguars in the wild.[5] With these studies and ensuing data came a more accurate way to assess the status of jaguars, both locally and across large landscapes. This, in turn, allowed for a better understanding of the threats to jaguars, while providing a reliable information base from which to develop conservation approaches and measure their effectiveness.

Today, jaguar populations remain threatened by habitat loss and fragmentation, proactive or retaliatory killings associated with livestock depredation, killing for trophies and illegal trade in body parts, fear for human safety, and competition with human hunters for wild prey. These core threats have placed substantial pressure on the species and continue to cause a decrease in overall numbers throughout most of the jaguar's range.

Although jaguars have been documented in a wide variety of habitat, including mangroves, temperate pine forests, deserts, and even mountainous regions, their primary habitat is dense, lowland tropical and sub-tropical forested lands below 1,000 m in elevation. These 'jaguar-preferred ecosystems' are rich and diverse in plant and animal species, supporting more than 400 species of mammals, 1,300 species of birds, and 40,000 species of plants. Numerous endemic plants occur in these areas, including edible plants and species of medicinal value, many of which are used by the pharmaceutical industry. Indeed, the jaguar is an indicator species of healthy tropical ecosystems which support

the cat itself, its prey, and a vast amount of biodiversity, as well as contributing to human well-being locally, regionally, and globally.

Considered a "Near Threatened" species on the IUCN Red List of Threatened Species, the jaguar has lost approximately 50% of its historic range, with an estimated 7 million km^2 of tropical and sub-tropical habitat remaining.[6] In addition, grasslands that support both prey and livelihoods of pastoralists that share the habitat are becoming increasingly degraded. Such areas also tend to be most accessible to human development. Whether caused by infrastructure development, agricultural expansion, or cattle ranching, the loss of native habitat—and along with it, of prey species and cover for jaguars—is currently the most significant threat. Habitat loss contributes to fragmentation and isolation of remaining areas, dividing the latter into progressively smaller segments. Small, isolated jaguar populations are vulnerable to local extinction, in part because their area-to-perimeter ratio drives increased conflicts with humans. Where small populations survive those pressures, genetic isolation becomes a longer-term threat to survival.[7]

Expanding agriculture and cattle ranching are the main drivers of habitat loss across jaguar range. In many areas, a fast-moving agricultural frontier based mainly on cultivation of oil palm, soy, citrus, sugar cane, and bananas is the leading proximate cause of habitat loss—one which merits better territorial planning to allow national development goals to be achieved in harmony with jaguar conservation. This planning can have positive influences on the presence and passage of jaguars and other wildlife through agricultural landscapes, generating long-term, positive effects on jaguars and biodiversity.

Large-scale infrastructure development is another important driver of habitat loss and degradation, posing additional threats to the long-term genetic connectivity of jaguar populations. Development projects are expected to significantly grow, largely spurred by mineral exploration and extraction, major road and rail transportation networks, new gas and oil pipelines, and reservoirs for hydroelectric power facilities, as well as upstream water-storage facilities to alleviate increasing water shortages in the densely populated lowlands. Such projects—if poorly planned or without adequate understanding of complex and technical environmental factors—have the potential to introduce a variety of negative impacts. These include increased fragmentation of large landscapes and the creation of barriers to movement of jaguars and prey, as well as direct mortality (e.g., road kills), pollution, disturbance, and habitat encroachment. Construction and/or operation of infrastructure projects directly eliminates and degrades habitat. Transportation networks open up remote areas to deforestation, agricultural expansion, and poachers, thus facilitating trafficking in wildlife. Risks are increased by the expansion of human populations into frontier areas, and hunting can rapidly reduce jaguar prey when areas become accessible.

The second most signficant threat to jaguars is direct killing. The primary driver of such killing is actual or suspected attacks on livestock, along with fear of attacks on people. In many landscapes in which large numbers of cattle, sheep, or other livestock are present—especially if there is a reduced abundance of natural prey—the killing of jaguars, also called retaliatory killing, is commonplace. In addition, sport and trophy hunting remain widespread, and hunting is apparently increasing due to demand for jaguar parts for trade. The dimensions of the emerging threat posed by resumed trade are not yet fully understood, but in some countries, such as Bolivia, it has meant hundreds of jaguars killed over a period of several years. More recent reports from Peru, Belize, and Brazil suggest that international wildlife trade in jaguar parts is increasing across the region.

Although habitat loss, fragmentation, and hunting are the most important threats facing jaguars, others include vehicle-jaguar collisions, which contribute to reducing and even eliminating jaguars from human-dominated landscapes.

Despite these threats, jaguars continue to range across 18 countries from Argentina to Mexico. They have been, however, eliminated from El Salvador and Uruguay,[*] and virtually eliminated from the United States—the latter of which is also historic range and now has developed a recovery plan.[8] The recolonization of jaguars to some areas from which they have disappeared is not out of the question.

Jaguars are at a crossroads, very similar to where the tiger and the African lion were before their populations precipitously decreased. At least 6 range countries have developed national conservation strategies that directly focus

[*] There are occasional movements of dispersing individuals in the United States.

on preserving core populations, reducing jaguar predation on livestock, and promoting habitat connectivity through corridors. There is an urgent need to extend solutions that work for both jaguar persistence and human development while adding benefits for biodiversity conservation, ecosystem services, and mitigating climate change.

Jaguars, Ecosystems, and Sustainable Development

The charismatic jaguar offers a unique focus to address development issues in the Americas through the conservation of a flagship icon—particularly in a context of climate change. As a flagship species for sustainable development, jaguars are a strategic indicator of biodiversity. To protect the jaguar, governments, NGOs, and local communities need to work in partnership to foster successful landscape-level coordination, expand protected areas and improve their management, and develop innovative finance mechanisms for conservation. These efforts will not only help protect wildlife across jaguar landscapes, but will also diversify economic opportunities for local communities, and contribute to global climate change mitigation and adaptation.

Jaguar habitat is critical not only as the home for this beautiful cat, but also for the environmental and natural resources on which hundreds of millions of people depend. For example, jaguar habitat safeguards water for hydropower and agriculture, food, mineral resources, medicinal supplies and products, global climate regulation (e.g., Amazon rainforest), ancient cultural traditions and spiritual values, and inspiration that draws increasing numbers of people from around the globe.

Ecosystems that support jaguars are of significant economic value. While a comprehensive economic valuation of these services is not yet available, a rapid estimate of some prominent ecosystem services generated from jaguar habitat in Brazil alone exceeds $4 billion a year, including hydropower generation, livestock and agriculture, and tourism in the Amazon basin and Pantanal.[9]

Jaguar conservation is inextricably linked to the **2030 Sustainable Development Agenda**, the **Aichi Targets**, and other global goals for biodiversity and climate change mitigation. The Sustainable Development Goals (SDGs) and the overall 2030 Sustainable Development Agenda were established in 2015 and have become an over-arching policy guide for integrating environmental conservation with sustainable development, recognizing that they are inextricably linked and mutually dependent at local, national, and international levels.

Finally, an analysis conducted within the context of preparing the present Roadmap shows that conservation of jaguar habitat will deliver significant benefits in the context of climate change mitigation. Overall, forests cover an estimated 4.80 million km^2 within the Jaguar Corridor (see Section 2) and sequester vast amounts of forest carbon, estimated at 125.90 gigatons (12.59×10^{10} tons). Since 2001, approximately 184,000 km^2 of this forest cover has been lost, with associated emissions estimated at 6.84 gigatons (6.84×10^9 tons) of CO_2 equivalent. Emissions associated with forest cover loss in the Jaguar Corridor represent roughly 25% of total emissions due to forest loss within the 18 range countries.[10]

Looking forward, as many as 16 jaguar range countries have included reducing forest carbon emissions as part of their Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change (UNFCCC). Many of these countries have been active participants in REDD+ readiness activities, with notable overlap and congruence between REDD+ priority locations and jaguar habitat.[11] Reducing the rate of forest cover loss from causes such as agricultural commodity production within the Jaguar Corridor can thus make a significant and likely cost-effective contribution to mitigating forest carbon emissions, while conserving important—often critical—habitat for jaguars and associated biodiversity.

Beyond the issue of mitigation, communicating climate change to a broader public across the Americas may be greatly facilitated by focusing on the jaguar. Visual representations and written descriptions of jaguars have captured human imagination though art and literature for thousands of years, and can continue to do so in the struggle against climate change. Clearly, empathy and affinity play a major role with respect to climate change communication, as demonstrated by the example of polar bear iconography. Linking jaguars explicitly to the threatened landscapes of the Americas, their image can enable regional leaders to localize the climate change phenomenon and visualize its

effects and consequences. The cultural value of the jaguar and its ecosystems can thus be leveraged to communicate the urgency of climate change work—giving climate change a recognizable and localized icon.

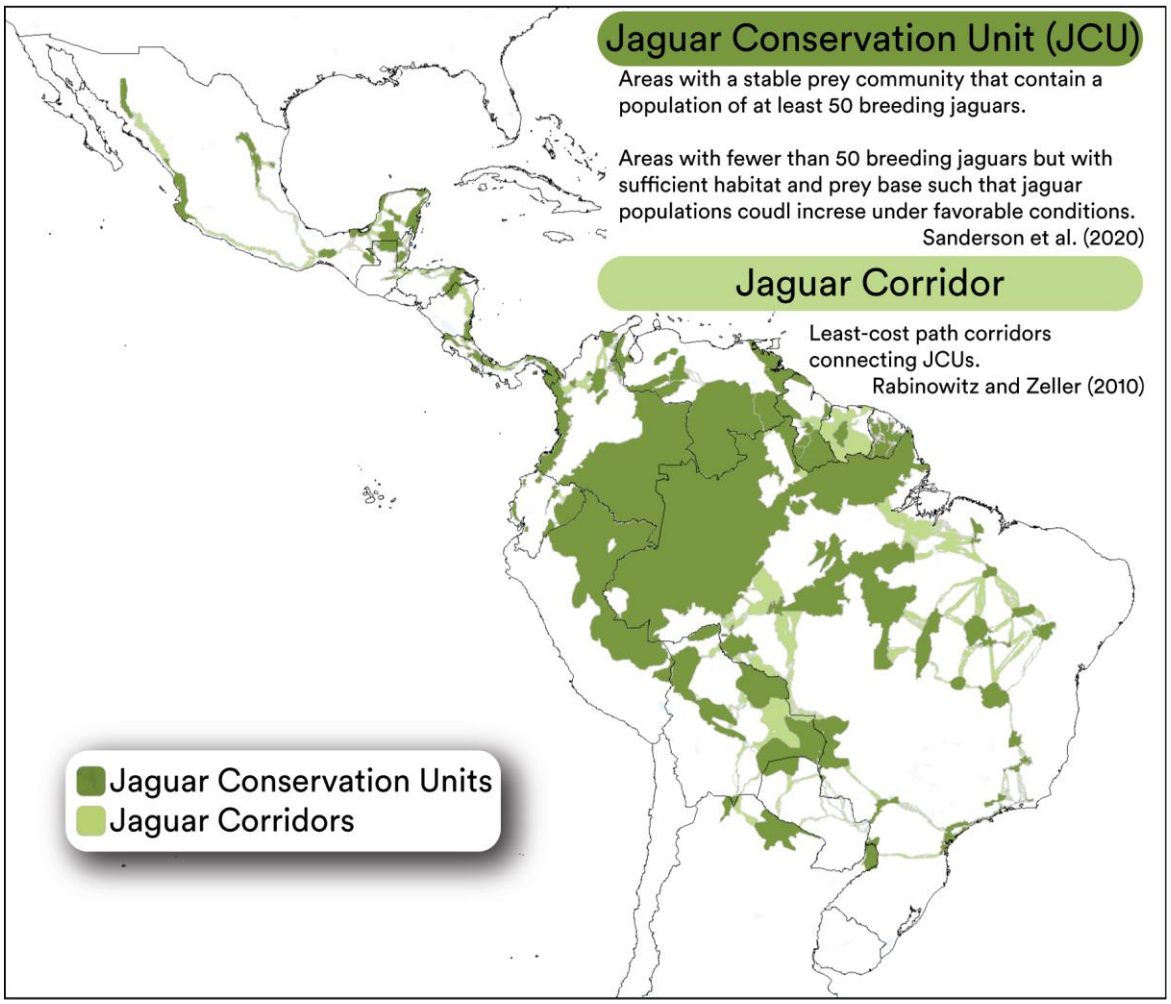
2. Core Principles, Scales, and Strategies of Jaguar Conservation

In 1999, with no prior range-wide evaluation of jaguar status or priorities for research and conservation, the Wildlife Conservation Society (WCS) and the National Autonomous University of Mexico (UNAM) organized and executed the first range-wide priority-setting exercise for the species. The intent of the workshop was to gather all known data and knowledge on jaguar presence and status in order to prioritize core jaguar breeding sites throughout their range for conservation action and investment.

Among the products of the 1999 workshop was the most comprehensive collection of jaguar research ever published in one volume.[12, 13] One of those studies, a genetic analysis, would change the face of large carnivore conservation, becoming an example for new fields of conservation genetics, landscape ecology, and corridor conservation. The analysis was based on DNA fingerprinting of jaguars throughout their range and demonstrated that, contrary to prior thinking, there were no subspecies of jaguars. The evidence meant there was sufficient movement among jaguar populations to maintain genetic connectivity of the single species, *Panthera onca*.[14]

Figure 1. Rangewide map of the Jaguar Corridor with all Jaguar Conservation Units (JCUs, dark green) and Corridors (light green).

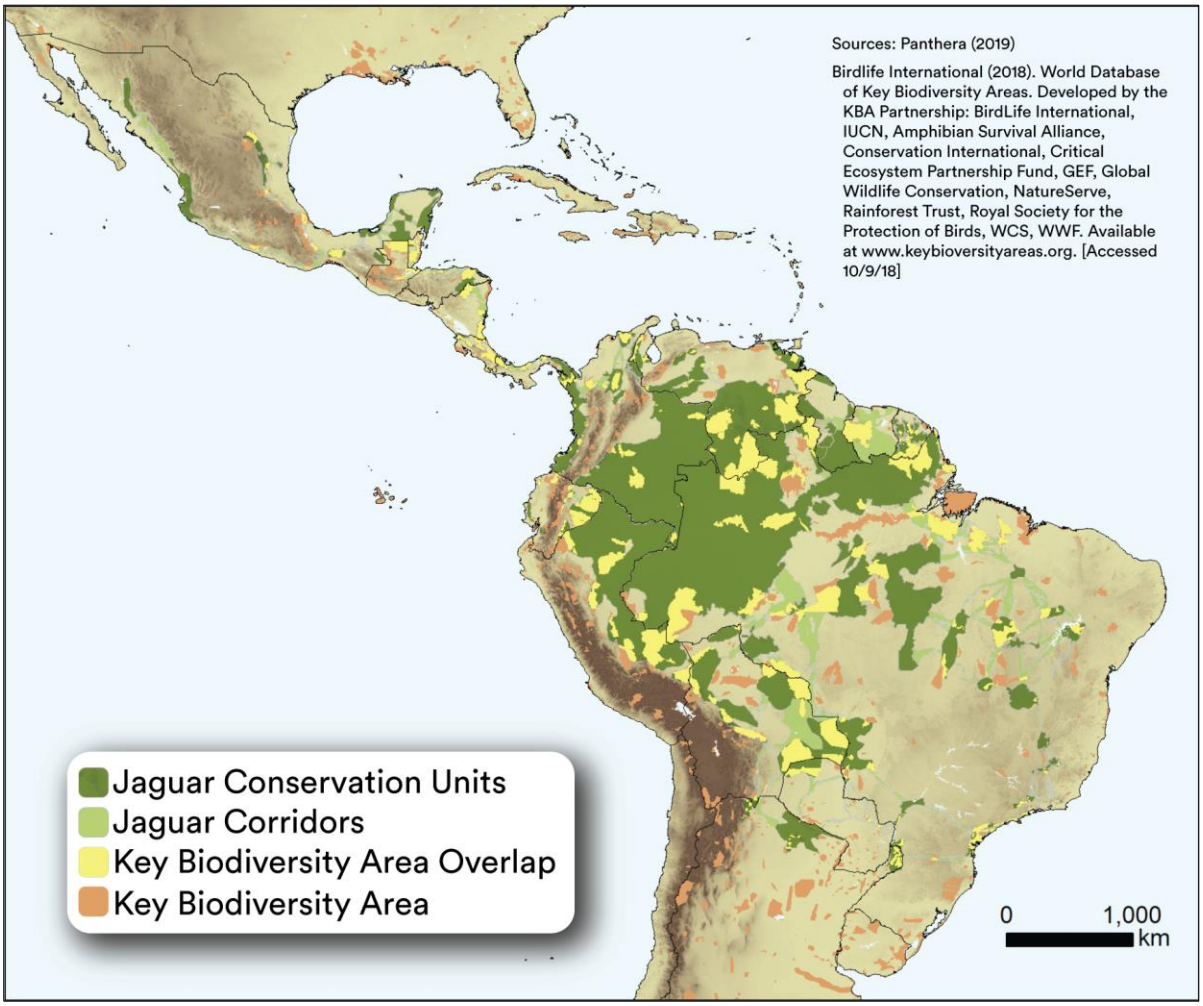
Figure 2. Detail and definition of Jaguar Conservation Units (JCUs, dark green) and Jaguar Corridors (light green) throughout the species' range.



Not only did the core populations identified by experts become the basis for jaguar conservation, but the genetic results mandated an additional component—corridor identification and protection—to secure the species' integrity over the long term.[15] In this model, core jaguar populations, or strongholds, are connected via a series of biological and genetic corridors into a single, large-scale ecological unit: the Jaguar Corridor. The model has been successful in accelerating knowledge of jaguar distributions and the challenges the species faces, while also advancing conservation tools employed to 'hold ground', or secure core populations. Figures 1-4 provide various views of the Corridor, including JCUs and core areas with connecting corridors (Figures 1, 2, and 4) and overlap with key biodiversity areas (Figure 3).

Jaguar conservation units (JCUs) and corridors work together to maintain the viability of populations. A network of core populations and connecting corridors is the only way to ensure the persistence of a single, interconnected meta-population. The JCUs and their respective corridors are examined in greater detail below.

Figure 3. Map of Key Biodiversity Areas (yellow, pale green), Jaguar Conservation Units (JCUs, dark green), and Corridors (light green).



JAGUAR CONSERVATION UNITS (JCUS) AND THEIR CORE POPULATIONS

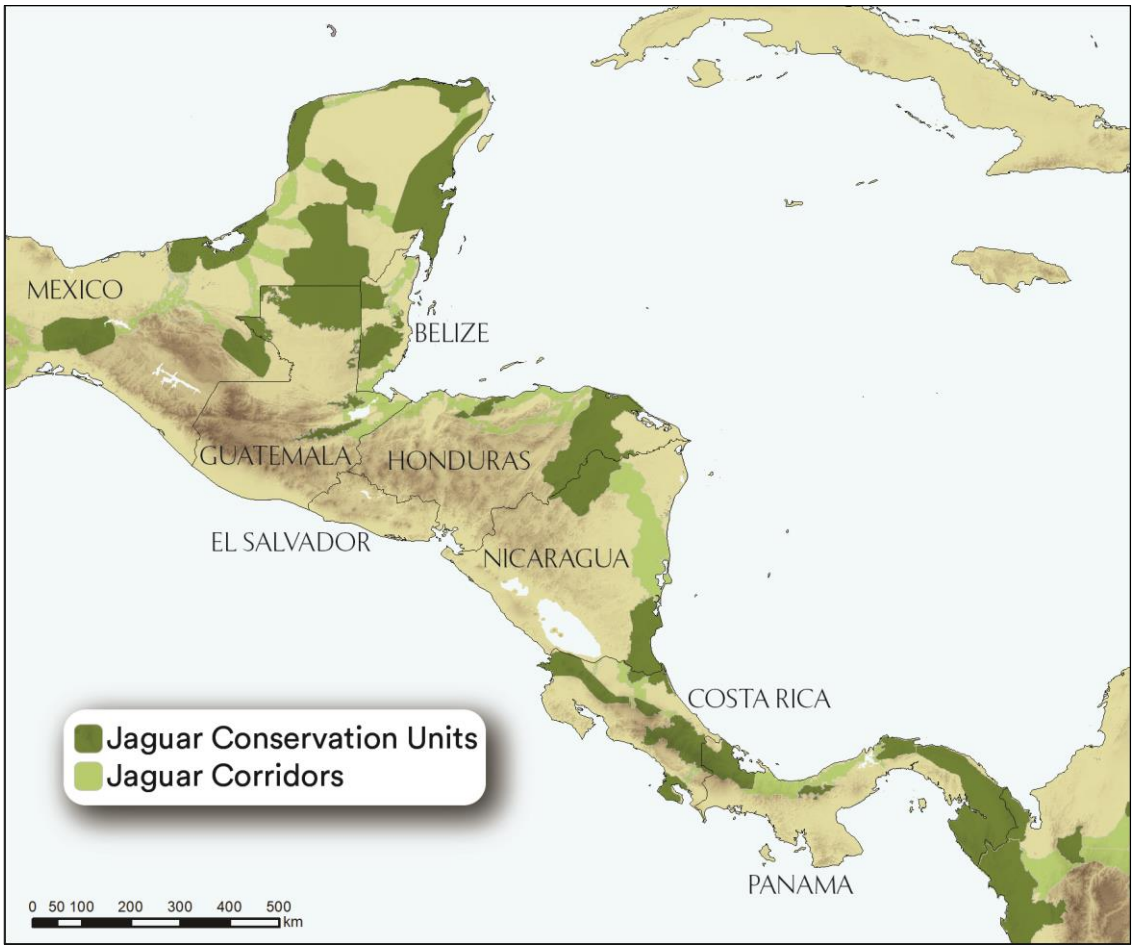
Fundamental to conserving jaguars over the long-term is the maintenance of core population strongholds for the species, the majority of which were first identified during the 1999 meeting of range-country jaguar experts in Mexico City. A Jaguar Conservation Unit (JCU) is any contiguous area with an estimated population of 50 breeding resident jaguars, also referred to as core populations which occur in relatively intact habitat and sufficient prey.[13] JCUs are most often found within protected areas such as national parks, reserves, and sanctuaries; at a minimum, JCUs tend to have a high percentage of their area in landscapes with some form of restricted human use. The more than 90 JCUs defined by the experts as a result of the 1999 Mexico City meeting covered some 1.90 million km^2; however, the figure was based in part on a significant under-representation in the Amazon basin, as there was a dearth of information at that time. In 2011, many of the JCUs of the Amazon basin were combined into one large JCU that includes much of Brazil and parts of Colombia, Ecuador, Venezuela, and the Guianas. Additionally, some JCUs may now have deteriorated to the point that they can no longer be considered JCUs and may require interventions to achieve recovery. Currently, a total of 83 JCUs cover 4.61 million km^2, of which 4.03 million km^2 is currently forested.[16]

JAGUAR CORRIDORS

Corridors were identified using a least-cost path modelling analysis that assessed the condition of six landscape variables between the JCUs.[15] Landscape features included: (i) land cover class; (ii) percent tree and shrub cover; (iii) elevation; (iv) human population density; (v) distance from human settlements; and (vi) distance from roads. The product of the analysis is a "best path" for jaguars to travel between the JCUs. This does not mean that jaguars are not found outside of those modeled corridors; it simply means that the areas outside of the modeled corridors are not as well suited for jaguar passage—or for resident jaguars—and that conservation activities are therefore best focused in identified corridor areas for maximum impact.

As with the JCUs, many of the identified corridors require updating. The current total area of identified corridors is approximately 1 million km^2. This area includes an estimated 0.82 million km^2 of forest—a figure which has been reduced by some 11.60% since 2001—and the conservation of which is especially important to facilitate jaguar passage through the corridors. Because the areas within corridors are often more impacted by human activities, the primary focus for conservation activities within corridors is the advancement of techniques that allow for the passage of jaguars through areas with the presence of human development, particularly agriculture development, livestock raising, and human infrastructure support.

Figure 4. Detail of Mesoamerican Jaguar Conservation Units (JCUs, dark green) and Corridors (light green).



In the overall scheme of jaguar conservation, both JCUs and corridors are key for long-term conservation efforts. JCUs—or core population strongholds—can be interpreted as the primary "reserves" of jaguars into the future. However, only a few of the JCUs (e.g., the Amazon JCU) are large enough to contain enough jaguars to be self-sustaining in the long term (>200 years).[17] In fact, population viability analyses predict the decline and extinction of 50 breeding adult isolated jaguars in less than 150 years. Corridors thus provide the essential genetic flow for the long-term survival of JCUs.

Scales and Strategies for Securing the Jaguar Corridor

Given the above, securing jaguars across the overall Jaguar Corridor requires working both within core areas—including protected areas—as well as within the productive landscape which jaguars are sometimes required to cross. However, it also requires working at different scales as delineated by humans. These include: landscape level; national level; and transboundary and regional levels. The remainder of this section discusses and presents examples of solutions to challenges at each of these levels, thus laying the groundwork for the Roadmap, which is presented in Section 2.

