Keystone Species Guideline

1. KS GENERAL INFORMATION

Scientific name:	*Panthera onca* (Linnaeus,1758)
Popular name in Brazil:	Onça-pintada, Jaguaretê
Name in English:	Jaguar
Conservation Status:	Near threatened (NT - IUCN) and Vulnerable (VU - MMA, n°444/2014 - Brazil).
Distribution:	Originally the distribution of this animal took place from the southwest of the United States to the North of Argentina. Currently the jaguar is officially extinct in the United States, is very rare in Mexico, and can still be found in Latin America, including Brazil. See figure 1.
Territorial Area:	It is not possible to define a general average habitat area, since areas may range from 30 km², in the Pantanal, to 1,300 km², in the Cerrado. The smallest areas are in the Pantanal, probably because of the high availability of food
Diet:	Medium and small mammals (such as peccaries, capybara, peccaries, deer, and armadillos)
Reproduction:	Males and females interact for a few days and copulate during this period. After fertilization, gestation begins, which can last between 90 and 110 days. Usually, a jaguar gives birth to one or two cubs, and up to four may be born. The cubs stay with the mother until they are about two years old.
Trophic level:	Top of the chain - tertiary consumers.
Main threats	Regionally, jaguar populations are threatened by habitat loss and fragmentation, the decline of their natural prey, and pro-active or retaliatory killings. Jaguar killings are associated with livestock depredation, fear for human safety, competition for wild meat with human hunters, and killing for trophies/ illegal trade in jaguar body parts. Other major threats include unsustainable logging, mining, infrastructure development, disease, increased frequency and severity of fires, and ecosystem changes due to climate change[1].

[1] WWF. (2020). WWF Jaguar Strategy 2020-2030. Available at: https://wwflac.awsassets.panda.org/downloads/estrategia_jaguar_2020_2030_wwf.pdf

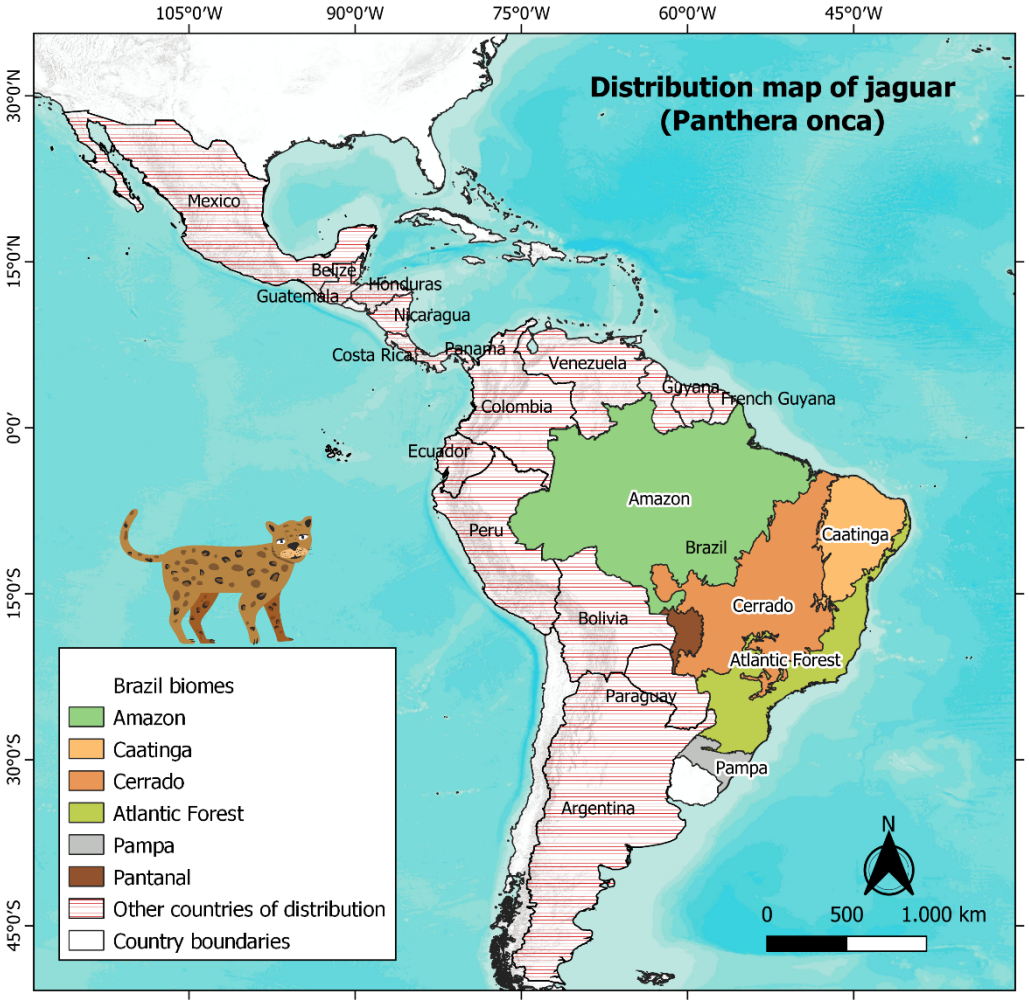

Figure 1: *Distribution map of Panthera onca.*

2. Indicators and Goals

This section describes the goals, as the importance of the strategies design for each indicator. The indicators are Keystone Species Health, Ecosystem Health and the Environmental Steward Indicator which is composed of Property Management, Social Engagement, and Financial Strategy.

Indicator	Goal
Keystone Species Health	A major concern for any conservation effort is the need for reliable information about the distribution of species and models that can explain and estimate their occurrence. Models based on presence-absence data are the standard approach to habitat modeling, and they assume that sample sites are thoroughly monitored so that the presence or absence of a species can be reliably confirmed. For example, in Brazil there are some initiatives that work in jaguar conservation, however, the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) is the government agency that builds the national strategy for the protection of the species. Therefore, the integration of data from conservation projects is essential to support the work of public strategies. Camera-trap-based (Capture-Recapture method) can provide a foundation for long-term studies of numerical trends and demographic patterns. Also, the method is important to measure the efficiency of activities related to property management and the use of the land for Jaguar conservation. The high level of capture effort refines the information about occurrences of the species in the project area. The GPS collection schedules, and time-periods provides each animal a position every half hour to one position every 24 hours. Therefore, the outlined occupancy survey provides the necessary knowledge base to target further conservation-oriented research on jaguars and their prey. Research institutions, such as WWF, indicate the monitoring of populations as one of the main strategies for the conservation of the species. For Brazilian Projects, Goal 1.8. of the National Action Plan for big cats is to identify suitable areas (protected or not) with the presence of big cats and/or potential areas of occurrence that require actions to protect and maintain the integrity and propose necessary measures to the public managers. The partnership with the scientific community can adequately direct the results of the project's surveys and monitoring, turning data into actions to support public policies.

ERA
ECOSYSTEM REGENERATION ASSOCIATES

Ecosystem Health	The Project Area in compliance with laws, statues, allied with the protection of significant surplus of vegetation helps in preserving the connectivity of habitat, including ecological corridors.
Property Management	The single most important driver of hunting and persecution of large cats is livestock depredation, resulting in economic losses to local ranchers and farmers, a conflict that generates retaliatory culls. Assessing the potential or realized costs and benefits involved in large carnivore conservation is an intractable task to be integrated into land management. Many actions can be placed to prevent forest fires, such as controlled burning, opening permanent access to water sources and firebreaks. It is important that the management of fire at the project area is done in accordance with the design of integrated fire management plans, developed by the state agencies as a regional strategy. For any controlled burning action in a rural property, it is necessary to obtain prior environmental authorization, with a responsible technical professional, from the state environmental agencies. Deforestation is the main cause that leads to biodiversity loss. When animal species that live in the forest no longer have their habitat, cannot relocate, feed, or procreate, they will certain get vulnerable and more likely to get extinct.
Social Engagement	One of main goals to jaguar conservation projects must be influence development projects (mining, infrastructure, agroindustry, cattle ranching, logging) and their financiers to adopt social and environmental safeguards that include jaguar conservation requirements. Therefore, developing social engagement activities is essential to raise awareness amongst diverse audiences and ensure the conservation of the species.

Financial Social	Implementing awareness campaigns for drivers who travel in the surroundings of the project area can reduce the loss of biodiversity and the negative impact on wild animal populations, caused by road kills on the highways of the country. A successful conservation project needs to focus on the adequate management of an area, based on practices that guarantee the occurrence of key species. It must also focus on promoting sustainable economic development and reducing conflicts and overlaps of land use. Wildlife tourism is a valid tool for species conservation. Big cats represent some of the most charismatic species appealing to a wide audience and are therefore of great value to wildlife tourism activities. Consequently, traditional communities involved with ecotourism are typically more tolerant of large cats and develop a healthy relationship that allows coexistence. Conservation outcomes effectively depend on several factors, including local community participation and appropriate local financial trickle-down. Financial and political barriers must be reduced with the implementation of the project and with the inclusion of the community, generating jobs and economic alternatives to improve the quality of life in the area.