LANDSCAPE LEVEL: CONSERVATION AND CONNECTIVITY THROUGH IDENTIFICATION AND MANAGEMENT OF INDIVIDUAL JAGUAR CONSERVATION UNITS AND JAGUAR CORRIDORS

Jaguar strongholds are ideally secured through establishment and effective management of protected areas and other management units which conserve forest cover and wildlife, such as indigenous territories and forestry concessions. Whether government reserves, such as national parks, or other forms of legally recognized protected areas, including indigenous reserves, these areas can be highly effective—when properly managed—in protecting jaguars, their habitat, and their prey. Emerging techniques for more effective and cost efficient protected area management include the use of SMART[†]-directed patrols.

Expanding and raising the level of effectiveness of protected areas are key to securing jaguar strongholds. Many 'protected' areas across the jaguar range are protected in name only, with little capacity to deter poaching, logging, agricultural incursions, and other emerging threats. In addition to further recognition, there is a need to build capacity for management and patrols through training, infrastructure, and equipment. Engaging with local communities is necessary to raise awareness, support, and, in some cases, active participation in the management of protected areas.

In the human-dominated landscapes that connect core jaguar populations, high-potential corridors can be identified, land-use characterized, and actions applied that support jaguar movement through multi-use landscapes. Such efforts help to ensure the integrity of corridors and to mitigate human-jaguar conflict (e.g., participation in wildlife underpasses during construction of highways; constructing electrical fences to prevent jaguar depredation on livestock).

Many of the threats facing jaguars are linked and can be addressed in tandem. For example, habitat fragmentation frequently leads to lower densities of jaguars and prey in forest patches. Generally, livestock occupy pastures that replace forest. As the native prey base is depleted, jaguars may instead shift to using domestic livestock as prey, leading to retaliatory killings by ranchers. Management alternatives to clearcutting are emerging which would allow for agricultural productivity in habitat mosaics, thereby supporting jaguar passage through livestock-dominated landscapes.

Broad approaches and proven conservation solutions exist to counter most major threats to jaguar population persistence—even in human-dominated, multi-use landscapes. The specific approaches need to be scaled up, yet also adapted to local conditions, then integrated across multiple land use practices. Success is measured by the: (1) long-term presence of resident jaguars with stable or increasing populations; and/or (2) successful passage of jaguars through the area and between core areas. When this combination of approaches is applied across landscapes, true

[†] http://smartconservationtools.org/

security is provided for the long-term survival of core jaguar populations. Box 1 (below) presents examples of landscape-level solutions being implemented by range countries. Additional details are presented in Section 5.

Box 1. Landscape-level solutions

An array of site-level conservation methods has been used by jaguar range countries to address the threats to jaguars and their habitat:

- ✓ In terms of retaliatory killing, solutions such as guard donkeys in **Belize** or criollo bulls in **Colombia** and **Brazil**, have been effective in reducing or preventing jaguar attacks on livestock.
- ✓ In **Brazil**, **Pantanal river tourism** attracts thousands of visitors, paying $500/day or more, to see jaguars. Ecotourism has altered community behaviour from killing jaguars in retaliation for perceived or actual losses of livestock, to preserving the jaguar for tourism.
- ✓ Maintaining forests (e.g., 50%), eliminating or reducing hunting of native prey species, and using anti-predation methods to reduce jaguar attacks on livestock have been effective in cattle ranches in **Brazil**, **Paraguay**, and **Colombia**.
- ✓ Assisting small livestock operations to improve dairy and meat production has saved forests in **Guatemala**, **Venezuela**, and **Nicaragua**.
- ✓ Jaguar surveys indicate that well-managed certified sustainable timber extraction can be compatible with jaguar and prey conservation in **Guatemala**, **Peru**, **French Guiana**, and **Bolivia**.
- ✓ Data from **Bolivia** have demonstrated the effectiveness of landscape conservation efforts focusing on providing sustainable livelihood alternatives for local communities, whilst developing governance capacity and land-use planning, implementation and monitoring for a range of local actors (protected areas, indigenous territories, municipal governments and local communities) have yielded demonstrable increases in jaguar populations between 2000 and 2014. Indeed, more recent regional analyses of landscape conservation efforts have revealed population recoveries.
- ✓ There are cases where jaguars occur in agricultural plantations. For instance, jaguars have been spotted in cacao plantations in **Honduras** and **Belize** and in an oil palm plantation in **Colombia**. Even though jaguars cannot permanently live in these plantations, their ability to move freely through plantations promotes landscape connectivity.
- ✓ There are cases of jaguar hunting associated with casual encounters by people using river transport in **Peru**. Integrating jaguar conservation measures into aquatic "road" infrastructure projects should be considered an important activity to reduce this killing. Where river transport routes bisect JCUs and potentially disrupt connectivity, special measures to reduce the impacts of riverine "highways" on large scale jaguar and wildlife connectivity merit consideration.
- ✓ Built infrastructure can be designed to better promote the mobility of the jaguar. For example, in **Mexico**, underpasses for a 4-lane highway allows wildlife including jaguars to safely pass through the landscape. In 2017, several workshops were conducted in range countries that specifically focused on building wildlife friendly roads and promoting more sustainable and versatile infrastructure.
- ✓ To measure the effectiveness of corridor connectivity, thousands of camera traps and genetic tracking data are used to monitor jaguar movement and population status. Monitoring is vitally important as the jaguar is a useful umbrella species for the conservation of all biodiversity.

NATIONAL LEVEL: NATIONAL STRATEGIES, INCLUDING CONSERVATION ACTIONS AND ENABLING ACTIVITIES

Each jaguar range country has a unique set of protected areas, connective corridors, and human development challenges. An important, even essential, complement to work conducted at the landscape level involves efforts to secure national-level support for jaguar conservation. Several countries (see Box 2) have developed national action plans for jaguar conservation. Such plans can be useful to identify gaps and priorities in current knowledge, and to bring together a wide range of stakeholders under a common umbrella. Action plans typically cover a series of steps (or actions) that can be taken to achieve a goal, usually including resources required (e.g., personnel) and a timeline.

A well designed and functional system of protected areas is essential to protect core jaguar areas. Protected areas are a central tool that governments use to secure vulnerable ecosystems and species. At the national level, gap analyses may be needed and expansion of protected areas may form a key element of action plans.

Box 2. National-level solutions

A variety of national-level approaches have been employed by jaguar range countries, including the following:

- ✓ Several countries—including **Mexico, Colombia, Ecuador, Paraguay, Argentina,** and **Brazil**—have developed national action plans for jaguar conservation. These action plans encompass a wide range of national, sub-national and in some cases transnational priorities.
- ✓ Protected area systems have expanded. In **Mexico**, the number of protected areas has tripled since 2012; in **Panama**, the Ministry of Environment is investing $15 million to recuperate established protected areas and **Guyana** is aiming to develop a network of protected areas with special consideration for jaguars.
- ✓ In Peru, 136 Protected Natural Areas have been identified in the Jaguar distribution area. Furthermore, the National Forest and Wildlife Service is beginning the process of preparing a national plan for the conservation of the jaguar, in coordination with authorities and stakeholders.
- ✓ Criminalization of hunting and trafficking of jaguar parts which since 2013 has emerged as a rapidly increasing and significant threat in several countries across the range, most notably in **Bolivia.**
- ✓ **Argentina** has implemented numerous policies that aim to reduce deforestation and promote sustainable forestry.
- ✓ **Ecuador** works with communities on boosting environmental education to help reduce human-jaguar conflict.
- ✓ The **Yaguara Foundation in Panama** produces educational radio programs.
- ✓ Television programs and national newspaper coverage has reached millions of people in **Paraguay**
- ✓ **Brazil's** 5-year term for the country's action plan is focused on Increasing the functional connectivity among viable populations, increasing people's awareness to reduce jaguar killing and the removal of cubs from the wild through communication and education programs, and improving rescue, maintanence, and rewilding procedures for reintroducing orphans and injured animals.

A strong set of laws, regulations, and policies is another important element of a national-level enabling environment. An obvious legal step is the criminalization of hunting and trafficking of jaguar parts, which since 2013 has emerged as a rapidly increasing and significant threat in several countries across jaguar range. While governments have demonstrated their commitment to biodiversity and jaguar conservation through relevant legislation and policy, a number of challenges remain. Many countries have weak wildlife laws, poor enforcement, or low levels of prosecution even when offenders are apprehended. The size, remoteness, and relative harshness of jaguar habitat, plus the fact that large areas lie outside protected areas, makes law enforcement challenging. Porous borders that reduce the detectability of well-organized criminal traffickers presents additional significant challenges.

In addition to direct species protection laws, protection of forested habitat is an important avenue for governments to conserve natural ecosystems not only for jaguars and other wildlife, but for a variety of economic and social factors.

All jaguar range states are signatories to CITES, which has protected the jaguar from all international commercial trade since 1975 when the species was listed on Appendix I.

Furthermore, at the 13th Conference of the Convention on Migratory Species Parties (COP 13, February, 2020), the plenary approved to list this species in Appendices I and II of the Convention, which constitutes an additional and stronger level of protection for the species and the connectivity of its populations.

Mainstreaming biodiversity considerations—including those related to jaguars—into national strategic planning, both overall and at sectoral level, represents another priority area for action. Mainstreaming involves collaborative planning between the environmental sector and other relevant sectors, especially agriculture, forestry, tourism, mineral extraction, and infrastructure including placement of roads and dams. Designation and protection of corridors, and corresponding responsibilities for sectoral ministries, is of particular importance here. Many infrastructure and energy projects that use multilaterial funding aim to accomplish no net loss in biodiversity, and when guided, the corresponding mitigations can result in jaguar conservation. Other important national policies include livestock insurance, jaguar relocation programs, highway construction provisions, and national censuses of jaguar populations.

Policies and practices to address jaguar-livestock conflict are another priority for most, if not all, jaguar range countries. Different approaches have been used based on the scale of the livestock operations, and the volatility of the situation, history, and the health of focal animals. The primary tool to reduce conflict is to avoid providing opportunities for jaguars to take domestic animals, through sound livestock management and preventative measures including deterrents to attacks. Multiple anti-predation tools have been tested across the spectrum of livestock operations. Retaliatory killings remain prevalent in many range countries, emphasizing the need to scale up land planning as well as deployment and uptake of site-specific methods to reduce jaguar attacks on livestock and achieve coexistence in productive landscapes. Local trade in jaguar parts obtained from killings related to livestock conflict, and even tourism sometimes emerges, but needs to be prohibited because it adds incentives to kill, rather than search for feasible co-existence solutions. Institutionalizing the responses to jaguar-cattle conflict, and pre-emptively applying anti-predation techniques, supported by government personnel, such as in the Wild Cat Conflict Response Unit (Unidad de Atención de Conflictos con Felinos; UacFEL) program in Costa Rica or the Grupo Atención al Conflicto con Felinos (GRECO) program in Colombia, are proven methods for acceptance in local communities and the reducation of predation by jaguars.

An additional issue is the re-emergence of focused trade in jaguar parts to satisfy national and international markets that can drive hunters to actively hunt jaguars. Egregious examples are now documented from Bolivia and Suriname. This issue requires immediate national vigilance and international cooperation. This new threat has been serious in the countries where it has been documented, and it merits personnel and resource allocations to intervene before this growing threat drives population declines, such as those most notably seen in tigers.

Educational programs aim to cultivate respectful perspectives aimed at co-existence for people living with jaguars. In an effort to be more inclusive and engage with key stakeholders, local communities and indigenous peoples should be included and represented in jaguar conservation planning sessions. To promote sustainable, long-term conservation efforts, it is critically important to listen to the communities that share the landscape with jaguars.

TRANSBOUNDARY AND REGIONAL LEVELS

Coordination of effort among range countries is a crucial component of jaguar conservation and habitat restoration. This conclusion is based in part on a suite of lessons learned from tiger and snow leopard conservation that appear to be highly applicable to jaguar conservation. First, high-level political will and champions are essential to take the species conservation agenda forward. Second, individual efforts are not enough to solve the most pressing issues—collective efforts and impacts are required. Third, real and lasting change requires a country-driven agenda that links people on the ground working in the jaguar landscape with high-level authorities that will champion the agenda on a political level. Finally, regular and coordinated reporting helps raise the profile of the challenges and priorities of range countries and builds a community of common practice in the process. These valuable lessons will help guide jaguar conservation on a positive, unified path toward success.

Coordination among range countries needs to occur at two distinct, yet complementary, levels: (i) overall regional level, including range-wide vision development, action planning (including goal setting), standardization of monitoring and evaluation protocols, and sharing of experience; and (ii) transboundary co-operation among neighboring nations, which mainly involves landscape-level cooperation, but may extend up to national-level protocols and agreements.

In light of the need for enhanced cooperation at both regional and transboundary levels, a High-level Forum was held at the UN Headquarters in New York on Thursday, 1 March 2018 (see Box 3). The commitment by range countries under the **Jaguar 2030 New York Statement** is the first step towards systematically conserving jaguars and their habitat across range countries. The Forum represented an important opportunity to take jaguar conservation to a new level, and set the species on the road to recovery.

The High-Level Forum provided an important boost to range-wide cooperation. The one-day event launched the process. Accomplishing the goals will require persistent and continued efforts to realize the potential that Forum and the Statement envisioned. Since the Forum took place, a Jaguar Coordination Committee (JCC) was established. Composed of leading ministries of range countries and experts in conservation organizations, the JCC holds regular meetings to maintain this momentum, elevate the profile of jaguars across their range, and continue conservation impact on the ground.

Box 3. JAGUAR 2030 High-level Forum

On Thursday, 1 March 2018, a Jaguar 2030 High-Level Forum was held at the UN Headquarters in New York. The Forum was built around the 2018 **World Wildlife Day**, the theme of which was **Big Cats–Predators under Threat**, and longer-term efforts to advance the **2030 Agenda for Sustainable Development**. Representatives from 14 range countries and over 50 experts from leading international conservation organizations contributed to discussions on the current status of jaguar conservation and next steps.

In 2015, 193 countries adopted the 2030 Agenda to tackle the fundamental challenges of the 21st Century, and work towards the 17 Sustainable Development Goals (SDGs). The SDGs are integrated, indivisible, and balance the three social, economic, and environmental dimensions of sustainable development. Achieving the SDGs requires safeguarding the essential biodiversity and ecosystem services which underpin human well-being.

The title "**Jaguar 2030 High-Level Forum"** signifies the importance of the jaguar as a flagship species, as well as the health and connectivity of its key habitat strongholds as an indicator for sustainable development across the region. The jaguar occurs across **18 range countries**: Argentina; Belize; Bolivia; Brazil; Colombia; Costa Rica; Ecuador; French Guiana; Guatemala; Guyana; Honduras; Mexico; Nicaragua; Panama; Paraguay; Peru; Suriname; and Venezuela. Jaguar conservation represents range countries' efforts to advance the 2030 Agenda through a holistic set of well-coordinated multi-sectoral and multi-jurisdictional approaches. Consequently, the overall goal of the Forum was to champion jaguar conservation and its role in promoting ecosystem resilience, local development, climate mitigation, and achieving the SDGs.

The Forum had three main objectives:

1. To agree on the features of **a regional program** to secure jaguar landscapes and corridors, priorities within those landscapes and corridors, and forward-looking mitigation strategies;
2. To initiate discussions on **strengthening collaboration** between jaguar range countries; and
3. To **share new jaguar conservation approaches** including innovative financial mechanisms such as payment for ecosystem services (PES) and strategies for mobilizing domestic resources.

Jointly organized by UNDP, Conservation International (CI), Panthera, Wildlife Conservation Society (WCS), and World Wildlife Fund (WWF), the Forum was co-hosted by the Permanent Missions of Mexico and Colombia to the United Nations.

Considering the full jaguar range in general, and the Jaguar Corridor in particular, as 'the Region', it is also important to recognize opportunities to work at the 'sub-regional' or 'transboundary' levels.

At the sub-regional level, a recent workshop held in Bogota, Colombia was sponsored by WWF and attended by 17 organizations. A result of this workshop was a proposed single way to organize the jaguar range into 7 distinct bio-geographical regions:

Region 1: Mexico, Guatemala, and Belize
Region 2: Central America (from Honduras to western and central Panama)
Region 3: Northern South America (western Venezuela, eastern Panama, northern and western Colombia, and western Ecuador)
Region 4: Amazon (Guyana, French Guiana, Brazil, Colombia, Venezuela, Ecuador, Peru, and Bolivia)
Region 5: Chaco, Pantanal, Cerrado, and southern Andean Yungas (Argentina and Bolivia)
Region 6: Atlantic Forest (eastern Paraguay, northern Argentina, and southeastern Brazil)
Region 7: Caatinga (northeastern Brazil)

The above regions were then used by the Bogota group as units of analysis, including viability and threats analyses. Biogeographic regions such as these—some of which fall within a single country (i.e., Brazil)—may be useful when developing sub-regional analysis and cooperation.

Finally, successful jaguar conservation will require international cooperation at the transboundary scale. The full set of bilateral transboundary relationships is presented in Table 1. Moving from north to south, each of the 18 range countries share 'jaguar borders' with anywhere from 2 to 8 neighboring countries. A total of 52 transboundary areas represent important locations where one or more JCUs or corridors cross an international border. Section 4 (below) presents profiles of 30 such areas. The transboundary areas may benefit from an approach that helps bring together experts and other stakeholders from both sides of a given border.

Table 1. Jaguar range countries and their respective neighboring jaguar range countries.

Jaguar Country	Neighboring Jaguar Countries								
	1	2	3	4	5	6	7	8	9
Mexico	Guatemala	Belize							
Belize	Guatemala	Mexico							
Honduras	Nicaragua	Guatemala							
Nicaragua	Honduras	Costa Rica							
Costa Rica	Nicaragua	Panama							
Panama	Costa Rica	Colombia							
Ecuador	Peru	Colombia							
French Guiana	Suriname	Brazil							
Guatemala	Mexico	Belize	Honduras						
Venezuela	Colombia	Brazil	Guyana						
Guyana	Brazil	Suriname	Venezuela						
Suriname	Guyana	French Guiana	Brazil						
Paraguay	Argentina	Brazil	Bolivia						
Argentina	Paraguay	Brazil	Bolivia						
Colombia	Venezuela	Brazil	Peru	Ecuador					
Peru	Brazil	Bolivia	Colombia	Ecuador					
Bolivia	Brazil	Peru	Paraguay	Argentina					
Brazil	Bolivia	Peru	Colombia	Venezuela	Paraguay	Guyana	Suriname	French Guiana	Argentina

Most of the larger JCUs are transboundary. In addition, some JCUs will lose their capacity to contain viable jaguar populations for more than 100 years without connectivity to other core populations. Thus, although jaguar conservation strategies may begin with national evaluations of the jaguar's status, actions necessary for long-term conservation will also need to include a set of cross-border or transboundary actions. Transboundary and sub-regional strategies need to be developed, based on critical jaguar conservation sites that are shared by neighbouring nations.

Currently, weak transboundary cooperation for jaguar conservation threatens protection, law enforcement, and habitat connectivity as well as recovery efforts for the jaguar and its prey. Critical portions of jaguar range are located along international borders of range countries. Existing Memoranda of Understanding (MoUs) and other agreements do not necessarily reflect current urgent transboundary needs and lack a clear set of actions supported by resources and political will. Many border areas lack sufficient on-the-ground institutional presence to successfully effect conservation. This situation can be improved to ensure that functional protected areas and corridors connect across national borders, thereby helping to ensure conservation on a continental scale.

SUSTAINABLE FINANCING

From an environmental economic perspective, jaguars and their habitat represent a significant stock of natural capital, which generates important returns via a suite of ecosystem services. Both capital and interest / returns are eroded when jaguars and their habitat are lost. Local communities are among the first to suffer the consequences. Understanding and quantifying these dynamics is crucial to making the case for investments and other actions designed to conserve jaguars and their habitat.

Protected areas have an important role to play in securing core areas, or strongholds across the jaguar range. A key part of the sustainable financing challenge is to ensure the adequacy and sustainability of protected area financing systems. A comprehensive 2010 study[18] found that, across 19 Latin American countries, an estimated $402 million was available for managing protected areas. However, this sum covered only 56% of basic management needs and 36% of optimal management needs. Such estimates could be refined for the sub-set of protected areas that are of particular relevance to jaguars, together with a sense of the benefits generated by such investments.

Aside from the ongoing costs of managing protected area systems, costs are also associated with conserving jaguars across productive landscapes. In some cases, such costs may be surprisingly low, as policy actions eliminate externalities and other inefficiencies. Where real costs occur (e.g., infrastructure), there are strong arguments for ensuring that such costs are internalized into investment decision making. This logic of internalization applies whether the issue is jaguars, carbon emissions, or other cases of environmental valuation.

Box 4. Sustainable financing solutions

- ✓ **Costa Rica** created a tax on fossil fuels and a Payment for Ecosystem Services (PES) scheme for water use. This has allowed for approximately $400 million dollars to be invested in rural areas over the past 20 years. Additionally, the Costa Rica Government is investigating a PES scheme in the jaguar corridor that would provide payments to farmers for maintaining forests that contain jaguars and other wildlife.
- ✓ One such program that is addressing the environmental value of jaguar habitat is Conexión Jaguar, based in **Colombia, Peru,** Chile, and **Brazil.** ISA, a multinational energy company, along with Panthera and South Pole Group have created a model to support communities and landowners developing REDD+ or restoration and reforestation projects in jaguar corridors. The project proponents receive financial support to develop the methodology and market carbon bonds generated from their conservation or restoration activities within jaguar corridors, and Panthera estimated a baseline of jaguar presence and its prey to demonstrate the impact of the project and make carbon credits more attractive to buyers. At present, two projects have been implemented in Colombia and two projects in Peru.

Various sources of financial support may be available for jaguar conservation. National and local government budgets and personnel support are necessary to provide a backbone for the work. In addition, Payment for Ecosystem Services (PES) options include: payments for ecotourism use rights in landscapes that jaguars inhabit; payments for carbon sequestration and storage in the grasslands and forests of the jaguar's range; and watershed protection. Another option is a wildlife premium market mechanism, where an explicit performance-based payment system to meet wildlife conservation targets is developed and is nested within REDD+ or other PES schemes (see Box 4).

The private sector is another potential source of financial support. Business-as-usual practices in agriculture, mining, hydropower, and other industries result in a net loss of biodiversity. There is opportunity for range country governments, NGOs, and financial institutions to work with industry to ensure more environmentally sustainable and responsible approaches. Corporate Social Responsibility (CSR) funding from the private sector could be accessed by governments and NGOs, and used to fund jaguar conservation activities, particular projects, or contribute to long-term trust funds.

Range country governments can also promote biodiversity offsets, to ensure industry development leads to no net loss of—or even to potentially yield a net gain in—biodiversity. Biodiversity offsets can be defined as "measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken." Biodiversity offsets account for species composition, habitat structure, ecosystem function, human use, and cultural values associated with biodiversity.

Finally, external support will be required to reach the full level of funding needed for conservation across jaguar range. This will include support for securing global benefits such as conservation of globally significant biodiversity, climate change mitigation, and for regional conservation actions that are beyond the scope of individual range countries. One aim of the Roadmap is to raise the profile of current activities and to highlight additional needs for jaguar conservation, thereby helping to focus the attention of potential donors. These include: international conservation non-government organizations, such as Panthera, WCS, WWF, and others; bilateral agencies, such as GIZ, JICA, UK Defra, USAID, and others; and multilateral agencies, including the Global Environment Facility (GEF), UNDP, and World Bank.

Roadmap to 2030

Jaguar 2030 is a range-wide effort that unites range country governments, non-governmental and inter-governmental organizations, local communities, and the private sector around a shared vision to conserve jaguars and their ecosystems.

The jaguar range countries and partners unanimously agree to the shared goal of Jaguar 2030. They agree, with support from interested organizations, to work together to counter the multiple threats to jaguars, including habitat loss and fragmentation, livestock conflict, and the growing trafficking of jaguar parts—helping to preserve the natural and cultural heritage that jaguars represent for many Latin American cultures. They agree to identify and secure at least 30 jaguar landscapes across the cat's range by 2030 or, in shorthand—"Secure 30 by 2030." Secure jaguar landscapes are defined as those that contain at least 50 breeding-age jaguars conserved with stable or increasing populations and secure prey populations, with functional connectivity to other jaguar landscapes, some of which cross international boundaries. This will be done with the involvement of local communities, adequate government, technical and financial support, and management capacity. "Secure 30 by 2030" will lay the foundation to reach the ultimate goal: ensuring that jaguars remain the living icon of the Americas for generations to come.