3. KS Strategies Guideline

The five indicators presented above are described in the table below, which contains the criterion and metrics for each indicator, the activities to achieve the expected status, and the documents/material that prove the activity and scoring. The table below also shows the impact assessment using the cost, difficult to implement the strategy and the result as parameters that are calculated as an average. With the average calculate for each activity the score is estimated.

At the first monitoring report, project developers should score at minimum 20 (twenty) points of the activities listed below, being two activities obligatory: (1.1.a) Specialized fauna survey service to confirm the presence of big cats in the area; (1.4.b) Establishing evaluations of prey abundance through occupancy methods refined by more rigorous methods; and, (3.3.b) Use of remote sensing tools to identify deforestation and forest degradation.

It is expected that the project to have procedures to establish continue improvement strategies, therefore it is mandatory that the final score in the subsequent monitoring periods to be 10% higher than the period before.

ERA
ECOSYSTEM REGENERATION ASSOCIATES

Indicator	Criteria	Project Activity (Outcome)	Accepted Evidence	Cost	Difficulty	Impact		Average	Score
Keystone Species Health Indicator	1.1. Survey of the occurrence of Jaguars in the Project Area	1.1.a Specialized fauna survey service to confirm the presence of big cats in the area.	- Monitoring report from the specialized consulting company. - Camera Trap images with geolocation.	3	2	3		3	5
		1.1.b Fauna report submitted to compose the national datacenter of big cats of Host Country.	Proof of report submission and acceptance from the responsible institution (e.g., e-mail).	1	1	2		1	1
	1.2. Methods for the monitoring of the Jaguar population	1.2.a Population survey and monitoring with camera traps covering up to 10% of the project area.	Map with distribution points of the camera traps with geolocation and records captured by the traps.	2	2	1		1	2
		1.2.b Monitoring of the population with camera traps in more than 10% of the project area.		3	2	2		2	2
		1.2.c Monitoring stations based on camera traps placed on trails/trails, with stations consisting of one trap.		3	2	2		2	2

		1.2.d Monitoring stations based on paired camera traps, with stations consisting of two traps, making it possible to carry out the survey and monitoring with the capture-recapture method.		3	3	3		3	5
	1.3. Establishing a partnership with the scientific institution or NGO.	1.3.a Establishing a partnership with a scientific institution or NGO to monitor jaguars in the Project Area.	Contract or document for formalizing the partnership for monitoring and studies of large cats	1	2	3		2	2
	1.4 Monitoring the Jaguar population through telemetry methods and spatial location with GPS	1.4.a Establishing capture and collaring efforts to understand jaguar space use, ranging behavior, and social behavior.	Monitoring report of the specialized consulting company.	3	3	3		3	5
		1.4.b Establishing evaluations of prey abundance through occupancy methods refined by more rigorous methods.		1	1	3		1	2
		1.4.c Establishment of partnerships with the scientific community to develop studies based on samples of biological material from the capture effort.	Contract or document of formalization of the partnership for the collection of biological material.	2	2	3		2	2
Ecosystem Health Indicator	2.1 Assess whether the Project Area complies with local legislation regarding legal reserves.	2.1.a The Project Area has legally preserved forest or vegetation as per the host country´s environmental legislation, statutes, and norms.	- Document from Host Country Environmental or Public Registry. - Poligons or Shape Files.	1	1	2		1	1

		2.1.b The Project Area has forest or native vegetation surplus, above legal requirements of the host country´s legislation, statutes, and norms.	-Reports.	1	2	3		2	2
		2.1.c The Project Area´s forest or native vegetation surplus has a conservation easement placed on it.		3	3	3		3	5
		2.1.d The Project Area´s forest or native vegetation surplus is in a permanent conservation unit (e.g. national park).		3	3	3		3	5
		2.1.e The Project Area is improving the forest connection of different forest patches.		3	3	3		3	5
		2.1.f The Project Area is an ecological corridor connecting areas of high ecological pristineness.		2	2	3		2	2
Property Management Indicator	3.1 Improving property management techniques to reduce conflict.	3.1.a Implementing herd management (evaluation of areas susceptible to depredation and relocation of herds to other areas).	Present plan with the proposal for herd management.	2	1	2		1	2

		3.1.b Implementing anti-predation strategies associated with physical barriers, such as electric fences, fixed or movable, around the maternity houses and retreats where the herd is more predisposed to being depredated.	Photographic evidence or contract with the specialized contracted team.	2	1	2		1	2
		3.1.c. Implementing anti-depredation strategies associated with light or sound effects, such as placing bells in the herd and the use of light repellents at strategic points to reduce animal traffic around retreats where the herd is more predisposed to being depredated.	Photographic evidence.	1	1	2		1	1
		3.1.d. Carry out lectures on environmental education for the property's employees.	Attendance lists and photographic evidence.	1	1	2		1	1
		3.2.a The project area complies with local legislation on forest fire prevention and fighting.	Report describing legal requirements and property actions.	2	2	1		1	1

3.2. Fire management: prevention and combat

		3.2.b The project area has an Operational Plan for Integrated Fire Management, developed using the model provided by the responsible environmental agency. The plan has include: water truck availability, creation of fire breaks and constant maintenance, trained local fire brigade with equipment available for use, observation towers to detect fire outbreaks, sensors with alerts to detect fire prone conditions, and use of technologies such as drones for fire detection.	Present integrated operational plan of fire management and photographic evidence of attendance.	3	2	3		2	3
	3.3 Deforestation, Poaching and Forest Degradation	3.3.a Security patrols and surveillance inside the Project Area.	Map with proposed rounds and surveillance and evidence of actions.	2	1	3		2	2
		3.3.b Use of remote sensing tools to identify deforestation and forest degradation.	Report using polygons or shape Files.	2	2	3		2	2
		3.3.c Use deforestation detection technologies such as bioacoustics to identify agents, including machinery sounds, such as tractors or chainsaws, gunshots and other associated sounds.	Contracted expert advisory report or equipment report used.	3	3	3		3	5

Social Engagement Indicator	4.1 Develop and implement an education and communication program	4.1.a Implementing a campaign to raise awareness of good practices for drivers in the project's surrounding area, especially big cats, contributing to the reduction of roadkill rates of big cats.	Attendance list and photographic evidence.	2	2	2		2	2
		4.1.b Implement signs indicating protected areas, ban on hunting, burning, deforestation and with good driving practices on roads and highways in the project area and its surroundings.	Photographic evidence.	2	1	2		1	2
		4.1.c Report any road kills that occur in the project area and its surroundings, in order to provide statistics for research projects and/or surveys of road kill animals.	Report including numbers of road kills and statistics.	1	2	1		1	1
	4.2 Implement a stakeholder relations program with rural assistance and extension agencies	4.2.a Elaborate a communication plan for a stakeholder relations program.	Communication plan.	1	2	2		1	2
		4.2.b Develop a discussion workshop on land use, initiate a dialogue on more sustainable land uses, such as agroforestry systems, and encourage the implementation of these uses in priority areas, such as biodiversity corridors.	Photographic evidence of the workshop and attendance list.	1	2	2		1	2

	4.3. Establish a partnership with inspection agencies	4.3.a Implementing an institutional protocol for communicating events and environmental communication such as the recognition of potentially harmful activities, like hunting reports, improper use of pesticides and chemical products, etc.	Protocol and deployment report.	1	2	2		1	2
		4.3.b Establishing joint actions with inspection and enforcement agencies, to make society aware of the hunting problem and aimed at preventing hunting (sport, amateur, commercial, and retaliation) and increasing the number of civilian complaints.	Reports of the joint actions.	1	2	2		1	2
Financial Strategy Indicator	5.1 Develop an adaptive management plan	5.1.a Develop an adaptative management plan.	Adaptative management plan and report implemented actions.	1	2	3		2	2
	5.2 Demonstrate funding for the project budget	5.2.a Project has secured less than 15% of funding needed to cover the total cash out.	Spreadsheet with forecast and financial control.	1	1	1		1	1
		5.2.b Project has secured 15% to less than 40% of funding needed to cover the total cash out required to secure project activities for 10 plus years.		2	1	2		1	2

		5.2.c Project has secured over than 40% of funding needed to cover the total cash out required to secure project activities for 10 plus years.		3	2	3		2	3
	5.3. Implement a communication program to mobilize and increase financial resources	5.3.a Implement a communication program to mobilize and increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	Communication program and photographic evidence.	2	3	3		2	3
	5.4. Implement an Ecotourism Program at the project area	5.4.a Develop and implement a business plan for the implementation of an ecotourism product related to the conservation of the project area, focusing on the sighting of big cats, such as the jaguar	Business plan for ecotourism and report of implemented actions. Partnership contracts with ecotourism companies.	3	3	3		3	5
		5.4.b Elaborate a communication plan for a stakeholder to promote the project area as an ecotourism destination. When possible, involve research centers and small businesses in building multisectoral and multistakeholder solutions, creating local employment through the implementation of project activities.	Communication plan focused on ecotourism and report of actions performed.	3	2	2		2	2

		5.4 c Establish commitment terms with observatories, associations, and secretariats related to public policies for the promotion of sustainable tourism.	Term of commitment.	1	2	3		2	2
							Total		100