Jaguar 2030 is underpinned by program features designed to address issues that transcend national boundaries or otherwise go beyond the capacity of any single country or organization. Jaguar 2030 seeks to catalyze support and assist range countries in the areas of: knowledge sharing; establishment and effective management of protected areas; wildlife law enforcement; transboundary cooperation; engagement with industry; and research and monitoring. Best practices that have proven successful in one or more range countries should be scaled-up within those countries and replicated in others.

The portfolios of national activities will be implemented by the range countries with support from international and national partner organizations as needed. Options for financing the program will vary by range country, but will include: national government budgets; official bilateral programs; multi-lateral development bank programs; Global Environment Facility (GEF) programs; funding from inter- and non-governmental organizations; private sector social responsibility programs; various forms of PES schemes; and, potentially, climate and carbon funds.

Successful implementation of the program will require substantial political will, leadership, vision, and knowledge sharing to create effective institutional arrangements for national implementation, monitoring, and reporting purposes.

The Roadmap lays out a set of complementary and mutually reinforcing Pathways—including priority actions and targets at regional, national, and landscape levels—that will converge on the 2030 objective of 30 priority jaguar landscapes secured.

Objective: Strengthen the Jaguar Corridor across the range countries by securing 30 priority jaguar landscapes by 2030, stimulating sustainable development, maintaining natural prey, reducing jaguar-human conflict in human-dominated landscapes, and increasing the security and connectivity of core protected landscapes, thus meeting globally significant biodiversity goals

Pathway #1: Range-wide coordination in support of protection, connectivity, scaling up, and enhancing ambition

A regional approach is required with a common vision for the future of the jaguar and its habitat, and the well-being and sustainable development of communities residing in jaguar landscapes. There is a need to deepen regional collaboration that helps scale up successful local efforts in jaguar conservation and replicate best practices across range country borders. Innovative approaches should be identified, tested, and rolled out, and government and private-sector partnerships expanded. Such collaboration can serve as the foundation for a solid and sustained regional effort to secure the ecological health of jaguar landscapes across the species' range.

1.1. **Establish a small, nimble, and effective permanent secretariat as the implementation mechanism for regional-level cooperation on jaguar conservation, to be guided by a Steering Committee**

Steps:

1) Agree on location: consider a rotation scheme for location (unless permanent staff are to be recruited, in which case a fixed location would be preferred)
2) Prepare terms of reference
3) Secure financing (see Pathway 4) and roles of partners
4) Identify and recruit staff
5) Create a Jaguar 2030 steering committee that meets (annually), led by Government representatives and key institutions (UNDP, Panthera, WWF, WCS, CI) and includes experts working on the ground where conservation needs can be prioritized and actions divided by comparative advantage, scope, and local presence

General notes:

1.2. **Prepare a baseline assessment of Jaguar Corridor functionality and gaps, including: (i) JCUs that are not secured; (ii) areas not designated as JCUs but which should be; (iii) JCUs that are under conservation land use but insufficiently managed with increasing threats, including to connecting corridors; and (iv) identification of corridors between JCUs, with an assessment of threats and function for moving jaguars through those corridor landscapes.**

Steps:

1) Using above data sharing network, assemble data needed for assessment, including data gap filling
2) Define responsible entities and funding sources
3) Prepare assessment
4) Update the JCU maps using improved knowledge. The current maps are data deficient in some areas and need updating
5) Develop a simple, cost effective way to assess and re-assess performance of conservation measures in the JCUs
6) Develop a simple, cost effective way to assess and re-assess performance of conservation measures in the identified corridors
7) With the understanding that mapping and planning is only as relevant as the on-the-ground conservation efforts, work towards addressing areas (i.e., fund-raising and prioritizing field intervention) where JCUs are currently undermanaged and / or decreasing in size, and where the connectivity between them is fragile or in decline

General notes:

1.3. **Building on present Roadmap and Assessment, develop a Vision, Strategy, and Action Plan, Phase 1 (2020-25)**

Steps:

1) Analyze existing national strategies (see Pathway 2.1, below), including coverage of key transboundary JCUs and corridors
2) Devise strategy to encourage / support enhanced national-level ambitions and capacities, including national strategy development and associated transboundary actions and agreements
3) Allocate tasks and responsibilities (e.g., a "division of labor") according to the comparative strengths of different institutions and organizations
4) Formalize partnerships through MoUs outlining commitments and timelines. Include other key allies in the public and private sector
5) Identify key areas and priorities for transboundary and regional-level cooperation, including site-based conservation, and transboundary issues such as wildlife trafficking
6) Identify priority demand-side actions (e.g., illegal trade) through developing partners in foreign countries responsible for the demand

General notes: A detailed and regionally **agreed upon path to 2030**, building on the present Roadmap, in the form of a Vision, Strategy, and Action Plan (latter to 2025; Notes: Should be costed during GEF PPG, with 50-70% financed through GEF and partners, remainder to be leveraged during GEF project period—see Pathway 4.2, below).

1.4. **Develop a data sharing, monitoring, and evaluation (M&E) system based on intensified scientific and technical exchanges among range country officials (e.g., enforcement and conservation agencies), experts, and their cooperation partners to track jaguar status and implementation / impacts of Roadmap and Action Plan**

Steps:

1) Identify key institutions to participate in data sharing network(s)
2) Agree on data gathering / sharing protocols
3) Develop data storage and management system and portal
4) Learn and disseminate past lessons and ongoing experience at national and landscape levels
5) Foster opportunities for exchange of experiences in a practical space in which smaller groups and project leaders can learn from peers and share success and failures
6) Identify specific tools and systems to support jaguar conservation actions (e.g., SMART) and implement them in a coordinated effort

General notes:

1.5. **Provide international technical support for national- (Pathway #2) and landscape- (Pathway #3) level implementation of Action Plan**

Steps:

1) Match technical support needs (demand) and providers (supply)
2) Develop best practice and guidance materials, incorporating latest data and lessons learned (Pathway 1.2)
3) Provide technical support (templates, guidelines, advisory services) for development, implementation, and monitoring of national-level strategies
4) Provide technical support (templates, guidelines, advisory services) for replication and upscaling of models for landscape-level conservation and mainstreaming jaguar conservation into national strategies

General notes: Technical support to, and further lesson learning from, **national strategy** development and implementation. Technical support to, and further lesson learning from, r**eplication and upscaling** of successful, gender-inclusive **models** for conservation and conservation-compatible JCUs / core / corridor planning and management (Pathway #3), through consolidation of models, technical cooperation, capacity building, lesson learning, awareness raising and other forms of guidance (this consists of regional-level

guidance and technical cooperation for landscape-level action [latter under Pathway #3], including national and transboundary sites; i.e., Secure 30 for 2030).

1.6 **Launch and implement mass communication and partnerships initiative**

Steps:

1) The Ministries of Environments in jaguar range countries or other suitable government agencies, together with relevant NGO and other interest groups per country, should individually and collaboratively work to increase jaguar conservation visibility and needs
2) Develop and implement a communications partnership with global and regional advertising industry and major brands
3) Create a regional campaign that highlights the conservation and cultural importance of jaguars, local names, legends, stories, and testimonials
4) Develop and implement other kinds of partnerships with private sector and other actors, including agricultural commodity producers and cattle ranching sector and encompassing jaguar-friendly certified products

General notes: The first step should be coordinated with each country's jaguar action plans (see Pathway #2), and in cooperation with the global/regional advertising industries and major brands, reaching consumer households in urban and rural areas in the jaguar range countries.

Pathway #2: Development and national-level implementation of range countries' national strategies, including priority JCU strengthening plans, improved national-level enabling environments, and national contributions to transboundary efforts

Well-developed national conservation strategies for jaguars for each range country will be the building blocks for the overall success of the range-wide program. Each country can consolidate knowledge to develop their national jaguar strategy, based on the locations of core populations and connectivity. Although there are always certain levels of uncertainty with any wildlife conservation plan, such a strategy provides national targets and goals, along with a mechanism for assessing priorities for transboundary cooperation.

2.1 Develop or update national jaguar conservation strategies

Steps

1) Establish multi-stakeholder consultative groups, led by Ministries of Environment and with participation of key sectoral ministries, to guide and validate process in each country
2) Develop / update **national strategies**, including **national-level enabling environments**, key elements of which are described under Pathway 2.3-2.6 (below)
3) Develop data and knowledge management systems to monitor and evaluate jaguar-related data and implementation of national strategies, including protocols for feeding into regional M&E (Pathway 1.4)

General Notes: For significant transboundary connections, encourage and support the workshops, data collection, and data compiling needed to produce regional strategies; national multi-stakeholder consultations to support processes. The justification is that the plans will reflect local and national reality (i.e., deforestation trends; mineral and hydrocarbon exploitation strategies; protected area connectivity systems), with all aimed to generate the on-ground interventions needed to better support transboundary connectivity.

2.2 System-level support for national protected area systems, including jaguar gap analysis and M&E

Steps:

1) Assess baseline protected area (PA) effectiveness from the perspective of jaguar conservation effectiveness, based on a commonly agreed upon metric / standard (see Conservation Assured Tiger Standards [CATS] for a possible model)
2) Strengthen jaguar management and monitoring in existing PAs
3) Ensure adequate national public investments, complemented by external support to achieve needed conservation goals
4) PA system expansion, as needed, to provide effective conservation of core areas

5) Assess the potential connectivity between PAs
6) Prioritize connectivity areas between PAs and between countries for effective on-the-ground interventions to effect large scale jaguar conservation

General notes:

2.3 Strengthen national policies, laws and regulations, and enforcement capacities specifically related to jaguars (i.e., illegal trade)

Steps:

1) National plans (see Pathway 2.1) should guide changes in development planning, infrastructure development, and zoning to include jaguar- and wildlife-friendly structures and forms
2) Following published jaguar conservation action plans per country, the national Jaguar 2030 committee should provide stewardship to support sustainable policies and regulations, and identify major barriers that need to be removed to enable effective conservation
3) Facilitate fast-track learning from Asia and Africa for national authorities charged with addressing International Wildlife Trade (IWT)
4) Facilitate coordination, planning, and progress arenas for personnel involved in addressing illegal wildlife trade within and across countries, with implementation of equipment and protocols for communication and information exchanges
5) Support strategic personnel such as police, prosecutors, customs officers and environmental authorities in key institutional strengthening and capacity building activities to better respond to the emerging IWT issue for jaguars

General notes: May include policies related to road design and agricultural outreach for anti-predation assistance, and measures relating to commerce of jaguar body parts to tourists.

2.4 Mainstream jaguar conservation into national strategic planning documents and national policies, laws, and regulations governing key economic sectors

Steps:

1) As signatories to SDGs and Aichi Targets, each country should align those targets with the Jaguar 2030 Conservation Strategy, to ensure that the latter is taken into consideration when delivering on all SDGs in multiple sectors
2) NGOs contribute with technical expertise and support for on-the-ground monitoring and other actions as appropriate
3) Promote prioritization of intact, well managed protected areas, and national corridor plans as conservation targets per country
4) Assess national policies related to hunting of jaguar prey, habitat conversion, building of roads and other major infrastructure impacting jaguar habitat, riparian buffers, livestock management
5) At a sectoral level (e.g., agriculture; infrastructure), development strategies should align with those in the Jaguar 2030 Conservation Strategy

General notes: Costa Rica has developed a comprehensive corridor plan for the country and for its protected area system.

2.5 Implementation of priority national-level actions relevant to transboundary priorities

Steps:

1) Based on scientific and technical knowledge on national levels, knowledge of regional transboundary conservation priorities, and exchanges with neighboring countries (see Pathway #1), as incorporated into national strategies (see Pathway 2.1), take key actions to strengthen transboundary connectivity

General notes: May include the characterization of the services that jaguar ecosystems or habitat provide to people, with special emphasis on transboundary areas, including their link with actions for mitigation and adaptation to climate change.

Pathway #3: Scaling up of conservation-compatible sustainable development models in JCUs and Corridors, including transboundary landscapes

Current successes need to be applied and taken to scale. Given the intensification of current and emerging threats, new tools and approaches are urgently required to secure core populations of jaguars and the connectivity between them. Certain tools are proven and well-developed, including SMART-directed patrols, better ranching techniques that maintain forests and wildlife, jaguar-livestock conflict reduction techniques, and road fragmentation mitigation techniques. With adequate levels of national public investment, such tools could be immediately implemented on a larger scale to bring rapid benefits to jaguars, associated biodiversity, and economic development.

3.1. Develop action plans and processes to scale up jaguar conservation and mainstreaming activities at landscape levels

Steps:

1) Define 30 priority landscapes across the region, including various combinations of JCUs and corridors
2) Assess key issues including land tenure, threats, and protection of protested areas
3) Develop recommendations for mainstreaming conservation activities across the landscape
4) Generate funds to facilitate execution of these plans and processes

General notes:

3.2. Mainstreaming and planning actions for jaguar conservation within productive landscapes (e.g., jaguar-friendly agricultural planning to preserve connectivity in productive landscapes, commodity supply chains, certification and marketing, and road conflict mitigation)

Steps:

1) Work with sectoral industries and oversight entities (e.g., Forest Stewardship Council) to implement best practices in forestry, agriculture, and livestock production per region. Use Corporate Social Responsibility (CSR) commitments to leverage offset and compensation payments to benefit critical jaguar habitat (e.g., mitigation banking)
2) Work on seals and certification options to obtain a prime price on commodities produced in jaguar-friendly landscapes using best practices
3) Establish a feasible and easily applicable Carbon bonds scheme to secure standing forests in key jaguar landscapes
4) Influence design and routes of linear and grey infrastructure development, joined up with government
5) Conduct comprehensive analyses of agricultural development at national levels and unify multiple sectors (e.g., transportation; agriculture; energy; mining; and urban development) to accomplish conservation in productive landscapes at the national scale in each range country

General notes:

3.3. Develop, upscale, and operationalize innovative human-wildlife conflict reduction measures

Steps:

1) Identify priority landscapes where jaguar mortality due to human-jaguar conflict will function as a sink for jaguar populations based in core areas, where conflict will increase as people penetrate core areas, and/or where human-jaguar conflict based mortality will impede connectivity between core areas
2) In the above-defined areas, promote conflict-reduction and prevention measures that are pragmatic, locally accepted, and economically sustainable, with the goal of increased jaguar survival and mobility across the jaguar conservation mosaic including productive lands, and to advance the goals and objectives of national and regional plans
3) Document local perspectives in those areas, organizing participatory processes with the relevant stakeholders and commodities groups (i.e., livestock associations; indigenous territories; rural communities; government agencies including agricultural assistance agencies) and/or private sector (i.e., mining enterprises; road construction companies) that will connect with large numbers of targeted user groups that experience jaguar and wildlife conflict

4) Participatory approach leads to selection of conflict-reducing measures most likely to succeed in specific areas, providing technical assistance during start-up, and evaluating performance of the technique in reducing losses and cost-effectiveness of the technique, requiring the assistance of and collaboration with producers and industry, increased tolerance for large cats (i.e., verified with camera traps), reduced deforestation, and reduced or eliminated hunting of prey. Where and when possible, promote pride in maintaining jaguars in productive landscapes at local and national scales
5) When and where possible, assign designated government personnel and resources to support human-jaguar coexistence through promotion of measures that prevent conflict, and develop capacity to respond when chronic issues result from jaguars that have habituated to livestock. Pilot projects have been developed in Belize and Costa Rica, and despite logistical challenges in larger areas where access is limited, scaling up should be considered

General notes: Multiple potential conflict reduction techniques can be used depending upon scale of livestock operation and management setting, including: flashing lights; cow bells; strategically located pastures; introduction of cattle breeds with defense instincts; electrical fencing; and controlled breeding seasons.

3.4. Raising awareness with local communities, farmers, ranchers, and other key stakeholders

Steps:

1) Identify media outlets by which owners, operators, and workers obtain their information about operations
2) Develop outreach instruments that engage user groups including local communities (e.g., on agricultural farms and cattle ranches)
3) Implement outreach to identified user groups to raise awareness about methods that reduce conflict as well as the positive role that jaguars play in the environment

General notes: A key part of the outreach is connecting with the leaders and group organizers, whether in a community or in a commodities group. For example, ranching associations and agricultural cooperatives can be very important in getting outreach to many people at once.

3.5. Strengthening and empowering local—including community-level—institutional and systemic capacity to swiftly counteract and suppress the emerging threat of trade in jaguar parts

Steps:

1) Conduct intensive regional and national evaluations of potential trade in jaguar parts, including determining routes, players, and modus operandi
2) Where active trade is identified, clarify where the sources of jaguars are that require special defense, and assign personnel and resources to those parts of jaguar range
3) Vigorously prosecute the sources of the demand for jaguars. The populations cannot sustain harvest for parts, so the demand chain must be addressed at the national level, but also at the international level by collaborating with border officials, and travel and shipping industries at both ends of the trade
4) Also consider that local trade in teeth, claws, and hides as ornamentals is: (a) an incentive to kill jaguars rather than seek coexistence solutions; and (b) potentially an entranceway into international trade, and actively prohibit local markets
5) Work across all sectors of society that may be involved in trade and publicize its negative aspects
6) Effectively prosecute cases, as it will function as deterrent. Publicize the cases and the penalties

General notes: The evidence of trade in jaguar parts is variable across the species' range. In some countries, a vigorous national and international demand has almost certainly dramatically thinned jaguar numbers. In those areas, actions required to counter trade are urgent. However, in many countres where the evidence is less clear, similar dynamics may be occurring, or may develop, and perhaps should be assumed to be underway until proven not so. Vigilance is required to maintain jaguar numbers, not only in protected areas, indigenous territories, ranches, but in cities as well. On the international level, cooperating with specialized personnel and agencies to completely eliminate international demand and remove actors driving the trade will be required. Tolerance of trade in parts at any level is not an option for effective jaguar conservation.

Understanding the demand where it exists, and educating people to prevent the trade where it hasn't yet developed, are both reasonable activities.

3.6. Development of gender-inclusive, community-based ecotourism and other sustainable livelihood ventures

Steps:

1) Conduct a review of jaguar-compatible livelihood potentials across priority jaguar areas in corridors and JCUs, and identify high-potential sites for the development of capacity to motivate jaguar conservation through livelihood benefits, including but not limited to: ecotourism; certified sustainable timber and non-timber forest (e.g., palm fronds; allspice seeds; brazil nuts) product extraction; jaguar-compatible agroforestry systems for cacao production; and coffee production, even considering jaguar compatible dairy and beef production that keeps forests and the prey within them intact
2) Evaluate the capacity needs in high-potential ecotourism sites and implement capacity building activities in high-potential ecotourism sites in a broad manner, providing training in service industry, professional, and commercial activities
3) Evaluate areas with potential for jaguar-friendly, nature based livelihoods. Refine how to effect jaguar compatible commodity production through verification, specialized production (e.g., cacao and/or coffee), and effective business models for diverse markets that incentivize relatively large scale transitions to amplify the impact of increased permeability for jaguars in productive landscapes. At the same time and in the same business models, ensure pragmatic, cost-effective ways to verify system performance

General notes: The above can be a very important, simple, and community-based activities that provide significant income with improved gender inclusion. For example, a women's group in Honduras now makes jaguar-etched glasses for sale in the local tour lodge. Well managed certified timber extraction has been shown compatible with jaguar conservation in several countries, and non-timber forest product extraction provides local livelihoods in model ways in some areas. The full potentials of cacao and coffee production in terms of jaguar conservation have yet to be realized but all these potentials for livelihood in harmony with forest, prey, and jaguar conservation merit consideration.

3.7. Habitat restoration and reintroduction actions in critical areas

Steps:

1) Recent analyses have indicated key threatened areas in which connectivity between JCUs and even within JCUs are in immediate danger of being completely severed. Jaguar-friendly passageways can include mixed hardwood and cacao productive areas, mixed hardwood and fruit production systems, and sustainable managed certified forest extraction areas. There are REDD+ programs and other climate change mitigation programs that encourage and support reforestation, and all the above can be used to support restoration actions using native species.
2) Captive population and artificial reproductive techniques may play an important role in reintroduction programs for the jaguar in areas where the species has been extirpated or when an at-risk population may require supplemental individuals or reproduction to persist. As an example, a reintroduction plan for the recovery of the Arizona-New Mexico jaguar population could integrate zoo populations as a source of individuals that are carefully raised, conditioned, and reintroduced. Artificial reproduction techiniques are also in progress, and recently a jaguar embryo transfer successfully delivered a cub reinforcing that this approach can be an additional tool for the species's conservation. Although addressing habitat loss, direct killing, and prey depletion will always be the first priority to halt population declines and promote the recovery of lost range, recent advancements in captive rearing and soft release techniques suggest that they also have potential relevance to range recovery in specific situations.

General notes:

3.8. Strengthen management of existing 'jaguar-critical' PAs including management planning, capacity building, management infrastructure development and equipment, biodiversity and incident monitoring system, co-management, and establish / operationalize new PAs including community and private-sector managed conservation areas and PA concession mechanisms

Steps:

1) Implement PA-strengthening actions developed under Pathway 2.2 and within priority landscapes identified under Pathway 3.1 (above)

General notes:

Pathway #4: Enhancing the financial sustainability of systems and actions aimed to conserve jaguars and associated ecosystems

Economic and financial sustainability within the Jaguar Corridor is critical for the long-term successful implementation of this roadmap. This includes promoting natural resource management and agricultural systems with built-in incentives for jaguar and prey habitat conservation, and intact trophic chains including jaguars. Support for this long-term goal will be based on the following components:

4.1. Increased awareness of current and potential economic values of jaguar habitat and and ecosystems, including costs associated with habitat degradation and loss

Steps:

1) In general economic terms, promote the connection in the public eye between effective conservation of jaguar habitat and reduced public costs countering the effects of drought, floods and fires, by linking jaguar survival to human benefits in ecosystem services
2) Estimate the value of increasing investment in jaguar habitat conservation and associated ecosystems by contrasting different ecosystem management scenarios, including income generating certified forest extraction strategies, sustainable agriculture including forestry, and using key indicators such as: changes in sector productivity; annual net revenue; investment costs; tax revenue (i.e., income to governments); foreign exchange earnings; number of jobs and salary levels; salaries by gender and ratio of benefits by ethnic group; and a range of other non-monetary values (e.g., cultural and aesthetic)
3) Widespread dissemination of results of (4.1.1) and (4.1.2)

General notes:

4.2. Identify appropriate policy reform targets

Steps:

1) Identify management policies, opportunities for environmental fiscal reform, and the respective decision makers
2) Develop terms of reference and carry out Targeted Scenario Analysis (TSA) applied to specific sectors and/or policies linked to jaguar habitat and ecosystems
3) Disseminate TSA results and policy reform recommendations to enable policy reform action and implementation of financial mechanisms

General notes: Environmental fiscal reform (EFR) refers to a range of taxation or pricing instruments that can raise revenue, while simultaneously furthering environmental goals. EFR provides economic incentives to correct market failure in the management of natural resources, ecosystems and control of pollution that affects biodiversity and ecosystems). EFR can mobilize revenue for governments, improve environmental management practices, conserve natural resources (including biodiversity), and improve livelihoods (e.g., reduce poverty). Although the Jaguar 2030 Roadmap will not promote increasing general taxation schemes or earmarking at national level, it will explore related instruments such as tariffs, fees, fines and environmental compensation systems. UNDP's Targeted Scenario Analysis (TSA) is an innovative economic valuation approach designed to provide this type of data and information. TSA is a sector-centered method that

combines solid technical valuation tools with an emphasis on advocacy and participatory approaches carried out in close consultation with relevant government offices and stakeholders.[19]

4.3. Prepare diversified financial sustainability plans that may include business-based incentives to maintain jaguar populations and accomplish habitat conservation and/or help cover the costs of national jaguar conservation actions and regional-level coordination

Steps:

1) Estimate result-based and value-added costs of supporting various sub-national, national, and regional coordination, along with implementation options and priorities to articulate specific financial gaps to need to be addressed to achieve jaguar conservation goals. Pursue funding to address those gaps
2) Develop and test jaguar-focused sustainable financing models and implementations: (1) where appropriate, draw on existing materials (e.g., PA System Financial Plans); and (2) generate and implement innovative business-based financial models that accomplish effective on-the-ground natural resource management and agricultural systems with concrete jaguar conservation components that compete effectively with land use options that otherwise would not
3) Identify / mobilize domestic and international financial support for implementing national strategies and associated landscape-level work, including new GEF-7 wildlife and landscapes conservation and sustainable use projects
4) Develop and implement strategies to optimize cost-effectiveness, transparency, and accountability; promote spending quality (i.e., results-based budgets for jaguar PA; results-based allocations; and financial impact reporting)
5) Optimize existing financial mechanisms and develop new conservation financing mechanisms at sub-national, national, and regional levels based onspecific jaguar conservation needs and opportunities, creating biodiversity financing plans that protect jaguars on private, community, and public lands. For example:

    - Assess potential REDD+ mechanism based on successful models in the region
    - Advertiser-led wildlife financing mechanism for the region using the Lion's Share model
    - Jaguar vehicle license plate system
    - Profit-generating production systems that protect jaguar habitat, including not limited to: certified sustainable selective logging; certified extraction of non-timber forest products (nuts, leaves, resins, fruits); sustainable crop agriculture with jaguar conservation components (cacao, coffee, other) built in; carefully managed livestock management/ranching that accomplishes jaguar conservation through habitat and prey protection commitments.
    - Private sector financing through financial and social corporate responsibility schemes
    - Comprehensive and sustainable modernization packages to optimize revenue from PA user fees and concessions, accounting for the entire PA financial cycle.
    - National and regional jaguar bonds (to finance PA infrastructure)

General notes: A diversified financial plan refers to a range of market and non-market based financial mechanisms that are organized and correlated in a financial plan. The FP includes the step-by-step process and program to implement each financial mechanisms, including its financial feasibility and expected performance. Each financial mechanism may be linked to a specific result and the respective outputs and activities (e.g., PA entry fees linked to visitation and visitor's safety programs). Larger financial mechanisms could finance several results linked to cross-cutting programs such as habitat restoration, infrastructure and high-tech patrolling and monitoring. The diversified FP minimizes the risk of funding shortcomings by incorporating multiple short and long-term revenue sources.

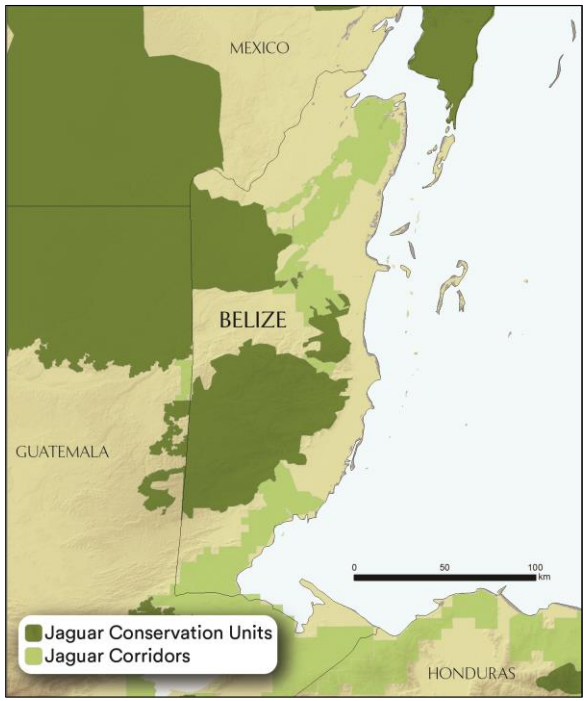
3. Range Country Profiles

Argentina

# JCUs	3
Total JCU area (km^2)	36,531
# Jaguar Corridors	4
Total Jaguar Corridor area (km^2)	10,461

Area & Demographics
Argentina spans 2,853,523 km^2 and has a human population of around 44 million people.
Estimated Jaguar Population
Argentina has a jaguar population of approximately 300 individuals.[20]
Jaguar Habitat
Argentina has about 76,000 km^2 of jaguar habitat. Jaguars remain in Salta, Jujuy, Formosa, and the Chaco, with a remnant population in Misiones province.[21, 22] Chaco populations are believed to be dwindling.[23]
Main Threats to Jaguars
Major threats include eroded lands and habitat from intensive agriculture and livestock, in addition to increasingly arid lands and indiscriminate hunting, even in protected areas.[22, 23, 24]
Jaguar Conservation Strategy
In 2017, Argentina's government ratified a National Conservation Plan for Jaguars. The plan's scientific baseline is drawn from earlier regional jaguar conservation plans in Yungas, El Chaco, and Paranaense forest regions. The national plan seeks to maintain and restore natural jaguar populations in northern Argentina through three lines of action: scientific research; landscape connectivity; and education.[25]
Neighboring Jaguar Countries
Brazil, Bolivia, and Paraguay
Transboundary Aspects
Transboundary gene flow occurs between Chaco and Yungas in the northern frontier between Argentina and Bolivia, and Brazil via the Atlantic forest.[26, 27]

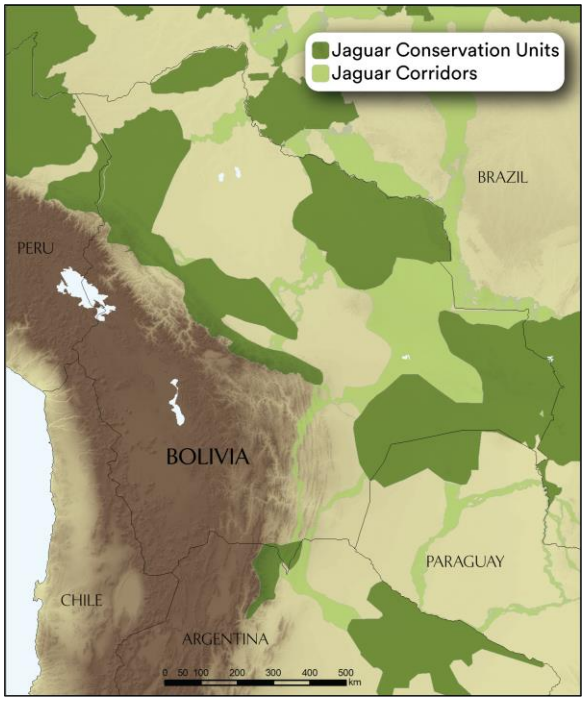
Belize



# JCUs	3
Total JCU area (km^2)	8,784
# Jaguar Corridors	3
Total Jaguar Corridor area (km^2)	4,720

Area & Demographics
Belize covers 22,000 km^2 and has a human population of approximately 380,000 people.
Estimated Jaguar Population
Belize has an estimated jaguar population of approximately 560 individuals.[20]
Jaguar Habitat
Jaguar habitat in Belize is estimated at 21,000 km^2. With 60% of the country still forested, Belize is considered a jaguar stronghold. There are significant core jaguar populations across two forest blocks—the Selva Maya JCU in the northwest, and the Maya Mountain JCU in central/southern Belize—both of which are pristine forests without human populations. The jaguar populations of these JCUs are connected to one another by the Maya Forest Corridor (MFC) JCU, and to neighboring countries in the south via the Southern Belize Corridor (SBC). The jaguar population inhabiting the forest in the northeast of the country has a more tenuous link to the remainder of Belize's protected area system via the Northern Belize Corridor (NBC).
Main Threats to Jaguars
The main threats facing the jaguars of Belize are: jaguar parts illegal trade; deforestation (particularly in the MFC and SBC, which are the only links connecting the jaguar populations in the north and west with Belize and the rest of Mesoamerica, and in the NBC, which threatens to isolate the jaguar population of the north-east from the rest of Belize); over-hunting of the wild prey base to supply the game meat tradition; and retaliatory killing of jaguars in response to livestock depredation.
Jaguar Conservation Strategy
There is currently no official jaguar conservation strategy plan. The Government of Belize chairs the National Jaguar Working Group, and supports a Jaguar Officer who responds to reports of depredation and lethal control of jaguars nationally. The government is also establishing a National Monitoring Program to monitor jaguars and their prey.
Neighboring Jaguar Countries
Guatemala and Mexico
Transboundary Aspects
Within the Selva Maya JCU, there is evidence of jaguar movement across the Belize-Guatemala border, from the Rio Bravo Management and Conservation Area in northern Belize to the Petén Biosphere Reserve in Guatemala.[28] Continued transboundary connectivity will depend on stable conditions within the Guatemalan Petén. Connectivity between Sarstoon Temash National Park in southern Belize and the JCUs of southern Guatemala is tenuous. Few jaguars have been recorded in areas which are under increasing agricultural pressure.

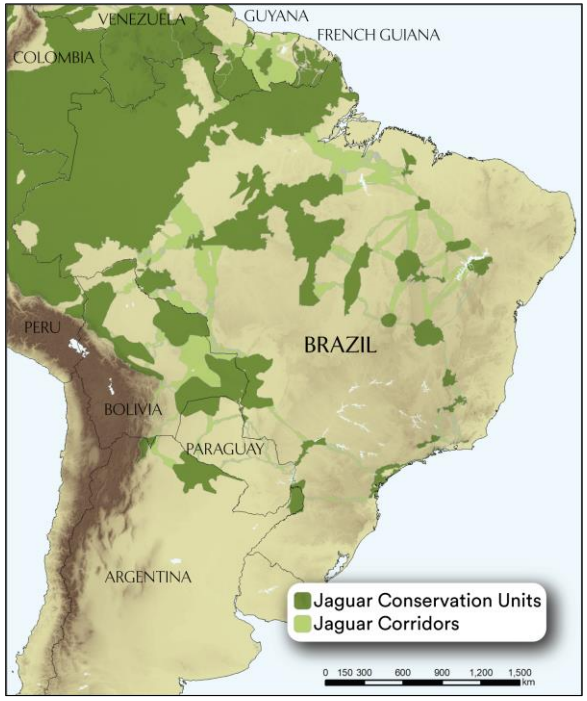
Bolivia



#JCUs	5
Total JCU area (km^2)	226,974
# Jaguar Corridors	8
Total Jaguar Corridor area (km^2)	191,825

Area & Demographics
Bolivia spans 1,121,579 km^2, with a human population of 11 million people.
Estimated Jaguar Population
Bolivia has an estimated jaguar population of 12,800 individuals.[20]
Jaguar Habitat
Bolivia has about 743,000 km^2 of jaguar habitat.[20] Most of the jaguar population inhabits the eastern lowlands, with strongholds in the Amazon forests of the binational Greater Madidi-Tambopata Conservation Landscape extending south through the Andean foothill forests and adjacent lowlands as far as Amboro National Park, the Brazil nut forests of northeastern Pando, the Noel Kempff National Park, and surrounding Chiquitano and Itenez forests, transitioning in the southwest to Cerrado and Pantanal.[29] Southeastern Bolivia contains a portion of the bi-national JCU connected to Paraguay.
Main Threats to Jaguars
The main threats to Bolivian jaguars include rapid deforestation associated with mechanized agricultural development and new roads, as well as hunting linked to human-jaguar conflict, sport hunting, and since 2014 growing international illegal trade in jaguar parts.
Jaguar Conservation Strategy
Bolivia approved a National Jaguar Action Plan in 2020. The strategy prioritizes actions to address three jaguar-specific threats: illegal international trade in jaguar teeth and other parts; human-jaguar conflicts; and reductions in jaguar prey base densities, as well as the more general challenge of addressing habitat loss and degradation.
Neighboring Jaguar Countries
Argentina, Brazil, Paraguay, and Peru
Transboundary Aspects
The transboundary sites that share jaguar populations border with Peru in the Greater Madidi-Tambopata Landscape, as well as the border with Brazil in northeastern Pando, and along much of the eastern border with Brazil down to the southeastern corner, where Gran Chaco jaguar populations connect with the Paraguayan and Brazilian Pantanal.

Brazil



# JCUs	20
Total JCU area (km^2)	2,651,827
# Jaguar Corridors	35
Total Jaguar Corridor area (km^2)	654,654

Area & Demographics
Brazil covers nearly 8.5 million km^2 and has a human population of over 200 million people.

Estimated Jaguar Population
With approximately 86,000 individuals, Brazil is estimated to support nearly three-quarters of the world's population of jaguars, primarily in Amazonia and throughout the country's Amazon River basin area.[20]

Jaguar Habitat
Brazil has approximately 4,500,000 km^2 of jaguar habitat.[20] Jaguars occur over all recognized biomes of the country, with Amazonia providing not just a national core population but also a regionally significant core population. Additional populations are spread throughout the country in Caatinga, Cerrado, Atlantic Forest, and Pantanal biomes.

Main Threats to Jaguars
Agricultural and industrial development impose negative impacts on jaguars and lead to related environmental concerns.

Jaguar Conservation Strategy
Brazil has a National Action Plan for the conservation of jaguars that has been in place since 2009 and was ratified by the government in 2018.‡

Neighboring Jaguar Countries
Argentina, Bolivia, Colombia, French Guiana, Guyana, Paraguay, Peru, Suriname, and Venezuela

Transboundary Aspects
Nine transborder jaguar areas are present in Brazil. Very significantly for jaguar conservation on a range-wide continental scale, the Brazilian Amazon has transborder connections with French Guiana, Suriname, Guyana, Colombia, Ecuador, Peru, and Bolivia. This giant area and its components form the largest contiguous block of jaguar habitat within the species' range. The Brazil-Bolivia area includes three JCUs and connecting corridors that provide over more than 1,500 km of shared border that are important to the long-term maintenance of those three core populations and for those to the south. The Brazilian Pantanal harbors the largest and southernmost population of wetland jaguars.

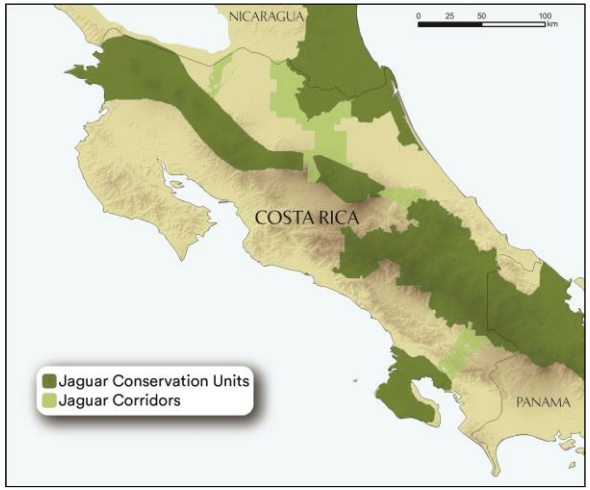
‡ Reference: http://www.icmbio.gov.br/portal/images/stories/docs-plano-de-acao/pan-onca-pintada/livro-onca-pintada.pdf

Colombia

# JCUs	8
Total JCU area (km^2)	699,377
# Jaguar Corridors	9
Total Jaguar Corridor area (km^2)	34,056

Area & Demographics
Colombia covers an area of 1,137,000 km^2 and has a population of around 49 million people.
Estimated Jaguar Population
Colombia has a jaguar population of approximately 16,000 individuals.[20]
Jaguar Habitat
Colombia has about 872,000 km^2 of jaguar habitat. The strongholds of jaguar populations lie in the Western biogeographic Chocó (64,238 km^2 of potential jaguar habitat of which 3,874 km^2 are strictly protected), the Llanos (252,815 km^2 of jaguar habitat of which 172,003 km^2 are under no protection and only 14,709 km^2 are National Parks), and the Amazon (283,385 km^2 of jaguar habitat of which 68,147 km^2 is protected as National Parks) ecosystems.[30] The most important national corridor joins the Darien, at the northern tip of the Biogeographic Choco region with the llanos, crossing through Paramillo, San Lucas, and Catatumbo JCUs.[30]
Main Threats to Jaguars
The main threats facing jaguars in Colombia are extensive agriculture, followed by retaliatory killing from disgruntled ranchers suffering attacks on livestock and illegal mining in key habitat.[31]
Jaguar Conservation Strategy
There is a National Program for the Conservation of Wild Cats.[32]
Neighboring Jaguar Countries
Brazil, Ecuador, Peru, and Venezuela
Transboundary Aspects
In the Panamanian-Colombian border lies the Chagres-Darien JCU (24,934 km^2) and the Chocó JCU (68,326 km^2). The northeastern frontier bordering Venezuela is key to maintaining gene flow from the Andes and Inter-Andean populations, but the border area is heavily degraded and only patches of remnant forest remain with a sole strong connector to the future being the Catatumbo JCU with the Perija National Park in Venezuela. In the south, the Amazon basin contains the strongest jaguar population, one which remains fully connected to the greater Amazon basin along the Peru-Brazil border.

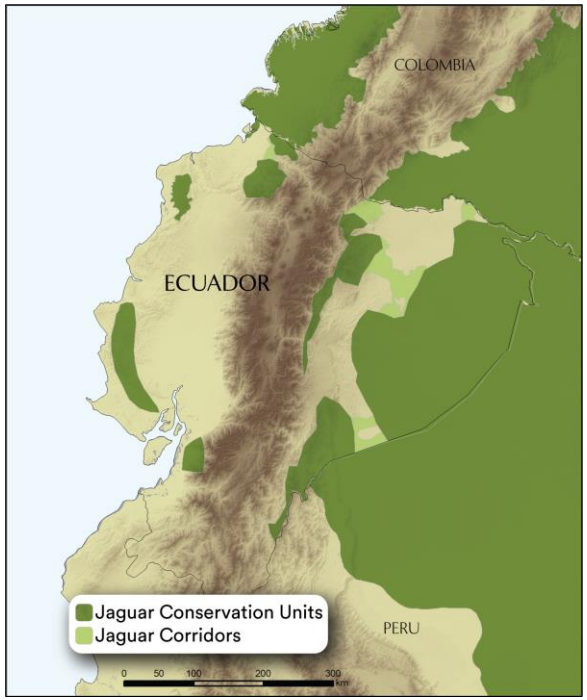
Costa Rica



# JCUs	5
Total JCU area (km^2)	17,901
# Jaguar Corridors	4
Total Jaguar Corridor area (km^2)	4,640

Area & Demographics
Costa Rica covers an area of 51,100 km^2 and has approximately 5 million people.
Estimated Jaguar Population
Costa Rica has an estimated jaguar population of approximately 570 individuals.[20]
Jaguar Habitat
Jaguar core populations are in the Guanacaste JCU in the northwest, the Central Volcanic JCU in the center of the country, the Osa JCU in the southwest and in two transboundary JCUs that extend into the neighboring countries north and south: Cerro Silva-Indio Maiz-Tortuguero JCU and Talamanca-Cordillera Central JCU, respectively. The two main jaguar corridors are: the Barbilla-Destierro Biological Subcorridor (a.k.a., 'the Path of the Jaguar') that connects the Central Volcanic and the Talamanca Cordilleras in the central part of the country; and the San Juan-La Selva Biological Corridor in the north connecting La Selva Biological Station-Braulio Carrillo National Park with Indio Maíz. Costa Rica has a total of 166 protected areas that cover 26% of its territory, plus 45 government-recognized biological corridors.
Main Threats to Jaguars
The main threats to jaguar populations are retaliatory killing of jaguars related to cat-cattle conflict, the potential isolation of certain populations due to habitat loss and barriers (i.e., major roads) and extensive hunting of jaguar prey.
Jaguar Conservation Strategy
Costa Rica does not currently have a national jaguar strategy or action plan in place.
Neighboring Jaguar Countries
Nicaragua and Panama
Transboundary Aspects
There is likely genetic flow of jaguar populations between Indio Maíz Biological Reserve and the protected areas in Northeast Costa Rica (Maquenque Mixed Wildlife Refuge and Barra del Colorado Wildlife Refuge). Gene flow also likely exists between jaguar populations in La Amistad International Park (Costa Rica-Panama). Nonetheless, due to a lack of samples from Nicaragua and Panama, there are no previous or current genetic studies to confirm this.[28] Further data are required on protected area performance and regional land use change between Tortuguero National Park and Indio Maiz Biological Reserve.

Ecuador



# JCUs	7
Total JCU area (km^2)	64,079
# Jaguar Corridors	9
Total Jaguar Corridor area (km^2)	22,694

Area & Demographics
Ecuador covers an area of 283,560 km^2 and has a population of over 16 million people.

Estimated Jaguar Population
Ecuador's jaguar population is estimated at nearly 1,100 individuals.[33, 34]

Jaguar Habitat
Ecuador has 93,700 km^2 of jaguar habitat. The core habitat is in the Amazon, northeastern tip of the country, with scattered patches of intact forest along the eastern foothills of the Andes.[34]

Main Threats to Jaguars
Current threats include the eastern expansion of the agriculture and livestock frontier, new mining developments, and oil exploitation close to and within national parks, conflict with livestock, and road development fragmenting key Amazonian populations.[33, 35]

Jaguar Conservation Strategy
In 2015, the Ministry of Environment of Ecuador and the Wildlife Conservation Society (WCS) developed a 10-year National Conservation Plan for Jaguars (http://www.wild4ever.com/wp-content/uploads/2012/05/Ecuador-National-Jaguar-Plan.pdf). This plan seeks to integrate conservation actions to maintain and restore jaguar populations in Ecuador through 5 lines of action: scientific research; landscape connectivity; ex-situ management protocols; promotion of local community participation; and building local capacity / education.[36]

Neighboring Jaguar Countries
Colombia and Peru

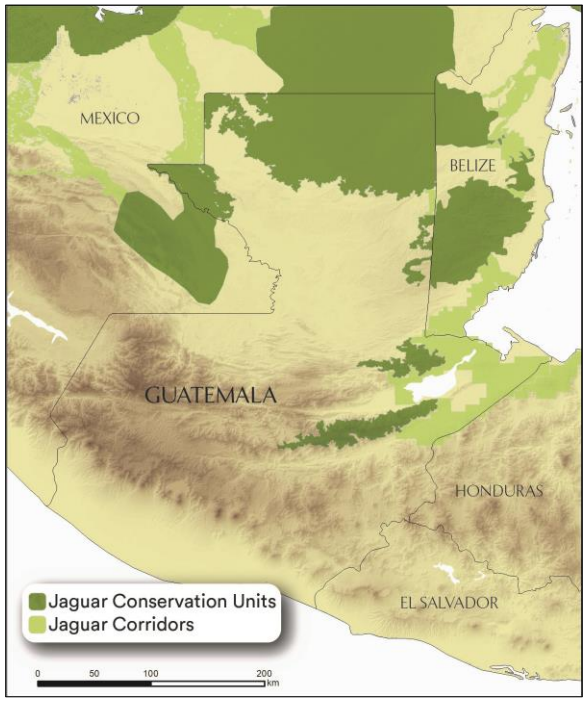
Transboundary Aspects
The international Amazonian frontier with Colombia and Peru maintains permanent gene flow and there are important potential connections between the Andes populations at mid-elevations between Ecuador and Colombia.

French Guiana

# JCUs	1
Total JCU area (km^2)	34,164
# Jaguar Corridors	0
Total Jaguar Corridor area (km^2)	0

Area & Demographics
French Guiana is an overseas department and region of France and spans an area of 83,534 km^2 with a population of almost 300,000 people. The coastal area represents around 8% of the territory contains 95% of the human population. The remaining landscape is covered by forest.
Estimated Jaguar Population
French Guiana has an estimated jaguar population of 1,600 individuals.[20]
Jaguar Habitat
French Guiana is estimated to support some 82,000 km^2 of prime jaguar habitat, with only low declines in densities within northern logged forests. Jaguars are still recorded within 5 km of the capital city of Cayenne, and the entire country can be considered one continuous jaguar population unit.[37]
Main Threats to Jaguars Current threats arise from conflict with people and livestock resulting in retaliatory jaguar killing.[38]
Jaguar Conservation Strategy
There is currently no governmental action plan for jaguar conservation in French Guiana, but the Ministry of Environment funds a study on jaguar conflict mitigation (e.g., enquiries; relocation; public awareness). Jaguar trade and transport are illegal and it is forbidden to kill jaguars.
Neighboring Jaguar Countries
Brazil and Suriname
Transboundary Aspects
All borders in French Guiana act as permeable sites for jaguar gene flow.

Guatemala



# JCUs	5
Total JCU area (km^2)	19,890
# Jaguar Corridors	2
Total Jaguar Corridor area (km^2)	10,682

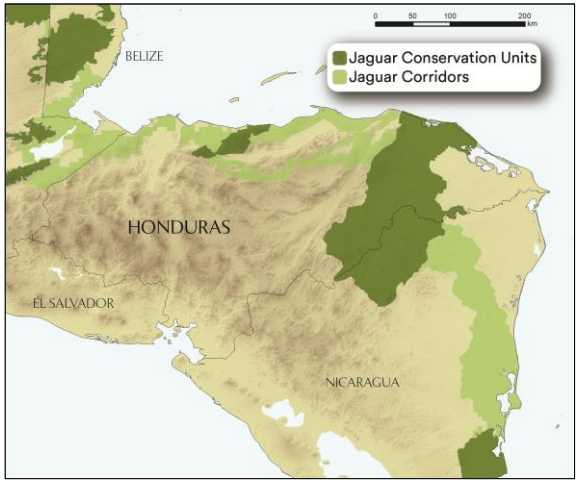
Area & Demographics
Guatemala covers an area of approximately 108,889 km^2 and has approximately 17.5 million people.
Estimated Jaguar Population
Guatemala has an estimated jaguar population of approximately 1,000 individuals.[20]
Jaguar Habitat
Guatemala contains an estimated 43,000 km^2 of jaguar habitat. The largest core jaguar population is in the Maya Biosphere Reserve. Notably, three JCUs extend into neighboring countries, namely: Montes Azules/Sierra del Lacandon JCU in the northwest, the Selva Maya JCU in the northern extreme of the country, and the Mayan Mountains JCU in the northeast. There is a population located in the Sierra de las Minas JCU (status unknown) and perhaps in the small and isolated and threatened Sierra Santa Cruz JCU (both in the eastern portion of the country). The Yahxa-Maya Mountain Corridor connecting the Selva Maya JCU with Maya Mountain JCU is highly threatened. Guatemala-Belize connectivity may be best achieved by preserving the Central Belize Corridor (CBC; or, in Belize, known as the Maya Forest Corridor (MFC)), which links the huge tri-national Selva Maya JCU to the Maya Mountains. The CBC may extend the Sierra Santa Cruz Mountain Corridor, extending the Maya Mountain JCU with Sierra Santa Cruz JCU (this may be a challenging endeavor), and the Guatemala-Honduras Binational Corridor that connects Sierra Santa Cruz JCU with Sierra de las Minas JCU, again a challenging endeavor.
Main Threats to Jaguars The main threats to jaguar populations include: hunting and decline of native prey species; forest fires; and habitat fragmentation due to increased urban and industrial development.
Jaguar Conservation Strategy
There is currently no national jaguar strategy for Guatemala. WCS had modest funding to initiate one in 2018, and seeks to match funds in order to expand and scale up current efforts. Currently, the National Council of Protected Areas (CONAP), with support of WCS, is carrying out actions aimed at developing the national strategy for jaguar conservation.
Neighboring Jaguar Countries
Belize, Honduras, and Mexico
Transboundary Aspects
The transboundary Selva Maya JCU is the biggest forest complex northwest of the Panama Canal with 40,465 km^2. The latest research indicates genetic flow in this tri-national JCU (Mexico-Guatemala-Belize).[28] Additionally, Mexico and Guatemala share the Montes Azules/Sierra del Lacandon JCU with 7,306 km^2. The Selva Maya and Montes Azules/Sierra del Lacandon JCUs are potentially connected through the Selva Maya Binational Corridor, but more research is needed to confirm this. Connectivity between Sarstoon Temash National Park in southern Belize and the JCUs of southern Guatemala (Sierra Santa Cruz and Sierra de las Minas) is tenuous. Few jaguars have been noted in these areas and much of the land is under agricultural development.

Guyana

# JCUs	8
Total JCU area (km^2)	124,992
# Jaguar Corridors	2
Total Jaguar Corridor area (km^2)	68,289

Area & Demographics
Guyana spans 228,641 km^2 and has a human population of less than one million people.
Estimated Jaguar Population
Guyana has a jaguar population of about 4,000 individuals.[20]
Jaguar Habitat
Guyana has an estimated 208,000 km^2 of jaguar habitat, including an undivided JCU covering most of the southern half of the country. The main corridors of connectivity ranges north to south from Iwokrama Forest and International Centre, crossing the Rupununi savannahs to the Konashen Community-Owned Conservation Area in the south. Guyana has a protected area network covering around 18,000 km^2, including four national parks, all of which support jaguar populations.
Main Threats to Jaguars
The main threat to Guyana's jaguar populations is habitat degradation and loss from unplanned and unsustainable development, in spite of the country's Low Carbon Development Strategy.[39] Development has emphasized mining and logging moving south towards the interior of the country. Rice and other extensive crops are also common in Rupununi savannas.
Jaguar Conservation Strategy
There is currently no official jaguar conservation strategy in place.
Neighboring Jaguar Countries
Brazil, Suriname, and Venezuela
Transboundary Aspects
Southern jaguar core populations are connected to the west with Venezuela and Brazil's Roraima, and to the east with Suriname.

Honduras



# JCUs	2
Total JCU area (km^2)	18,689
# Jaguar Corridors	3
Total Jaguar Corridor area (km^2)	49,000

Area & Demographics
The Republic of Honduras, at 112,492 km^2 is the second largest of the 7 Central American countries in area, with an estimated human population of about 9 million people.

Estimated Jaguar Population
Honduras has an estimated jaguar population of approximately 1,200 individuals.[20]

Jaguar Habitat
Jaguar habitat in Honduras is estimated at 49,000 km^2. The main jaguar core population is located to the east and is known as the Reserva de Biosfera Transfronteriza JCU, which includes the Moskitia in the Honduran side. In the north central portion of the country lies the Cordillera Nombre de Dios JCU, an area that includes the Texiguat Wildlife Refuge, Pico Bonito National Park, and Nombre de Dios National Park. The Eastern Costal Corridor in the Caribbean connects the Reserva de Biosfera Transfronteriza JCU and the Cordillera Nombre de Dios JCU core populations. There is a possible alternate connection to the south called the Honduras Mountain Corridor; nonetheless this needs to be verified on the ground.

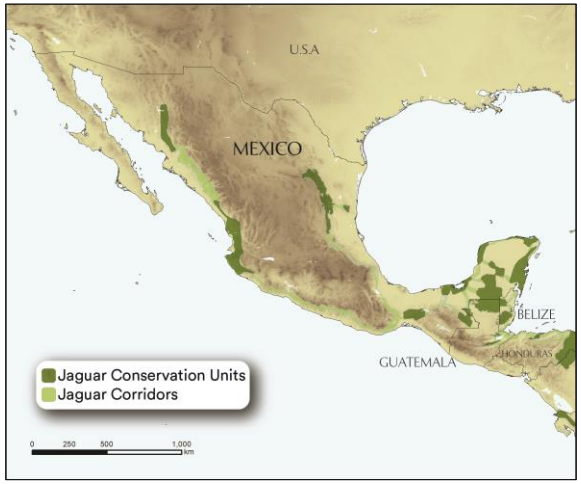
Main Threats to Jaguars
The main threats to jaguar populations are: the potential isolation of core populations due to loss of habitat and barriers (i.e., deforestation; major roads), the potential destruction of the Reserva de Biosfera Transfronteriza JCU due to deforestation for cattle ranching, and the hunting and extirpation of jaguar prey.

Jaguar Conservation Strategy
In 2012 the government of Honduras, with support from Panthera, developd a the National Jaguar Conservation Plan, 2012-2021.[40] However, this has not yet been ratified, and likely needs to be updated.

Neighboring Jaguar Countries
Guatemala and Nicaragua

Transboundary Aspects
The Guatemala-Honduras Binational Corridor potentially connects the Sierra Santa Cruz and Sierra de las Minas JCU in Guatemala with Cordillera Nombre de Dios JCU in Honduras. This is one of the most critical connectivity areas as revealed by Wultsch et al. 2016; there is a limited gene flow between Guatemala-Belize and Honduras populations. In addition, Sierra del Merendón Reserve Zone, that includes Sierra Caral Reserve in Guatemala and Cusuco National Park in Honduras, maintains connectivity between Selva Maya and the cross-border biospehere in Honduras. Evidence has Identified this area as a key habitat and corridor to maintain cross-border connectivity. Honduras and Nicaragua share the second biggest transboundary JCU in Mesoamerica with an area of 24,844 km^2. The Reserva de Biosfera Transfronteriza JCU is a stronghold for jaguars in the region and should allow for gene flow between jaguar populations in these two countries; nonetheless, it is one of the areas under greatest threat.

Mexico



# JCUs	11
Total JCU area (km^2)	16,2348
# Jaguar Corridors	8
Total Jaguar Corridor area (km^2)	15,2564

Area & Demographics
Mexico has over 120 million people distributed across approximately 2 million km^2.
Estimated Jaguar Population
Mexico has an estimated jaguar population of around 4,000 individuals.[17, 20]
Jaguar Habitat
A 2018 analysis defined approximately 530,000 km^2 as jaguar habitat or "corridors", which comprises about 27% of the country.[41] Mexico has 11 JCUs and 8 corridors. The largest jaguar populations are found in the Yucatan Peninsula, including the states of Quintana Roo, Campeche, and Yucatan. These form the Selva Maya, the largest uninterrupted tract of humid and subhumid tropical forest in Mesoamerica. The coastal plains along the Pacific, including the states of Sinaloa, Jalisco, and Nayarit, as well as the southern states of Oaxaca and Chiapas, contain important jaguar populations.
Main Threats to Jaguars
The main threats to the species include: retaliatory killing related to cattle predation; isolation of the northern populations due to habitat loss and fragmentation in the form of road construction, human settlements; and the increasing change of land use to accommodate the demand for agricultural and cattle ranching development. The cattle industry in Mexico partially drives ranching development in Central America due to supply chains into Mexico from other countries and, potentially, when within-country beef supplies are limited.
Jaguar Conservation Strategy
The Jaguar National Conservation Action Plan (Plan de Acción para la Conservación de la Especies: Jaguar, PACE Jaguar, currently under revision) is implemented by CONANP (Commission of Natural Protected Areas), which is additionally assisted by the National Jaguar Conservation Alliance (Alianza Nacional para la Conservacion del Jaguar, ANCJ) and the Group of Experts (Grupo de Expertos en la Conservación y Manejo Sustentable del Jaguar y otros Felinos Silvestres en México) for guidance and feedback.[42] Through a public-private partnership, the ANCJ produced an updated national strategy that provides direction for the conservation of the species.[41] However, these require updating and ratification. The current strategy is based on the protection of populations within 40 legally protected lands and the reduction of conflict in the landscapes between them.
Neighboring Jaguar Countries
Belize and Guatemala
Transboundary Aspects
Connectivity of jaguar populations between southern Mexico, northern Guatemala, and Belize occurs through the Selva Maya JCU, and between Sierra del Lacandón and Montes Azules protected areas.[28] Some jaguars have been detected across the border in the USA (Arizona), but they are likely dispersing males from resident populations in Sonora, Mexico.

Nicaragua

# JCUs	2
Total JCU area (km^2)	16,002
# Jaguar Corridors	1
Total Jaguar Corridor area (km^2)	14,878

Area & Demographics
Nicaragua has 130,375 km^2, and is the largest country in Central America with a population over 6.3 million people.

Estimated Jaguar Population
Nicaragua has an estimated jaguar population of approximately 600 individuals (WCS Jaguar Conservation Program).

Jaguar Habitat
Jaguar habitat in Nicaragua is currently estimated at 43,000 km^2. The main jaguar populations in Nicaragua are in the Reserva de Biosfera Transfronteriza JCU (which includes Bosawás) in the Autonomous Region of the North Caribbean Coast (RACN) and in the Cerro Silva-Indio Maíz-Tortuguero JCU in the Autonomous Region of the South Caribbean Coast (RACCS). The corridor connecting these two areas (Bosawas-Cerro Silva corridor) is one of the longest in the region, extending for more than 280 km. Although jaguars reside in this corridor (including a potential important population in the indigenous territories of Awaltara, Prinzu Auhya Un, and Prinzu Awala), their persistence is not guaranteed if they become isolated. Conservation in the Caribbean regions of Nicaragua is driven by indigenous peoples and there is little state presence throughout most important jaguar areas.

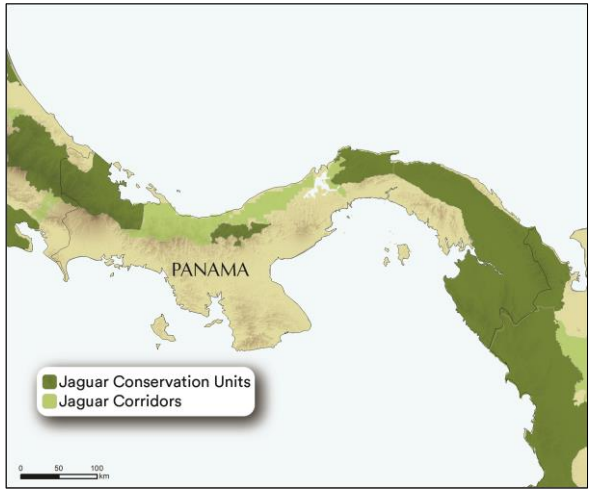
Main Threats to Jaguars
The main threats to jaguar populations in Nicaragua include: habitat loss due to the expansion of the agricultural and livestock frontier, one of the country's main economic activities; hunting of prey; and retaliatory killing of jaguars related to cat-cattle conflict.

Jaguar Conservation Strategy
There is currently no national jaguar strategy in place for Nicaragua.

Neighboring Jaguar Countries
Costa Rica and Honduras

Transboundary Aspects
Honduras and Nicaragua share the second biggest JCU in Mesoamerica with an area of 24,844 km^2. The Reserva de Biosfera Transfronteriza JCU is a stronghold for jaguars in the region and should allow for gene flow between jaguar populations in these two countries., Nonetheless, it is also one of the areas under greatest threat. WCS has conducted and is conducting rigorous field expedition based verifications of the last remaining opportunities for bi-national connectivity, in collaboration with indigenous and national governments. There is likely genetic flow between jaguar populations from the Indio Maiz Biological Reserve and the protected areas in northeastern Costa Rica (Barra del Colorado Wildlife Refuge and the Maquenque Mixed Wildlife Refuge), which leads to corridor connectivity in central Costa Rica. Connectivity is challenged, however, by decade-old invasions into Costa Rica's Barra Colorado Wildlife Refuge.

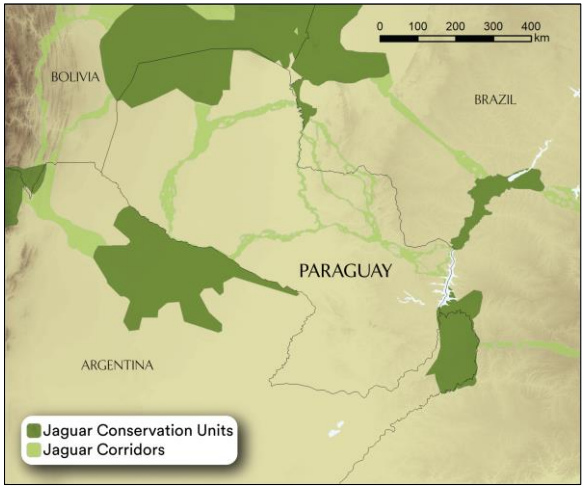
Panama



# JCUs	4
Total JCU area (km^2)	27,681
# Jaguar Corridors	2
Total Jaguar Corridor area (km^2)	7,350

Area & Demographics
Panama covers a total area of 75,845 km^2 and a population of 4 million people.
Estimated Jaguar Population
Panama has a jaguar population of approximately 870 individuals.[20]
Jaguar Habitat
Jaguar habitat in Panama is estimated at 43,000 km^2. Core jaguar populations occur in three main JCUs: the Talamanca-Cordillera Central JCU (a transboundary JCU located in western Panama and composed of protected areas including La Amistad International Park, Volcan Baru National Park, Fortuna Forest Reserve, and Palo Seco Protected Forest); the Santa Fe JCU (located in central Panama and composed of three protected areas, Santa Fe National Park, General de Brigada Omar Torrijos Herrera National Park, and the recently established Donoso Multiple Use Area); and the Chagres-Darien JCU (largest JCU in Panama and runs from the eastern Panama Canal to Colombia and is composed of three National Parks (Chagres, Portobelo, and Darien), two Indigenous Territories (Guna Yala and Emberà-Wounaan), and the Nargana Wild Area). Corridors include: the Colon Corridor (east of the Panama Canal and connects Chagres and Portobelo National Parks with Soberania National Park); Lago Gatun-Santa Fe Corridor (extends from Lago Gatun to Santa Fe JCU); and Ngabe-Bugle-La Amistad Corridor (connects the Santa Fe JCU with the Talamanca-Cordillera Central JCU).
Main Threats to Jaguars The main threats to jaguars in Panama include: overhunting of prey species; habitat loss and fragmentation; and retaliatory killing due to cattle predation.
Jaguar Conservation Strategy
In 2011, the Environment Authority (ANAM) adopted an Action Plan for Jaguar Conservation.[43] Ratification pends, and the plan may merit being updated.
Neighboring Jaguar Countries
Colombia and Costa Rica
Transboundary Aspects
Costa Rica and Panama share the Talamanca-Cordillera Central JCU, an uninterrupted block of forest covering 12,354 km^2. On the Panamanian-Colombian border lies the Chagres-Darien JCU (21,782 km^2) and the Chocó JCU (67,883 km^2), basically a continuous forest. Thus, both Panamanian jaguar populations in the northern and southern borders likely sustaincontinued genetic flow.

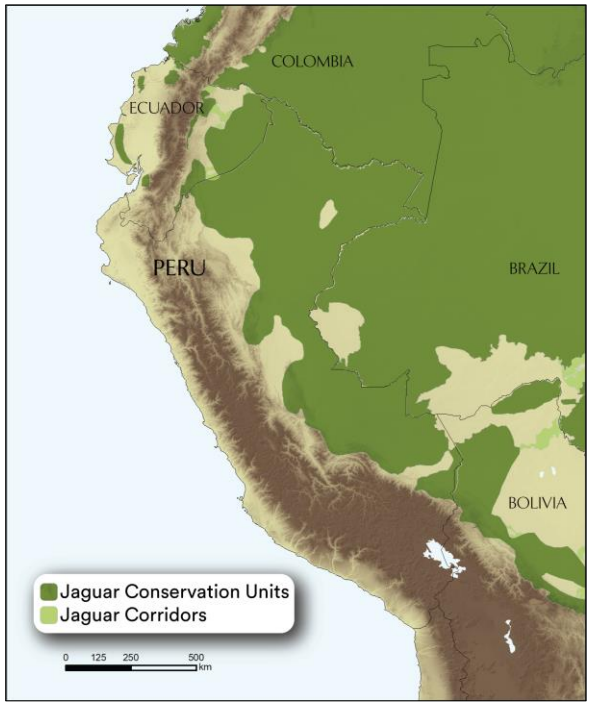
Paraguay



# JCUs	1
Total JCU area (km^2)	42,117
# Jaguar Corridors	2
Total Jaguar Corridor area (km^2)	30,316

Area & Demographics
Paraguay covers an area of 406,752 km^2 and has a human population of around 6.9 million people.
Estimated Jaguar Population
Paraguay's jaguar population is estimated at 1,500 individuals.[20]
Jaguar Habitat
Extant jaguar habitat is estimated at 233,000 km^2. Little is known about Paraguayan jaguar populations, but their stronghold is likely in the northern Chaco. Smaller and imperiled "populations" likely persist in the Atlantic Forest in eastern Paraguay, linked to the same biome in Brazil and Argentina
Main Threats to Jaguars
The main current threat is conflict with humans and livestock.[44]
Jaguar Conservation Strategy
In 2017, the Environmental Ministry of Paraguay and WCS developed a 10-year National Conservation Plan for jaguars, from 2017 through 2026. This plan seeks to integrate conservation actions to maintain and restore jaguar populations in Paraguay through 5 lines of action: scientific research; landscape connectivity; ex-situ management protocols; promote local community participation while building local capacity; and education.[45] Formal ratification pends and the plan may soon merit an update.
Neighboring Jaguar Countries
Argentina, Bolivia, and Brazil
Transboundary Aspects
Transboundary connectivity is strong with the Bolivian Chaco (Maffei et al. 2004) and lower with the Argentinian Chaco.[23]

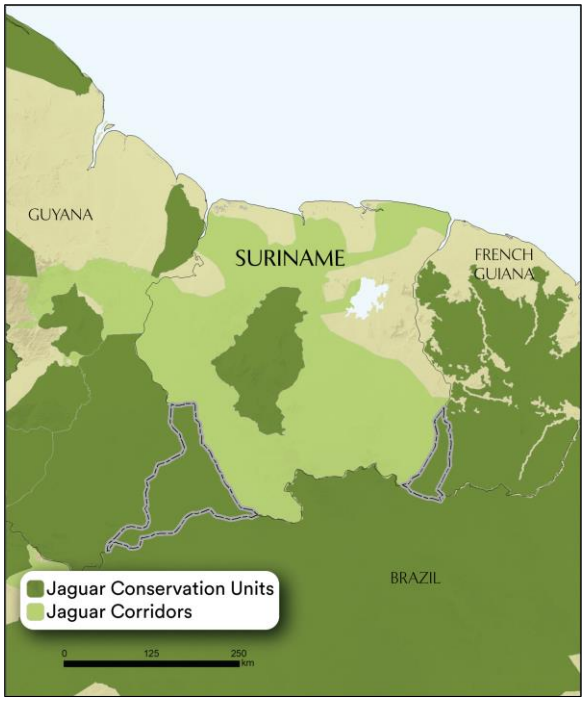
Peru



# JCUs	5
Total JCU area (km^2)	128,999
# Jaguar Corridors	7
Total Jaguar Corridor area (km^2)	104,901

Area & Demographics
Peru contains 32 million people living in 1,292,693 km^2 of national territory.
Estimated Jaguar Population
Peru is estimated to have a jaguar population around 22,000 individuals, representing the second largest jaguar population in jaguar range (after Brazil).[20] Areas with high densities are found along the eastern Andes toward the Amazon.[46]
Jaguar Habitat
As of 2017, Peru had over 739,000 km^2 of jaguar habitat.[20] The main stronghold is in the eastern Amazon forest.[47] The largest core remains in the Loreto region of the Amazon within indigenous-managed areas, and southeastern Amazon where FSC forestry concession in addition to protected areas are key, mainly along the borders with Bolivia and Brazil.
Main Threats to Jaguars
Major threats to jaguars in Peru include the spread of informal mining, agriculture, and unsustainable hunting of native prey species. The first two threats are expanding eastward from the Andes foothills, while hunting is endemic to indigenous and settler communities, leading to reduced jaguar populations in the affected areas.[47]
Jaguar Conservation Strategy
There is currently no national action plan for conservation of the jaguar, but the process of developing this plan is underway.
Neighboring Jaguar Countries
Bolivia, Brazil, Colombia, and Ecuador
Transboundary Aspects
There is high degree of longitudinal connectivity along the Amazon basin to Colombia and Brazil, as well in the southeast with northwestern Bolivia in the Greater Madidi-Tambopata Landscape.

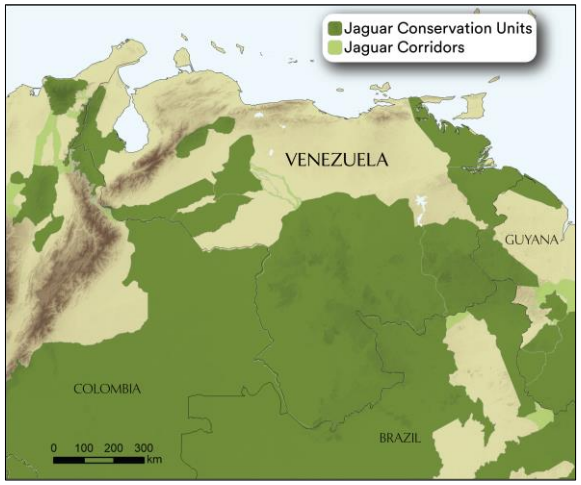
Suriname



Area & Demographics
Suriname covers 162,203 km^2 and has a human population of approximately 600,000 people.
Estimated Jaguar Population
Suriname's jaguar population is estimated to be at least 3,000 individuals.[20]
Jaguar Habitat
This small country contains significant jaguar habitat estimated to cover 142,000 km^2, or about 87% of the national territory. Jaguar strongholds are found in the southern three quarters of the country, with a core area located within the Central Suriname Nature Reserve.[37]
Main Threats to Jaguars
Main threats include: the southward expansion of agricultural and livestock frontier; jaguar hunting in retaliation for livestock depredation; and unmanaged mining.
Jaguar Conservation Strategy
There is currently no national strategy or action plan in place for jaguars.
Neighboring Jaguar Countries
Brazil, French Guiana, and Guyana
Transboundary Aspects
Transboundary connectivity exists longitudinally to the west with Guyana, to the south in an unbroken Amazonia matrix of forest with Brazil, and to the east with French Guiana.

# JCUs	1
Total JCU area (km^2)	18,007
# Jaguar Corridors	2
Total Jaguar Corridor area (km^2)	29,263

Venezuela



# JCUs	11
Total JCU area (km^2)	535,441
# Jaguar Corridors	8
Total Jaguar Corridor area (km^2)	41,444

Area & Demographics
Venezuela has an area of 935,106 km^2 and a population of about 32 million people.
Estimated Jaguar Population
Venezuela's jaguar population is estimated to be around 11,500 individuals.[20]
Jaguar Habitat
Jaguar habitat in Venezuela is estimated to be around 589,000 km^2. The country's best-conserved populations are located in the Amazon (Amazonas state), in the Guyanese shield (Bolivar state), and south of the Orinoco River.[48, 49] The Llanos population is likely significantly diminished, probably due to heavy persecution in the last two decades; its connectivity is not currently well known.[48] The most important corridor used to be along the Orinoco riparian forest, but the northern half has been significantly altered. Currently, the rivers most strongly associated with jaguar forest are the Caura, Caroni and, to some extent, the Arauca River.
Main Threats to Jaguars The main threats in Venezuela include: unplanned development; a lack of sustainable conservation land planning, especially driven by land conversion for agriculture and livestock; mining; and oil exploitation.[49] Hunting of jaguars in retaliation for livestock depredation and incidental killing are also important threats, particularly in the Llanos, around main cities, and frontiers. It is unknown whether there is an illegal trade in jaguar parts.
Jaguar Conservation Strategy
There is currently no national jaguar strategy in place.
Neighboring Jaguar Countries
Brazil, Colombia, and Guyana
Transboundary Aspects
The main transboundary connectivity to Colombia, Brazil, and Guyana is through the Amazon. JCUs here are difficult to separate and are more of a homogenous forest matrix. The eastern flank of the country likely has fairly well conserved jaguar gene flow and continuous population of jaguars with western Guyana and northern Brazil through Roraima state. Transboundary populations through the Llanos and the Tachira depression to the north are of considerable conservation interest. This area has important value for the Jaguar Corridor as a connection between Andes, Llanos, and Amazon. This is a patchy area, dependent on the Catatumbo National Park in Colombia and the Perija National Park in Venezuela.

Transboundary Maps

Figure 5. Detail of South American Jaguar Conservation Units (JCUs, dark green) and Corridors (light green).

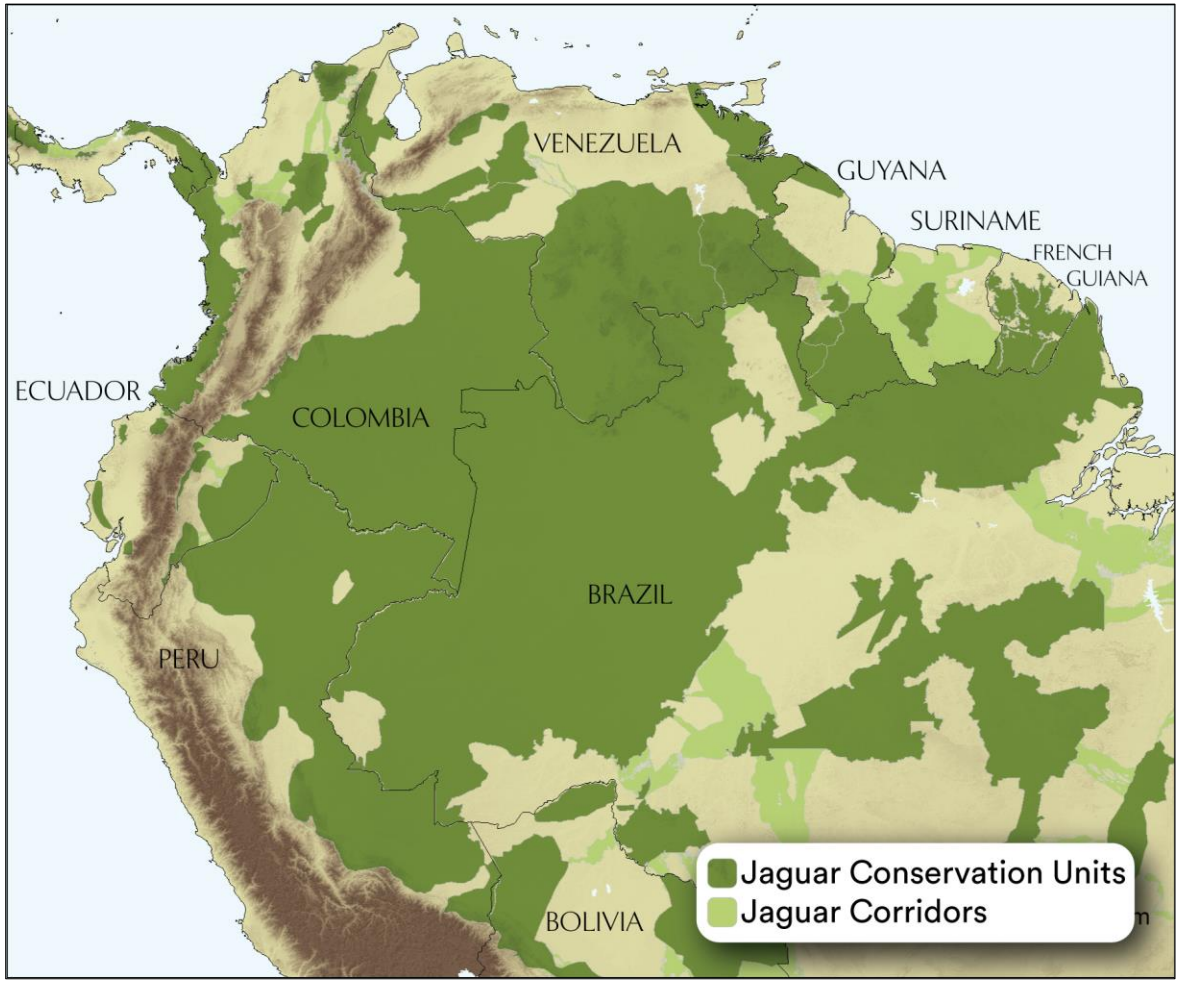
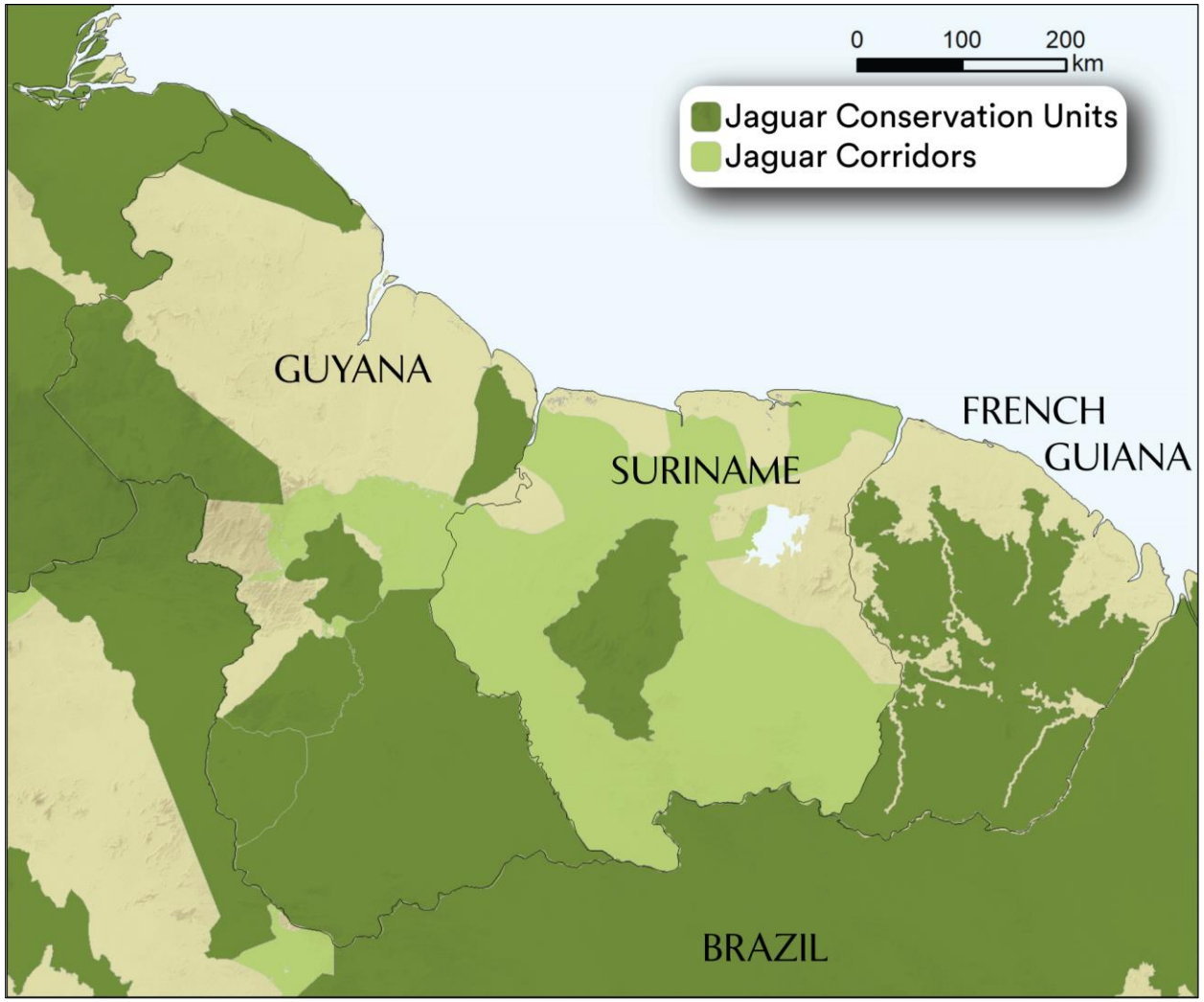
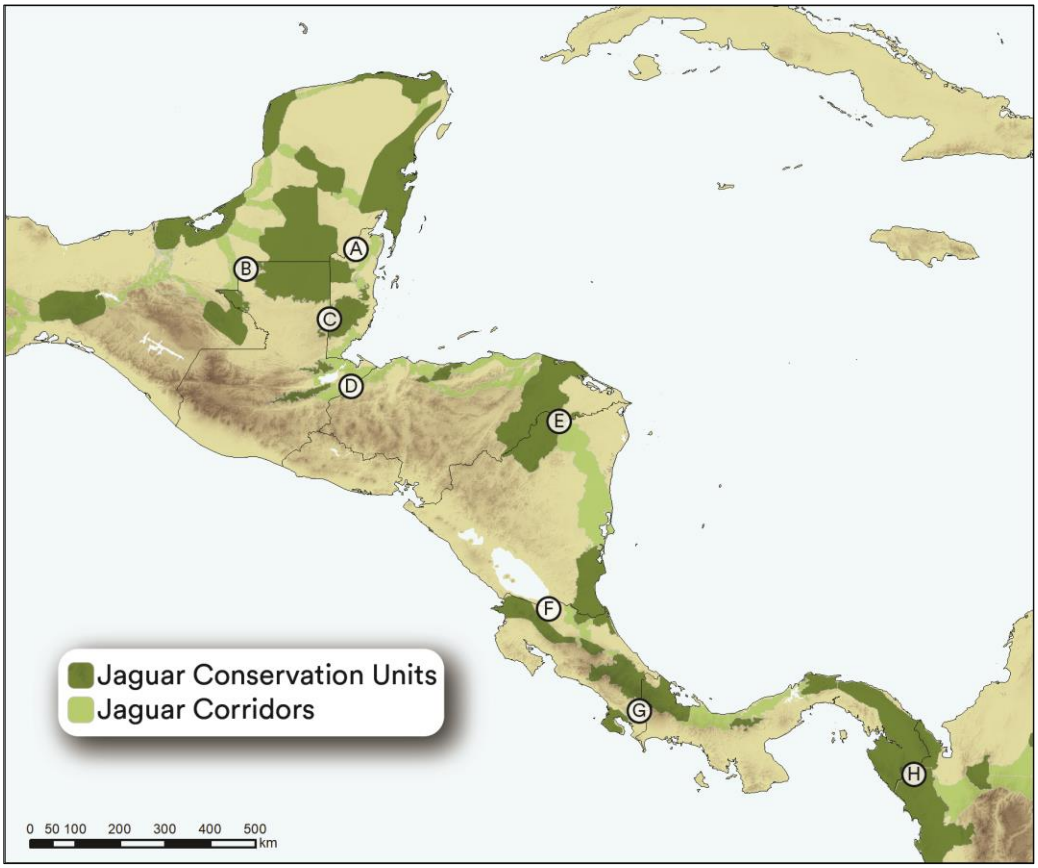


Figure 6. Map of Guiana Shield Jaguar Conservation Units (JCUs, dark green) and Corridors (light green).



4. Transboundary profiles

Figure 7. Map of Mesoamerican Jaguar Conservation Units (JCUs, dark green) and Corridors (light green) with 7 identified priority jaguar border areas (A-H).



A. Selva Maya (Mexico-Guatemala-Belize). The transboundary Selva Maya JCU (40,465 km^2) is one of the most important ecosystems in the world and is considered the most extensive continuous massif of humid and subhumid tropical forest in Mesoamerica. The region includes areas of multiple protection categories, including Biosphere Reserve, Forest Reserves, and National Parks. The main threats within this JCU include forest fires, illegal logging, and illicit trade of flora and fauna species. Livestock and agricultural activities (i.e., oil palm), drug trafficking, mineral and petroleum exploration, and exploitation all contribute to forest loss in the Selva Maya JCU. A large number of cattle cross the Guatemala-Mexico border illegally. Various environmental agencies, non-governmental organizations, and civil society organizations from the three transboundary countries collaborate in the Selva Maya. Community forest concessions are considered successful conservation and development instruments with positive economic and social impacts. Significant results include preventing and fighting forest fires.

B. Montes Azules-Sierra del Lacandón. Mexico and Guatemala share the Montes Azules/Sierra del Lacandon JCU with 7,306 km^2; with a great majority on the Mexican side. The Selva Maya and Montes Azules/Sierra del Lacandon JCUs are potentially connected through the Selva Maya Binational Corridor. Research projects in the Mexican side include monitoring jaguar populations and interactions between jaguars and humans. Although not well defined, the main threats in the area include deforestation due to human colonization of natural habitat, an expansion in livestock and agricultural activity, retaliatory killing of jaguars, hunting, forest fires, and illegal logging.

C. Maya Mountains, Belize-Guatemala. The majority of the Maya Mountains JCU (5,899 km^2) is in Belize. Formerly, the JCU included portions of eastern Guatemala, however conditions have deteriorated on the Guatemalan side of

the border due to livestock expansion. With the Guatemalan side now virtually deforested, the Maya Mountains JCU lies almost entirely within Belize and suffers negative environmental impacts caused by border crossings. Here, hunting, logging, and land clearing for agriculture and settlements are among the main threats. Illegal settlements and extraction of flora and fauna remain a continued and serious threat to the Maya Mountains JCU.

D. Guatemala-Honduras. The Guatemala-Honduras Binational Corridor potentially connects Sierra Santa Cruz (1,057 km^2) and Sierra de las Minas (2,053 km^2) JCUs in Guatemala with Cordillera Nombre de Dios JCU (1,718 km^2) in Honduras. This is one of the most critical connectivity areas as revealed by the most comprehensive genetic study of jaguars in Mesoamerica, which indicates a limited gene flow between the Mexico-Guatemala-Belize and Honduras populations.[28] The core of this transboundary corridor is along the Cordillera de Merendon, a mountain range that extends the Motagua valley in Guatemala to the Sula Valley in Honduras. Camera trapping and interview surveys in Merendon have indicated the presence of jaguar and important prey species such as collared peccary and brocket deer.

E. Honduras-Nicaragua. Honduras and Nicaragua share the second biggest JCU in Mesoamerica with an area of 24,844 km^2, and is arguably the most threatened JCU in Central America due to high deforestation rates. The Reserva de Biosfera Transfronteriza JCU—also known as Corazon del Corredor (Heart of the Mesoamerican Biological Corridor)—includes the Patuca National Park, the Tawahka Asangni Biosphere Reserve, the Río Plátano Biosphere Reserve, some areas not officially declared as protected in eastern Honduras, and the Bosawas Biosphere Reserve in in Nicaragua. Low institutional presence and weak environmental law enforcement have resulted in high rates of deforestation, associated in part with drug trafficking. The majority of indigenous groups (Miskitu, Mayangna, Pech, and Tawahka) have community land titles and are the primary legal stewards—but those areas often suffer forest-clearing invasions by ladinos associated with organized crime. Traditional small-scale agriculture is being replaced by extensive cattle ranching. As a result, large tracts of forest are lost every year and threatens to bisect this binational forest in less than five years if trends are not reversed. Additionally, park rangers and environmentalists are often at risk and threatened. Nonetheless, this JCU holds the most important jaguar population in both countries, as well as important jaguar prey; in fact, this is the only area of Honduras where white-lipped peccaries still occur. The titling of indigenous lands has advanced significantly in recent years. Further support for the titling of indigenous territories where still needed, and defense of those territories in both Honduras and Nicaragua, will help to ensure the protection of this JCU.

F. The Cerro Silva-Indio Maiz-Tortuguero JCU is a block of approximately 9,411 km^2 shared between Costa Rica and Nicaragua. This JCU begins in the Cerro Silva Nature Reserve and continues through the Indio Maiz Biological Reserve in the RACCS of Nicaragua. In Costa Rica, this JCU contains Maquenque Mixed Wildlife Refuge, Barra del Colorado Wildlife Refuge, and Tortuguero National Park. In Nicaragua, this JCU has suffered from widespread deforestation for cattle ranching and small-scale agriculture, a process driven by non-indigenous colonists and limited government enforcement of environmental laws. Unfortunately, the Barra Colorado Wildlife Refuge was previously diminished by similar factors. The Indio-Maiz region remains one of the two main strongholds for jaguars in Nicaragua. On the Costa Rican side, the main threats include hunting, retaliatory killings of wild cats in response to cattle depredation, illegal deforestation, and agricultural expansion of monocultures (i.e., pineapple; banana). More research is needed to assess the potential effects of agrochemicals used in the crop industry in Costa Rica on the rivers, other water systems, and wildlife.

G. Costa Rica and Panama share the Talamanca-Cordillera Central JCU which covers 12,354 km^2. This block is composed of 43 different protected areas and indigenous territories in the Costa Rican side, and includes one international park, national parks, biological reserves, forest reserves, wildlife refuges, and protective zones. The Panamanian side is composed of eight different protected areas (including a Natural World Heritage site) and private lands, including an international park, wetlands, a national park, a forest reserve, and a protected forest. Marijuana plantations have been detected in the Costa Rican side and could lead to significant deforestation. Hunting in indigenous territories may pose a threat to large wild cats and prey populations. More research is needed to assess the sustainability of hunting. Retaliatory killing of jaguars (related to cat-cattle conflict) and development projects (i.e., large hydroelectric projects) are some of the main threats on the Panamanian side.

Figure 8. Map of South American Jaguar Conservation Units (JCUs, dark green) and Corridors (light green) with 23 identified priority jaguar border areas (A-W).

A. Darien, Panama-Colombia border. Along the Panamanian-Colombian border lies the Chagres-Darien JCU (24,934 km^2) and the Chocó JCU (68,326 km^2). These jaguar core areas total 93,260 km^2 and are formed by national parks, indigenous, and afro-Colombian territories. This frontier is still heavily forested and should remain so for the next decade. Destructive processes from both sides include logging and illegal gold mining. On the Colombian side, there is strong pressure from oil palm developers and large scale agriculture. Formal palm oil producers have committed to zero deforestation, but the drivers of this deforestation are informal and do not adhere to these or other green agreements. A stronger governance on the expansion of oil palm and other commodities is important to protect the area. The Pan-American Highway initiative has been hovering in the plans of both country governments for decades but has not yet been constructed. When constructed, this frontier site will suffer immediate damage from fragmentation, roadkill, and invasion of coyotes south of Panama, altering the ecology of carnivores and prey species. As a secondary effect, the Pan-American Highway would enable the penetration of loggers and hunters that will rapidly erode the conserved forest of the Darien from the road outwards. A clear zoning of the jaguar corridor signed by both countries is important to limit impact on jaguars and their prey once the Pan-American Highway is constructed.

B. Colombia-Venezuela border. The northeastern frontier bordering Venezuela is heavily impacted by human disturbance.Only patches of tropical dry forest remain, where the sole strong connector is the Catatumbo JCU with the Perijá National Park in Venezuela (2,953 km^2). Along the Colombian side in the Perijá mountains and north of Catatumbo NP (1,581 km^2), threats arise from degradation from extensive livestock ranching (50% of land cover), coal mining, and coca plantations for cocaine productions.[50] Two small regional protected areas currently exist, and Colombia plans on creating a new national park plus some protection for the Yukpa ethnic group. Of considerable conservation interest are the transboundary populations to the east into Venezuela and through the Tachira. This area has important value for the jaguar corridor as a connector between Andes, Llanos, and Amazon habitat in both countries. This area is heavily impacted by strong mining and narcotic interests, including Colombian rebels which hide along the frontier.

C. The Southwestern Colombia–Ecuador border is a key site where jaguars occur in forested slopes of the Andes below 2,000 m above sea level. The forest patches are in constant erosion due to mid-level altitude farming and road infrastructure. There is no connectivity across the Andes between the mountain slope populations and the region has been heavily deforested. A network of small protected areas in the Ecuadorian side and remnants of natural vegetation maintain a small jaguar population. This population, however, is likely not viable, and dependent on migrant individuals from Colombia to persist in the long run. The transboundary region is characterized by numerous threats which provide challenges to implementing conservation initiatives, and include deforestation, expansion of industrial agriculture (e.g., oil palm plantations) and livestock frontiers related to high human density, illegal crops, and social conflict.

D-E. The northern Amazon, bordering Colombia, Peru, and Brazil contains one of the largest jaguar populations, and is fully connected to the greater Amazon basin. The area overlaps indigenous reserves that have strong conservation practices and include multiple national parks. This is probably the second-best conserved area for jaguar after the central core in the Amazon basin. This area does not have a strong deforestation frontier as is seen along the southern Amazon limit in the deforestation arc. However, deforestation for extensive livestock ranching and agriculture is increasing in the Putumayo and Guaviare departments, along the northern border in Colombia, as a function of limited land governance by the Colombia government. Main threats in the region include unsustainable hunting of prey, although this is not an extensive practice. South of Colombia into the Ecuadorian Amazon there is a continuous and strong jaguar population which needs further research to more precisely estimate population status and fill this gap in existing jaguar range maps.

F-G. Eastern Venezuela. The main threats faced by jaguar populations in the Venezuela-Guyana frontier include unplanned development and lack of sustainable conservation land planning, specially driven by unregulated gold mining prospection and exploitation.[51, 49] Mining is an increasing threat to forest degradation from the Guyanese side. Hunting of jaguars as retaliation to perceived or actual livestock depredation, and incidental killing are also an important threat. It is currently unknown if there is illegal trade in jaguar parts. The eastern Venezuela area has a good probability of jaguar survival for the next 50 years.[49]

H-I-K-M. The northern Guyana shield. This frontier is composed of the northern limits of three Brazilian states (Rorarima, Pará, Amapá), and the southern limits of Guyana, Suriname, and French Guiana. The rainforest is well conserved with little human presence. Major threats include agriculture, unregulated gold mining, and prospective roads.[52, 53, 54] This is an ideal region for a peace park and can complement existing parks in the south of Suriname and northern Brazil.

J-L-N. Guyana-Suriname-French Guiana borders. The transfrontier area between Guyana and Suriname joins the southern jaguar core population connected with more or less continuous forest. The eastern frontier with Suriname is epiphenomenally conserved due to national claims on the boundary from both countries along the Courantyne river. The Suriname–French Guiana border and French Guiana-Brazil borders are well conserved and have continuous forested connectivity.

O. Ecuador-Colombia-Peru. In the Amazon region, the border between Ecuador, Colombia, and Peru still has large tracts of natural habitat which includes three protected areas along the borders of these three nations: Cuyabeno Wildlife Reserve (5,901 km^2) in Ecuador; La Paya National Park (4,220 km^2) in Colombia; and Güeppi-Sekime National Park (2,036 km^2) in Peru. The protected areas facilitate connectivity and gene flow between jaguar populations between these three countries. However, the border between Ecuador and Colombia faces several

conflicts including extraction of hydrocarbons from the underground, deforestation, expansion of oil palm and other crops, illegal crops, and social conflict. Acquisition of jaguar parts for illegal trade markets appears to be an emergent threat for jaguar populations in this region.

P. Peru-Brazil. The Peru-Brazil border is one of the longest border areas that traverses essentially undisturbed jaguar habitat. Much of this border area is protected as indigenous reserves or is under some level of national protection, several of which are bi-national. The level of land protection and amount of contiguous habitat make this area of significant importance for jaguar connectivity and for continued attention to conservation planning.

Q. Greater Madidi-Tambopata Landscape, extending south along the humid Yungas to Amboro National Park. This is a complex of several national parks between Bolivia and Peru, along the eastern Andes slopes and into the Amazon ecosystem. Protected areas include Bahuaja Sonene National Park and Tambopata National Reserve in southern Peru, and in Bolivia includes Madidi National Park and Natural Area of Integrated Management, Apolobamba National Natural Area of Integrated Management, Pilon Lajas Biosphere Reserve and Indigenous Territory, Manuripi Heath Amazonian Wildlife National Reserve, Isobore Secure National Park and Indigenous Territory, Carrasco National Park, and Amboró National Park and Natural Area of Integrated Management. Jaguar monitoring evidence from the Madidi protected area suggest jaguar populations have recovered over the last few decades. However, the populations are threatened by increasing deforestation linked to road development and large scale agriculture, proposed infrastructure, and energy projects. Over the last five years, poaching for jaguar parts in Bolivia has been linked to international illegal wildlife trade.

R. Noel Kempff JCU. This JCU includes the Noel Kempff Mercado National Park at its core. The park is subject to a myriad of threats and in need of infrastructural support. Along the eastern boundary which borders Brazil, threats include logging and poaching. Along the western boundary in Bolivia, threats include livestock encroachment, jaguar hunting due to attacks on livestock, unregulated hunting of prey species, fires, and active deforestation. New roads threaten to increase pressure from each of these threats.

S. Chaco and Yungas. Transboundary connectivity is especially strong with the Bolivian Chaco and less so with the Argentinian Chaco.[55, 23] Jaguars still exist in Salta, Jujuy, Formosa, and in the Chaco with a remnant population in the Misiones province.[22, 21] Chaco populations are believed to be dwindling, but these are likely the main strongholds.[23] Major threats include erosion and habitat degradation from intensive agriculture and livestock, added to increasingly arid lands and indiscriminate hunting, even in protected areas.[24, 23, 22]

T. The Bolivia-Paraguay-Brazil border. This transboundary region contians a mosaic of habitat including Chaco vegetation scrub, chiquitano, and cerrado forest, all of which are currently and relatively well conserved. This region is connected with the Pantanal to the east. The Brazilian Pantanal is one of the strongholds for jaguar conservation in central South America. In Paraguay and Bolivia, roads facilitate expansion of livestock ranching and unplanned human occupation. Little is known about the Paraguayan jaguar populations, but their stronghold seems to be within the northern Chaco. Current threats include conflict with humans and livestock.[44] The closed vegetation and marked dry season pose a limited use of the land that should strengthen the potential for expansion of existing, or the establishment of new protected areas. A peace park in this region would be ideal. Alternatively, the existing parks could collaborate to conserve jaguars and biodiversity throughout this region.

U. The Paraguay-Brazil border. This area is of limited regional value for core jaguar populations and connectivity. Jaguar presence is patchy at best, and the degree of agricultural development and human presence makes the area difficult for jaguar passage. However, there is potential for the area to be important for connectivity through the border area to jaguar populations in the Gran Chaco to the northwest, and populations to the west in the Upper Parana River and into the Iguaçu JCU. Jaguar conservation in the area will depend private land conservation and reduced jaguar-human conflict. The Mbaracayu Forest Nature Reserve could act as a source population for the border area and an anchor for jaguar conservation.

V. The Paraguay-Argentina border. This is a border area of nearly 1,000 km with limited jaguar distribution and widespread human development. However, there is still potential of the area to support jaguar dispersal and even residents. At least one core jaguar population may exist on the Argentina side, with a reintroduction planned in the

Ibera National Park area. The core populations could set the stage for widespread conservation efforts along the border area.

W. The Paraguay-Brazil-Argentina border. This area contains the largest and southernmost JCU, the Iguaçu JCU. It may still be connected to populations to the northwest through the upper Parana River drainage and across the mostly-agricultural landscapes to the Pantanal JCU. Although the Iguaçu JCU jaguar population is relatively small (< 100 individuals), maintenance of connectivity to the Pantanal JCU could significantly increase its long-term viability.[27]

5. Baseline Activities for Conservation of Jaguars and Associated Ecosystems

(1) Range-wide coordination in support of connectivity, scaling up, and enhancing ambition

Baseline and gaps

Element	Baseline activities
Institutionalization of regional-level coordination of jaguar conservation	Several different efforts over the last few years: WWF-WCS in Quito in 2013, Mexico in 2018, and WWF in Bogota in 2018, but none have resulted in a formalized platform or instance CCAD (Central American Commission on Environment and Development) is comprised of the environmental ministers from all Central American countries and meets twice annually to discuss regional issues. Park guards from National Parks in Guatemala and Honduras conducted a meeting in Honduras in September 2018 as an initial attempt to coordinate enforcement activities between the two nations (Panthera, governments of Guatemala and Honduras, FUNDAECO) In the 2019 Lima Declaration, the jaguar (*Panthera onca*) was declared an emblematic species of the Americas, for its importance in maintaining the integrity and functionality of the ecosystems, and because it represents a spiritual and cultural icon of many peoples throughout its area of distribution and a symbol of the fight against illegal wildlife trade. (The Declaration was endorsed by 21 countries)
Regional-level data sharing, monitoring and evaluation	CENAP (Brazilian governmental organization) organized a multi-author range-wide paper using jaguar telemetry data. (Morato et al. 2018) Panthera has a strong baseline of data (information) that ranges from México to Brazil and a strong team of scientists. WCS currently: has scientists working in sites totaling ~ 400,000km² from Guatemala to Paraguay; was engaged in first two years of Mesoamerican jaguar corridor; and in 2017 conducted jaguar population trend analyses to evaluate the effect of its landscape interventions in 11 sites. Several researchers and institutions contributing to regional databases of camera trap data and/or distribution points.
Up-to-date knowledge of overall jaguar corridor functionality and overall threats	Patchy with some long-term efforts at the scale of specific landscapes. Strategic genetic sampling to be put in place by 2023 using selected long-term sites throughout the Corridor. (Panthera)
Coordination of action planning and implementation	WWF and WCS have both led jaguar conservation workshops with partners, helping to establish the basis for a broad jaguar conservation partnership.[56]
Effectiveness and coordination of technical cooperation	
Communications and partnerships	

(2) Development and national-level implementation of range country national strategies, including JCU strengthening, national-level enabling environments, and national contributions to transboundary efforts

Baseline and gaps

Country	Element				
	National jaguar strategy	**PA system support to jaguar conservation (incl. 'border PAs')**	**Conservation-specific laws, regulations and related enforcement**	**Mainstreaming into macro- and sectoral-level policies / plans**	**National-level support to transboundary cooperation processes**
Argentina	Yes (2016, ratified 2017)	Transboundary (Argentina-Brazil) biennial monitoring of jaguar population (since 2004).	Jaguars declared National Natural Monument (Law 25.4631/2001). Jaguars included in Zero Extinction Plan (national scope; 2016-17). Signatory CMS, inclusion jaguars AI & II in 2020		
Belize	No. But there is a National Jaguar Working Group, a national monitoring program, and a Jaguar Officer in the government.	X	X	Pending.	Pending.
Bolivia	Yes, completed in 2020	X	X Signatory CMS, inclusion jaguars AI & II in 2020	In theory, publication of National Jaguar Action Plan could facilitate this.	Broad coordination efforts underway on the Bolivia-Peru border including protected areas and biodiversity conservation.
Brazil	The Jaguar National Action Plan was developed in 2009 and approved by government in 2018.	WWF, WCS, and ICMBio/CENAP are developing a monitoring program targeting Arpa's protected areas.	Law 9.605/98 Signatory CMS, inclusion jaguars AI & II in 2020		
Colombia			Jaguar Conservation Action Plan (not implemented). Corridor proposal on the table.		
Costa Rica	Draft (2014). There is also a recent Jaguar Conservation Status document (2018).				
Ecuador	Yes (2015)	X	National Action Plan for Jaguar Conservation (evaluation of its effectiveness pending). Plan to be updated by 2018.	X	X
French Guiana		X	Jaguars protected by state decree. Signatory CMS, inclusion jaguars AI & II in 2020		
Guatemala	No		CONAP is developing, with the support of WCS, the national strategy for jaguar conservation.		
Guyana					

Country	Element				
	National jaguar strategy	**PA system support to jaguar conservation (incl. 'border PAs')**	**Conservation-specific laws, regulations and related enforcement**	**Mainstreaming into macro- and sectoral-level policies / plans**	**National-level support to transboundary cooperation processes**
Honduras	Yes (2012-2021). Ratification pends, and may merit an update.	X	Yes, but specific threatened and endangered wildlife legislation needs an update. Signatory CMS, inclusion jaguars AI & II in 2020		Honduran environmental agencies have seen results of WCS–Yale Honduras-Nicaragua JCU studies identifying weak points for forest connectivity completed in 2017, and are currently organizing reconnaissance and patrols in support of realizing the full potentials of the Honduran side of the Transfronteriza Biosphere Reserve. Livelihood initiatives (i.e., improved livestock management and agroforestry cacao systems) with conservation commitments can also improve landscape permeability.
Mexico	Yes, the jaguar PACE (2009). In 2019, CONANP began an update process of the PACE, including most of the 2030 strategies, in order to align this International document with the national strategy.	Yes, in recent years, CONANP has increased jaguar conservation and monitoring efforts.	Jaguar is a priority species; the government has endorsed agreements produced by the National Alliance for Jaguar Conservation. General Wildlife Law (2000) and its Regulation. Environmental Protection-Wild Flora and Fauna Species Native to Mexico NOM - 059-SEMARNAT 2001, Indefinite Ban for the use of the Jaguar 1987.	Currently, there are efforts to incorporate biodiversity conservation and sustainable use into different sectors (e.g., agroforestry, ecotourism).	Since 2011, the project "Conservation and Sustainable Use in the Selva Maya" has been operating. Under this project, key governmental and civil society actors are carrying out coordinated measures for the protection and sustainable use of biodiversity and natural resources in the Selva Maya. The program operates in Belize, Guatemala, and Mexico, where it cooperates with the institutions responsible for the protected areas, as well as with other governmental and civil society organisations whose aims include the protection and sustainable use of the Selva Maya. National counterparts are the Forest Department in Belize, the national nature conservation authority CONAP in Guatemala, and the national nature

Country	Element				
	National jaguar strategy	**PA system support to jaguar conservation (incl. 'border PAs')**	**Conservation-specific laws, regulations and related enforcement**	**Mainstreaming into macro- and sectoral-level policies / plans**	**National-level support to transboundary cooperation processes**
					conservation authority CONANP in Mexico.
Nicaragua	No	X	X		Bi-national Honduras connectivity issues communicated visually and in reports to Ministry in 2017 and activites to preserve connectivity planned for 2018-19. The relevant indigenous governments are on board, and Ministry and indigenous groups are working together to defend the Nicaraguan side of Transfronteriza Biosphere Reserve through patrols and livelihoods projects (i.e., cattle and agroforestry cacao with conservation commitments).
Panama	Yes (2011)				
Paraguay	The National Jaguar Plan-Paraguay (2017-2026), co-authored by WCS and Ministry of Environment. The plan includes, *inter alia*, step-by-step guidance on use of WCS jaguar-cattle mitigation tool.	X	10-year Jaguar Management Plan 2017-2027. Law 5302/14 "*Of Panthera onca conservation*", but still lacks specific regulations needed to be fully functional. In progress. Signatory CMS, inclusion jaguars AI & II in 2020		
Peru	Planned for 2020 according to Serfor (Ministry of Agriculture).	X		Drafted a proposal for a Jaguar Agreement under CMS framework to be developd and submitted with other CMS parties member from the species distribution range. Drafted the proposal for a Jaguar Agreement under CMS framework that was submitted.	Broad coordination efforts underway on the Bolivia-Peru border, including protected areas and biodiversity conservation. Socialize and implement the strategy on prevention, control and sustainable management of forest, wildlife and hydrobiological resources in the Peru-Colombian border integration zone.
Suriname			Jaguar classified as endangered.		

Country	Element				
	National jaguar strategy	PA system support to jaguar conservation (incl. 'border PAs')	Conservation-specific laws, regulations and related enforcement	Mainstreaming into macro- and sectoral-level policies / plans	National-level support to transboundary cooperation processes
Venezuela					

(3) Demonstration and scaling of conservation-compatible sustainable development models in JCUs and corridors, in (A) Single countries and (B) Transboundary landscapes

Baseline and gaps

A. Single country

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
Argentina	Atlantic Forest Iguaçu JCU	A *Priority Landscape for Jaguar Protection* (PLJP) was designed, defining nine landscape categories and five key corridors.	Priority Landscape for Jaguar Protection (PLJP) taken as input for developing the Misiones Provincial Forest land Zoning Plan.	Baseline human-wildlife conflict map and baseline conflict perception analysis conducted.	Regular awareness work, including nine campaigns (2007-2017) within Argentine fraction of JCU.				FVS/WWF and environmental authority (Misiones Ministry of Ecology) strengthen anti-poaching planning and patrolling with ongoing systematized monitoring of results. Focus on jaguar-critical Northern block of PLJP.
Belize	Two JCUs, a portion of tri-national Selva Maya and the Maya Mountains, and an effort to keep the two connected through Central Belize Corridor (aka Maya Forest Corridor)	University of Belize's Environmental Research Institute (ERI) and Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development are working together towards sustainable productive landscapes.	Efforts underway to secure protection for the Central Belize Corridor (aka Maya Forest Corridor). Belize's Cabinet recently recognized and endoresed the need to protect this Corridor.	Jaguar Conflict Officer established within the Ministry of Environment (Government of Belize / Panthera).	Jaguar conservation touches on numerous local cultural and ecological issues such as environmental perceptions, conservation planning and local decision-making, power relations between locals and national authorities, and		Jaguars play an important role in Belize's nature based tourism industry, starting at Cockscomb Basin Wildlife Sanctuary, but with nation-wide impacts. Shade cacao projects are also contributing to forest conservation.		

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
		National Jaguar Working Group and National Monitoring Program (Government of Belize).			ecotourism opportunities.				
Bolivia	Five JCUs in the: (1) northern Pando Department bordering Brazil; (2) western Bolivia bordering Peru and running south along the Tropical Andes and foothills to Amboro; (3) southern Bolivia in Tarija and bordering Argentina; (4) Gran Chaco bordering Argentina and Paraguay; and (5) eastern Bolivia bordering Brazil.	Variable. Landscape conservation model in the Greater Madidi-Tambopata Landscape. Partnerships include national protected areas and systems, local protected areas, local governments, and a suite of indigenous organizations and territories. Not as explicit in the other JCUs in Bolivia, although landscape planning history in the Chaco is relevant.	Variable. Landscape conservation–and specifically jaguar conservation–needs to be built into protected area and indigenous territory planning mechanisms, as well as municipal protected areas in western Bolivia and the Chaco. Less evident in northern, eastern and southern JCUs.	Increased frequency of reports may link to recovering jaguar populations in combination with creeping expansion of agriculture. Major issue in Bolivia is International Wildlife Trade, where parts from around 200 jaguars have been documented from mid-2014 onwards. This activity is linked to conflict because actors who previously did not retaliate against livestock losses, now may act given additional financial incentives.	Publications, posters, and presentations locally, as well as specific incorporation into planning documents. National and urban outreach mechanisms such as Identidad Madidi. Contribution of the value of Indigenous territorial management also systematized and enacted.	Variable. Capacity building efforts with national protected areas and indigenous organizations including a wide range of issues linked to territorial management and governance as well as planning, monitoring, and applied research evident in western Bolivia, less evident in other JCUs.	Variable. Communities supported in sustainable natural resource management in western Bolivia (WCS). Best practices in cattle ranching include the need to refrain from retaliatory killing of jaguars, reducing jaguar-livestock conflict in eastern Bolivia (Panthera, WWF).	None.	Jaguars are part of justification for recent creation of significant municipal protected areas in eastern and western Bolivia, as well as within the management plans for other protected areas.
Brazil	Pantanal JCU						In the Pantanal of Mato Grosso		

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
							state, ecotourism guides and outfitters work together to establish safe and ethical jaguar viewing standards (Panthera / Mato Grosso state tourism agency, Ecopan). Oncafari/Mato Grosso do Sul state Brazil, pioneers in jaguar viewing experiences.		
	Central Amazon Biosphere Reserve and Rio Negro Watershed	WWF, WCS, ICMBio/CENAP, Mamiraua Institute, and Panthera constitute the Aliança Onça-Pintada aimed at coordinating efforts in jaguar conservation in Brazil's central and western Amazon.		Several hundred questionnaires conducted across 8,000 km² of riverside communities in central Amazon. Adequate level of focused pilot interventions still need to be executed/pending, in need of support.	Environmental education and competitions executed by Instituto Mamiraua with faculty of University of Sao Paulo.		There is a program in Mamiraua Sustainable Development Reserve in which tourists stay in high-end lodging and track jaguars with radio collars in the flooded forest.		The protected area complexes and adjacent indigenous territories on the Brazilian Amazon constitute some of largest wild and protected areas on the planet, but may need effectiveness raising.
Colombia	San Lucas JCU						Improved sustainable livelihoods, including small-scale coffee growers who respect jaguar habitat receive a 10% premium for their product with		San Lucas region designated as an Integrated Management district–a soft protected area, in a region that is a key stepping stone for the jaguar corridor

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
							a jaguar seal (Panthera).		(National Parks Unit, Panthera, WCS).
	Orinoquia		Regional Orinoquia JCU involving various institutional and private partners (Panthera, TNC).						
	Putumayo Tri-national Landscape				Community-based monitoring, and local school functions as pilot to refine methodologies and generate lessons (WWF).				
	Country wide			Thirty anti-predation model ranches throughout the country established to promote strategies of coexistence between livestock production systems and jaguars (Panthera).		Local and regional environmental authorities' aguar conflict response teams (GRECO) established (Government CARS, Panthera).			
Costa Rica		Jaguar Conservation Status document with prioritization of areas for conservation and monitoring (JICA, Government of Costa Rica, several partners).	Several official biological corridors include the jaguar as a conservation target (Corridor Committees, Government of Costa Rica).	Multi-institution publication of methods for constructing and maintaining jaguar- and wildlife-friendly roads (Panthera, others,		Twenty-eight wildlife officials trained and mitigating cat-cattle conflicts nationwide (Government of Costa Rica and Panthera).	Government of Costa Rica is developing an incentive for landowners that protect biodiversity and key species including the jaguar.	Costa Rica has increased forest cover in the last two to three decades by more than 50% (Forestry Law, Payment for Environmental Services, Gov of	

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
				Government of Costa Rica).				Costa Rica, general public).	
Ecuador	Putumayo (Cuyabeno)				Community-based monitoring helps build capacity of indigenous peoples for territory control (WWF).				
	Country-wide appraisal completed, maps available as part of national plan (2015).	Ministry of the Environment and WCS have identified jaguar landscapes on both sides of the Andes.	Ministry of the Environment and WCS working on the implementation of El Pambilar-Cotacachi-Cayapas corridor, Llanganates-Yasuni corridor, and Cuyabeno-Yasuni corridor.	WCS has been working on community-based wildlife management and reduction of human-wildlife conflict injaguar landscapes on both sides of the Andes.	Since 2012, WCS has been implementing Jaguars Forever environmental education program with local communities in both sides of the Andes.	Since 2001, WCS has been training protected area staff, local government officials, and local community members in wildlife monitoring, wildlife management, and conflict reduction.	Ministry of the Environment expanded Cotacachi-Cayapas Ecological Reserve in northwestern Ecuador to increase area and connectivity in key jaguar landscape.		
French Guiana	Amazonian NP			Work underway, including inquiries to monitor attacks on livestock and relocation efforts. A guide for human and jaguar co-existence has been developed (Ministry of Environment, ONCFS).		Ongoing research using camera traps (de Thoisy) and telemetry (Berzins) are building capacity.	High potential.		
Guatemala	Maya Biosphere Reserve (MBR) portion of tri-national Selva Maya JCU, which	For 25 years, WCS has engaged with forest communities in	Currently limited to certified timber and non-timber forest extraction practices	Working with the Ministry of Ranching and Agriculture to support	The WCS Jaguars Forever curriculum has been employed in Quiche Maya	Working with communities on economic alternatives that use timber and	Jaguars combine with pyramids and world class birding for high levels of nature	Active and protected area law enforcement in the MBR, has led to the	Advising and supporting protected area law enforcement, including through

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
	is Mesoamerica's largest JCU.	the Maya Biosphere Reserve to preserve forests and wildlife. In this 21,000 km² Biosphere Reserve, there are Alliances with the National Council of Protected Areas (CONAP), the Ministry of Ranching and Agriculture, numerous community forest concessions, and national police and military forces as well as national judicial system to protect jaguar habitat (WCS). Fresh water approach: integrated river basin management focused on water recharge zones, forests and protected areas (WWF).	resulting in documented jaguar and prey conservation. Substantial pilot projects with Ministry of Agriculture (hundreds of small producers and over 200,000 ha) on how to better manage livestock while maintaining forest cover. Need to scale up.	innovations that reduce deforestation and reduce human/jaguar conflict (WCS).	and Ladino communities on southern edge of MBR (WCS).	non-timber products and tourism to create incentives for forest and wildlife conservation, accompanied by requirements to conserve (WCS).	based tourism in the MBR. Community forest concessions.	expulsion of illegal deforesting occupants within the protected area, and effective prosecution, resulting in the restoration of over 120,000 ha of deforested lands, also silvo-pastoral systems with small livestock producers	the implementation of SMART; monitoring jaguar populations (WCS).
Guyana									
Honduras	Honduran Moskitia portion of bi-national with Nicaragua.	Additional support from multiple sources for collaborative	Multi-sector integrated planning and coordinated	Panthera has worked extensively on human-jaguar	WCS has supported Jaguars Forever environmental	Capacity building in Honduras started with WCS supported	WCS has engaged with the discoverer of an ancient "Lost	Re-introduction of collared peccaries in Jeanette Kawas	WCS and multiple government and indigenous

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
		agency/indigenous institutions anticipated (WCS, Panthera).	actions at the level needed and has occurred in some corridor areas, and pending in others. Potentials include promoting carbon storage in natural forest, agroforestal and silvopastoral systems and expanding eco-tourism in Moskitia uplands.	coexistence in much of the corridor. WCS supported the initial workshops 2008, 2009 that launched that work. In the more remote areas of Moskitia, progress has been slow, although WCS and the National University of Agriculture are working with ~ 100 small livestock operation in Moskitia, with technical assistance for improved production linked to forest conservation. Jaguar friendly farms (Panthera, Lacthosa S.A.).	education in several locations in Moskitia. Panthera works extensively on communication at national and local levels. WCS has elevated conservation urgencies through international media. WCS is engaging with small producers in Moskitia.	workshops in camera trapping (2007), environmental education (2007-2010), and rancher outreach and conflict mitigation (2008-09). Panthera has done an impressive job on expanding upon that. Both institutions have trained Honduran students and government personnel. However, in more remote areas, capacity still lags.	City", and is working with a broad suite of actors to increase tourism potentials in uplands of Moskitia. WCS and American Bird Conservancy are working together to enhance birding opportunities. Promoting agroforestal (cacao) and silvopastoral systems in partnership with private enterprises and local universities. WCS is engaging with producers and vendors of high quality cacao from Moskitia to promote agroforestry systems for connectivity.	(Panthera, Gov of Honduras).	institutions are developing an action-focused alliance for La Moskita. Despite this initiative, significant gaps remain in effectiveness of protected area enforcement. Training and support to protected area law enforcement and monitoring using SMART working with government and local people (WCS, Panthera).
Mexico	Yucatan Peninsula	There are several organiations colaborating in sustainable land management, sustainable agriulture and	Corridos have been identified for this region.	There is a national Protocol to address conflicts by cattle predation. Organizations addressing the	Environmental education activities implemented by several organizations and government	SMART is being piloted in Tabasco and the Selva Maya (Panthera, CONANP).	Some organizations are working in the promotion of sustainable activities with local	"Cero deforestation" goal. Some organisations are implementing restoration and	

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
		livestock (CONANP, state govererments, NGOs).		topic at local level (WWF-UNAM, Pronatura Península de Yucatán, Panthera, Biocenosis others).	institutions (CONANP, Pronatura Península de Yucatán, WWF-UNAM, others).		communities, including ecotourism, honey production, chewing gum, sustainable agricuture and cattle management, handcrafts, others.	reforestation programs (i.e., Pronatura Península de Yucaán).	
	Mayan Rainforest	WWF plan to implement tri-national jaguar conservation program in Mayan Rainforest (2019).	Jaguar and prey monitoring; priority corridors; best practice and human-jaguar conflict reduction.	Baseline to be defined and best practices to be implemented accordingly.	Public awareness of jaguar's importance for human well-being.	SMART and Conservation Assured to help protected area management.			
Nicaragua	Nicaraguan portion of bi-national JCU	In a 14-year alliance with indigenous territories key for Nicaragua-Honduran bi-national connectivity, WCS has promoted protected area patrols, improved livestock management, and environmental education. Global Wildlife Conservation has worked in close alliance with indigenous authorities in	Progress remains to be made. Global Wildlife Conservation allied with Nicaragua's leading beef producers in an effort to influence land management and conservation practices at the national level, but progress is currently stalled.	Considerable work remains to be done on human-jaguar conflict reduction. WCS has worked in systems with pigs and calves and is currently engaged with 45 small producers in the Bosawas Biophere Reserve.	WCS has delivered the Jaguars Forever curriculum in indigenous territories and conducts outreach with indigenous communities, but there is more to be done.	WCS's history started with participatory research conducted in collaboration with indigenous personnel. Those para-biologists are core to project operations in Bosawas. In addition, WCS has conducted SMART training workshops with government and indigenous personnel. Global Wildlife Conservation works closely	WCS has been working with the American Bird Conservancy to promote ecotourism and are working together on sustainable cacao production. WCS is also working with small livestock operations for improved protection in smaller spaces and commitments to forest and wildlife conservation.		In areas where existing protected areas are threatened and diminishing in size, defense of existing protected areas is more important than an effort to expand. WCS has been working with indigenous and national authorities to better defend the JCU in northern Nicaragua. Global Wildlife Conservation has worked closely with indigenous park guards to

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
		southern Nicaragua in many of the same issues.				with indigenous authorities and communities in southern Nicaragua, and has refined indigenous based SMART patrols in southern Nicaragua to a high degree.			defend the JCU in the south. Advising and supporting protected area law enforcement, including through the implementation of SMART (Local indigenous governments, GWC, Panthera).
Panama				Resolving cat-cattle conflict through the application of anti-predation techniques in farms (Panthera).	Environmental education programs for school students in jaguar corridor areas (Panthera).				
Paraguay	Gran Chaco	Work with ranches from 3,000-45,000 ha in size, cattlemen's association, Ministry, University, and large Mennonite communities.		WCS has a three-pronged conflict reduction program covering: (i) jaguar monitoring; (ii) installation of non-lethal control measures to deter predation; and (iii) education/ awareness raising. Ministry of Environment is involved. Work is developed thoughout the Chaco region, with high success in recruiting	Conducting Jaguars Forever curriculum in Mennonite communities and large ranches.	Direct links with ranching community through the largest and most influential cattlemen's association in the world's sixth largest beef exporter. Working with National university and Ministry developing biological monitoring capacity.			WCS working with Ministry of Environment to monitor jaguar populations in the largest Chacoan protected area, the Defensores del Chaco National Park (720,000 ha). In addition, WCS works with Colorado State University in park guard training.

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
				interested ranchers. Thirteen ranches >200,000 hectares involved as of September 2018.					
Peru					Raising awareness on illegal wildlife traffic has been included as part of implementation of National Strategy to Reduce Wildlife Trafficking.	Workshops aimed to enhance local law enforcement specialists capabilities on wildlife interventions, management and normatives.			
	(O) Ecuador-Colombia-Peru; (Q) Bauaja Sonene-Madidi FSC Forestry concessions.	WWF conducted a baseline of jaguar populations and prey on (O) transboundary landscape (results in process). In southwestern Amazon, San Diego Zoo Global in collaboration with WWF has established a baseline of jaguar populations in FSC Forestry Concessions which are key areas in terms of connectivity.	At (O) WWF has started the implementation of a strategy to ensure connectivity to jaguars including protected areas and indigenous territories.	San Diego is leading a baseline on human wildlife conflicts in southwestern Amazon.	WWF is working with the Ministry of Environment to raise awareness about threats to jaguars and their prey.				
Suriname									

Country	JCU	Element							
		Landscape-level action planning and partnerships / coordination	**Mainstream-ing and planning actions in corridors / landscapes**	**Human / wildlife conflict reduction**	**Local-level awareness raising**	**Local-level human and institutional capacity building**	**Sustainable livelihoods**	**Ecological restoration**	**PA expansion & effectiveness raising**
Venezuela				Large working model ranch Hato Piñero in llanos has maintained jaguars and prey for two decades, due to successful ecotourism model, and forest and prey protection.	WCS worked with indigenous communities of Upper Caura, Orinoquia> 10 years on wildlife management.	On a local level jaguars are tolerated on ~ 120,000 ha of ranchland in central Llanos. Indigenous para-biologists in Upper Caura conducted field work and presented in international forum.	Broad based nature tourism (including jaguars) to increase tolerance of local communities for living with jaguars.		

B. Transboundary JCUs and landscapes

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	**Mainstreaming and planning actions in corridors / landscapes (3.2)**	**Human / wildlife conflict reduction (3.3)**	**Local-level awareness raising (3.4)**	**Local-level human and institutional capacity building (3.5)**	**Ecotourism & sustainable livelihoods (3.6)**	**Ecological restoration (3.7)**	**PA expansion & effectiveness raising (3.8 & 3.9)**
Colombia-Ecuador-Peru	Multiple.	In 2016, WCS, WWF and Panthera published the proceedings of the workshop Planning Jaguar Conservation in the Amazon (WCS et al. 2016). WWF undertaking transboundary jaguar surveys to guide actions and planning beyond protected areas.		The Panthera project (2018-2020) "Building international capacity and transnational networks to counter big cat trafficking" is developing an Andean hub to improve capacity to counter wildlife trade (CWT) and a transnational intelligence hub to feed actions that combat illegal jaguar trade.	WWF Northern Amazon Programme working in the area to raise awareness of local and indigenous communities on jaguars and other wildlife, also through participatory monitoring.	WWF Northern Amazon Programme working on strengthening governance and participation in natural resources management and decision-making.			The area of Lagartococha in the Ecuador-Peru border has been designated as a Ramsar Site, increasing protection in eastern Cuyabeno Wildlife Reserve (Ecuador) and Güeppí-Sekime National park (Peru).
	Northern Amazon	WWF is working on a Northern Amazon Regional assessment and strategy. WWF conducts a baseline of jaguar populations and prey (Fig. 8, site O; in progress).							
Selva Maya									
Atlantic Forest									
South western Amazon (Acre, Pando, Peru)									

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	**Mainstreaming and planning actions in corridors / landscapes (3.2)**	**Human / wildlife conflict reduction (3.3)**	**Local-level awareness raising (3.4)**	**Local-level human and institutional capacity building (3.5)**	**Ecotourism & sustainable livelihoods (3.6)**	**Ecological restoration (3.7)**	**PA expansion & effectiveness raising (3.8 & 3.9)**
Bolivia and Peru	Greater Madidi-Tambopata Landscape in northwestern Bolivia and southeastern Peru (Note: this is one of five JCUs defined in Bolivia's draft National Action Plan, all five of which are already or would be binational JCUs).	Landscape conservation model in the Greater Madidi-Tambopata Landscape, including integrated planning between actors in Bolivia and Peru and between countries. Partnerships include national protected areas and systems, local protected areas, local governments, and in Bolivia, a suite of indigenous organizations and territories.	Landscape conservation, and specifically jaguar conservation needs, built into protected area and indigenous territory planning mechanisms, as well as municipal protected areas. Binational planning efforts, although incipient, to specifically consider key species, including jaguars.	Not a major issue in the landscape, however, increased frequency of reports may be linked to recovering jaguar populations in combination with creeping expansion of agriculture. Major issue in Bolivia is International Wildlife Trade, where around 200 jaguars have been documented from mid-2014 onwards. This activity is linked to conflicts because actors who previously did not retaliate against livestock losses, now may act given additional financial incentives.	Publications, posters, and presentations locally, as well as specific incorporation into planning documents. National and urban outreach mechanisms such as Identidad Madidi in Bolivia and Bahuaja Sonene Conoce Inspira in Peru. Contribution of the value of Indigenous territorial management also systematized and released.	Comprehensive capacity building efforts with national protected areas and indigenous organizations including a wide range of issues linked to territorial management and governance as well as planning, monitoring and applied research.	Over 100 communities supported in sustainable natural resource management projects involving timber management, cacao production, palm frond collection, essential oils production, spectacled caiman harvest, shade-grown coffee, incense harvest, ecotourism and handicrafts (WCS). Best practices in cattle ranching, including the need to refrain from retaliatory killing of jaguars and reducing jaguar-livestock conflict (WWF).	None.	50,000 ha municipal protected area created as a result of jaguar camera trapping efforts at Alto Madidi. Jaguars were part of justification for development of priority management plans for othermunicipal protected areas in the landscape.
Honduras-Nicaragua	Corazon del Corredor/ Tranfronteriza/ Moskitia. This is the second largest	Landscape level action planning, partnerships, and coordination are being	Working on carbon storage, cacao production, and improved	WCS and collaborators working with Darwin funds to reduce conflicts		WCS continues to work in alliance with indigenous communities	Promote shade cacao, promote agroforestry systems, and promote bird	Design jaguar friendly production systems and reforestation	Train and support SMART based protected area patrols, and subsequent

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	**Mainstreaming and planning actions in corridors / landscapes (3.2)**	**Human / wildlife conflict reduction (3.3)**	**Local-level awareness raising (3.4)**	**Local-level human and institutional capacity building (3.5)**	**Ecotourism & sustainable livelihoods (3.6)**	**Ecological restoration (3.7)**	**PA expansion & effectiveness raising (3.8 & 3.9)**
	JCU in Mesoamerica.	initiated with a Honduran "Alianza para La Moskitia". On the Nicaraguan side, WCS has a deep and strong alliance with the indigenous territories, and additional Ministry support is being developed. WCS is developing partnerships with cacao producers and vendors to maintain forest cover.	livestock management systems.	with ~ 140 small livestock operations in this area.		and authorities developing capacity for patrols, training and supporting government technicians in SMART methods, and developing capacity to prosecute environmental crimes.	and nature focused tourism.	projects to restore and promote connectivity in strategic areas needed to keep bi-national connectivity intact.	prosecution of environmental crimes.
Mexico, Guatemala, Belize	Selva Maya JCU shared between southern Mexico, northern Guatemala, and northwestern Belize (and could consider Maya Mountains JCU in Belize and the Central Belize Corridor connecting the two). This is the largest JCU in Mesoamerica.	Concept explored–needs high-level endorsement from all three countries.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.	See Guatemala, MBR, and Belize sections above.
French Guiana, Suriname, Guyana,	Transboundary upper Amazon-Central Amazon,	In 2016, WCS, WWF and Panthera	Pending.	Yes, details pending.	Yes, details pending.	Yes, details pending.	Yes, details pending.		Yes, details pending.

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	Mainstreaming and planning actions in corridors / landscapes (3.2)	Human / wildlife conflict reduction (3.3)	Local-level awareness raising (3.4)	Local-level human and institutional capacity building (3.5)	Ecotourism & sustainable livelihoods (3.6)	Ecological restoration (3.7)	PA expansion & effectiveness raising (3.8 & 3.9)
Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil	Guianan Shield/Nine Country JCU. One large transboundary JCU includes lowland Bolivia, sections of the Peruvian Amazon, Ecuadorian Amazon, Brazilian Amazon, Colombian Amazon, possibly grading into Orinoquia, southern Venezuela southern Guyana, and most of Suriname and French Guiana.	published the proceedings of the workshop Planning Jaguar Conservation in the Amazon (WCS et al. 2016).							
Bi-National Bolivia-Paraguay	Gran Chaco is the ecological crossroads between Pantanal and Amazon, and is considered high priority.	In 2012 WCS published the results of a workshop titled “El future del jaguar en el Gran Chaco”, with input from Bolivia, Paraguay, and Argentina. However, much more needs to be done to link conservation efforts across the Paraguay-Bolivia border – in protected		Relatively sophisticated work is being conducted on human-jaguar conflict in the Paraguayan Chaco. There are some model ranches in the Bolivian Chiquitano with jaguar focused tourism.		WCS has trained park guards in both countries, and more needs to be done. Awareness of coexistence tools has been elevated in both countries, with WCS in Paraguay and Bolivia, and Panthera in Bolivia.	Working on environmentally sustainable, high-quality beef production in Paraguay.		Bolivian Chaco includes enormous protected areas–including Kaa Iya 35,000 km², and Otuquis 8,000 km². Paraguay also has considerable private protected areas, including the 7,000 km² Defensores. However, also

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	**Mainstreaming and planning actions in corridors / landscapes (3.2)**	**Human / wildlife conflict reduction (3.3)**	**Local-level awareness raising (3.4)**	**Local-level human and institutional capacity building (3.5)**	**Ecotourism & sustainable livelihoods (3.6)**	**Ecological restoration (3.7)**	**PA expansion & effectiveness raising (3.8 & 3.9)**
		areas and private lands.							extensive undeveloped private land which is vulnerable to cattle ranching expansion. Thus integrated national and bi-national level planning and execution is important.
Bi-National Nicaragua-Costa Rica Rio San Juan/Indio Maiz-Tortuguero	This is the 5th largest wilderness in Mesoamericaand the sixth largest JCU. The Indio Maíz Biological Reserve is one of Nicaragua's largest reserves. Continguous with Costa Rican protected areas, including Tortuguero National Park, renowned for its sea turtle nesting beaches, the Indio Maiz-Tortuguero is one of Mesoamerica's significant transboundary areas for jaguars.	The bi-national, biological corridor San Juan-La Selva connects the Costa Rican lowlands adjacent to Nicaragua to montante forest deeper in the Costa Rican interior. From those mountains and Braulio Carrillo National Park, and the Reserva Forestal Cordillera Volcanica Central, the Barbilla jaguar sub-corridor facilitates connectivity with the Reserva Forestal Rio Pacuare and the		See Costa Rica in section A for innovations with outreach to improve human-jaguar coexistetne.		Panthera works at a Costa Rica national level training students and agency personnel in co-existence and jaguar monitoring. Global Wildlife Conservation works closely with the Rama Kriol indigenous of Nicaragua, whose titled territory eclipses the Nicaraguan side, with an emphasis in capacity building for SMART based patrols/monitoring, and trained parabiologists.	Tortuguero, world renown for its green turte nesting congregations has also become known for high visible jaguars prowlingthe beach and sometimes eating turtles.		WCS training SINAC park guards in SMART. Global Wildlife Conservation works with indigenous park guards to defend Indio-Maiz in Nicaragua.

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	**Mainstreaming and planning actions in corridors / landscapes (3.2)**	**Human / wildlife conflict reduction (3.3)**	**Local-level awareness raising (3.4)**	**Local-level human and institutional capacity building (3.5)**	**Ecotourism & sustainable livelihoods (3.6)**	**Ecological restoration (3.7)**	**PA expansion & effectiveness raising (3.8 & 3.9)**
		Barbilla National Park, northern limits of the Talamanca Range, achieving connectivity fromNicaragua to Panama.							
Bi-National Costa Rica-Panama-Talamanca Amistad	This is the 4th largest wilderness area in Mesoamerica and the fith largest JCU. The La Amistad International Park is a World Heritage Site and one of Central America's best examples of transboundary conservation, incorporating strict protection and multiple use forest management by indigenous communities.	Multinstitutional effort called "Vision Talamanca" being spearheaded by Costa Rica por Siempre, Global Wildlife Conservation, Wildlife Conservation Society, SINAC for binational action planning and sustainable financing for critical conservation actions.	The Amistad National Park Management Bi-national Executive Technical Unit (UTEB-PILA) was created in 2009 for binational coordination of the La Amistad World Heritage site.	Yaguara, ProCAT.			There has been a pioneering effort at jaguar friendly coffee on the slopes on the Tamananca range in Costa Rica.		WCS training SINAC park guards in SMART.
Bi-National Panama-Colombia Darien-Choco	The Darién Gap is a 160 km long swath of undeveloped forest and wetlands within Colombia's Chocó Department in South America and Panama's Darién Province in Central America. The Darien Gap represents the only			Yaguara	Yaguara works in schools, communities, and at a national level in Panama elevating the profile of jaguars, their threats and how to conserve them.	Yaguara is conducting multi-species large mammal research in the Darien, training students, and local para-biologists.			

Countries	JCUs / landscapes	Element							
		Landscape-level action planning, partnerships and coordination	Mainstreaming and planning actions in corridors / landscapes (3.2)	Human / wildlife conflict reduction (3.3)	Local-level awareness raising (3.4)	Local-level human and institutional capacity building (3.5)	Ecotourism & sustainable livelihoods (3.6)	Ecological restoration (3.7)	PA expansion & effectiveness raising (3.8 & 3.9)
	break in the Pan-American Highway, making it impossible to cross between South America and Central America by road. This remote area hosts wildlife rare for Mesoamerica such as the harpy eagle and bushdog, yet is increasingly exposed to deforestation, illegal wildlife harvests, and timber trafficking.								

(4) Enhancing the financial sustainability of systems and actions to conserve jaguars and associated ecosystems

Baseline and gaps

Country	Element			
	Environmental economic rationale for conservation	**Financial sustainability plan**	**Mobilization of financial resources**	**Emerging conservation financing mechanisms**
Argentina				
Belize			Belize Government plans to support jaguar conservation efforts via both its GEF 6 and 7 allotment as well as via the country's BIOFIN and REDD+ initiatives.	
Bolivia		Working with SERNAP for financial sustainability of Bolivia's protected areas as well as specific plans for Madidi, Pilon Lajas, and Apolobamba, as well as with three indigenous organizations. In the Gran Chaco, historically worked with SERNAP to develop financial sustainability of Kaa-Iya National Park.	SISCO or protected area fees already in place in Madidi and around half of protected areas across Bolivia. Noel Kempff Mercado National Park has early REDD fund though this is currently paralyzed. Kaa-Iya and CABI indigenous organization with some sustainable funding from hydrocarbons. Madidi has dedicated Trust Fund through online auction of scientific name for newly discovered primate.	Higher end tourism mechanism linked to sports fishing and wildlife observation in several Bolivian protected areas. Bolivia still seeking to implement REDD+ style national system for climate change mitigation with multi-year delays.
Brazil	A rapid estimate of the economic value of some prominent ecosystem services generated from jaguar habitat in Brazil alone exceeds $4 billion a year, including hydropower generation, livestock and agriculture, and tourism in the Amazon basin and Pantanal (See Endnote #10 for reference).	Establish a cooperation with the national government towards a long-term monitoring program supported by Arpa program (WWF).	WWF network has recognized jaguars as a priority species and offices in Europe are starting to fundraise for projects in South American countries.	See below.
Colombia	San Lucas			Conexion Jaguar Project. www.conexionjaguar.com Panthera, ISA, and south Pole constitute this carbon bonds project that channels payment for standing forests with jaguars and regeneration plots. Two sites in Colombia are currently operating, as well as one in Peru and one in Brazil.
Costa Rica				
Ecuador				
French Guiana				
Guatemala				Certified sustainable timber extraction has contributed to jaguar conservation, providing incentives and controls that

Country	Element			
	Environmental economic rationale for conservation	**Financial sustainability plan**	**Mobilization of financial resources**	**Emerging conservation financing mechanisms**
				maintain forest and prey, as documented by publications in Biological Conservation and Ambio.
Guyana				
Honduras				Working towards integrated cacao markets and jaguar conservation, including elevated nature based tourism in Moskitia.
Mexico			GEF project including jaguars; the Fondo Patrimonial de Biodiversidad is a PES program designed around jaguar habitat in Jalisco and Nayarit. CONANP has a subsidy program each year that supports conservation outreach, restoration and monitoring programs. That program integrates local communities in order to increase the interest and participation of society in conservation efforts.	
Nicaragua				
Panama				
Paraguay				Jaguar-friendly beef or jaguar-friendly certification is starting to be preliminarily explored by WCS and colleagues. A price increase due to being Wildlife Friendly would be a decisive step in jaguar conservation, but beef markets may still be reluctant to pay.
Peru				See above.
Suriname				
Venezuela				

Appendix 1: JAGUAR 2030 New York Statement

JAGUAR 2030 New York Statement

We, the attendees of the Jaguar 2030 High-Level Forum, 1 March 2018, representing jaguar range countries and international and national partner organizations, having come together to discuss the status and future of the jaguar with the shared goal to ensure more effective collaboration within and between range countries and partners:

Convinced in the central role that this apex predator has in maintaining natural landscapes, including within and across protected areas and biological corridors, and within broader efforts to ensure effective natural resource management, strengthen community livelihoods, and achieve the 2030 Agenda, the Strategic Plan for Biodiversity 2011-2020, and the Aichi targets;

Recognize the intrinsic value of jaguars and the biological diversity of jaguar landscapes, and that healthy jaguar populations are an indicator of sustainable ecosystems and the ecological services such systems provide for human well-being;

Note that efforts to protect jaguars and their range help to advance broader conservation and climate objectives in line with commitments made by all range countries through international environmental agreements, including: the Convention on Biological Diversity, the UN Framework Convention on Climate Change, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the Convention on Nature Conservation and Wildlife Preservation in the Western Hemisphere;

Acknowledge that jaguars and other fauna and flora are an irreplaceable part of the Earth's natural systems which must be protected for current and future generations, and Note the power of the jaguar as an umbrella species that advances broader biodiversity conservation objectives and the Sustainable Development Goals (SDGs);

Affirm the value of the jaguar as a significant cultural icon and key feature of past, present, and future national heritage throughout its range in the Americas, including for indigenous and local communities, and society more broadly;

Note with concern that the jaguar has lost nearly 50% of its former range and is already extinct in two former range countries; jaguar range continues to decrease; and human-caused mortality is affecting the health of core populations;

Remain fully aware that there are many common threats to jaguar populations, including habitat fragmentation, loss, and degradation; prey depletion; hunting of jaguars for sport, tradition or to protect livestock; and illegal trade in jaguar parts;

Recognize that jaguars can co-exist with people in human-dominated landscapes with minimal conflict; and practical solutions to minimize jaguar conflict can be implemented with little cost to landowners, while providing economic benefits;

Acknowledge that the long-term survival of the jaguar requires better protected core populations and movement continuity to ensure genetic connectivity, including through more efficient management of protected areas, reducing habitat loss, use of innovative financial tools and policies, and strengthened legal enforcement and rule of law;

Support ongoing efforts made by range country governments and partners to develop jaguar conservation plans that help protect core population strongholds and secure corridors between them, including jaguar-specific conservation strategies that integrate stronghold protection and corridor conservation measures into regional, national, and local land-use strategies and decision making;

Welcome regional cooperation and multi-national efforts to establish transboundary protected areas and address other issues relevant to jaguar conservation within and across national boundaries.

Given the above and our commitment to present and future generations, we, the attendees of this Jaguar 2030 Forum, **resolve** to work together to:

Promote research and **data-sharing** to support jaguar conservation and provide decision-makers, practitioners, companies, financial institutions, citizens, local communities and indigenous peoples with the data and information they need to better understand, respect, and support the role of the jaguar, its habitat, and jaguar corridors in achieving the SDGs, the Strategic Plan for Biodiversity 2011-2020 and the Aichi targets;

Increase awareness and **facilitate behavior change** among all stakeholders, including through additional comprehensive, global, regional, and local evidence-based advocacy campaigns and educational programs to support conservation of the jaguar;

Pilot, replicate, and scale-up successful integrated jaguar conservation approaches, including through initiatives that:

- mainstream biodiversity and jaguar conservation into development and sector policies, practices, and investments, including fisheries, agriculture, tourism, infrastructure, and forestry, and in this way harness nature-based solutions for achieving national and global sustainable development goals, without compromising human food security;
- help to shift social and economic incentives for land allocation, management, and restoration in ways that enhance jaguar conservation;
- strengthen capacities at all levels to secure jaguar core population strongholds and fill connectivity gaps between them, including mapping of biological corridors;
- improve jaguar-human co-existence, including addressing issues of livestock conflict and domestic animal disease transmission;
- mitigate fragmentation due to human activities; and
- prevent poaching of jaguars through effective national and international law enforcement to better respond to the trafficking of, and demand for, jaguar products;

Catalyze greater investments in nature-based solutions for development challenges by using public resources to incentivize private financing and combining domestic and international resources in tools and approaches such as payment for ecosystem services, subsidy reform, green bonds, and sustainable commodity production that generate social and economic benefits that are compatible with jaguar conservation.

Engage local communities and **indigenous peoples** as co-responsible stakeholders and partners in the above-outlined efforts to conserve jaguars and strengthen livelihoods.

To achieve these goals and objectives and to accelerate action, **we further resolve** to jointly explore collaboration options for developing and implementing a regional approach to jaguar conservation with clear coordination and financial mechanisms.

We also hereby propose the creation of an International Jaguar Day (29 November) to be observed annually with the goal of celebrating jaguars as an icon for sustainable development, raising awareness and public support for jaguar conservation, and consolidating conservation efforts by range countries and partners.

Appendix 2: Notes on calculating CO_2 emissions due to forest cover change in the Jaguar Corridor[§]

Forest loss dynamics were assessed across key jaguar conservation areas using the the Hansen Global Forest Change v1.5 dataset (Hansen et al. 2013). Initial forested area was determined using the canopy cover percentage for the year 2000 and classified as areas with tree canopy cover greater than 30%. The area of forest loss from 2001-2017 was classified as areas that were both delineated as forest (initial canopy cover greater than 30%) and classified as forest loss in the Hansen dataset (pixel showed a stand replacement disturbance during the 2001-2017 time frame). Above ground biomass (AGB) and AGB loss were calculated using the Global Forest watch ABG dataset (Baccini et al. 2017, Global Forest Watch). Initial forest AGB was estimated as the amount of AGB across the initial forested area, while AGB loss was that associated with the loss area. Emissions were estimated using the AGB loss area using similar methods to those used to produce the Global Forest Watch emissions dataset (Zarin et al. 2016). Carbon content was estimated as 50% of AGB and a conversion factor of 3.67 was used to convert metric tons of carbon to metric tons of CO_2. Initial forest area, forest loss, AGB, AGB loss, and emissions were aggregated by country and then across Jaguar Conservation Units, Jaguar Corridors, and area outside the key Jaguar conservation areas.

The calculations do not account for forest gain estimates associated with the Global Forest Change dataset. Estimates of AGB loss and emissions are considered gross estimates, assuming all of AGB loss is committed to emissions. Subsequent regrowth and associated carbon sequestration is not accounted for.

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