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Species conservation planning: the jaguar National Action Plan for Brazil

A species conservation plan provides a detailed proposal of actions that need to be undertaken to "save" a species. A species action plan must be based on sound conservation science and prepared through an inclusive, participatory process. The Jaguar National Action plan took place in Atibaia, São Paulo, Brazil in November 2009. It was organised and funded by CENAP (Centro Nacional de Pesquisa e Conservação de Mamíferos Carnívoros, the government organization responsible for all aspects of carnivore conservation, research and policy making), Pro-Carnivoros (a national carnivore NGO) and Panthera (an international felid NGO). The Brazilian Network of the IUCN/SSC Conservation Breeding Specialist Group (CBSG) together with the IUCN/SSC Cat Specialist Group (CatSG) designed and facilitated the workshop.

During four days 35 participants (Fig. 1) including biologists, representatives from governments, protected areas, NGOs, zoos, universities, and landowners worked together to produce an action plan who's main objective was to "Reverse the trend of jaguar population declines in each of the five biomes where the species is encountered and reduce the category of threat in each biome in the next 10 years". The workshop design was inspired by a mix of methods developed by the IUCN/SSC CBSG, CatSG as well as the specific demands of the workshop organisers. During the workshop a national action plan for jaguars was created, a status review of each jaguar population from the five biomes (Fig. 2) was assessed, a Population Viability Analysis model produced and various scenarios run based on Vortex (Desbiez et al. 2012, this issue), habitat suitability model was created to map the distribution of known and potential jaguar populations using Maxent (Ferraz et al. 2012, this issue) and corridors and main Jaguar Conservation Units (JCUs) were updated (Nijhawan 2012, this issue).

Fig. 1. Workshop participants in Atibaia in November 2009 (Photo B. Beisiegel).

Jaguars are the most studied felid in the Neotropics and their historical and current distribution has been well mapped compared to other species (Sanderson et al. 2002). The IUCN/SSC approach to species conservation planning requires a status review of the species be performed before the action plan is created. A different participatory approach for the status review was adopted. For each of the biomes in which jaguars occur a 'biome leader' was identified and a detailed questionnaire based on the information necessary to categorize a species according to the IUCN Red List criteria was sent. The biome leader consulted with all experts in his/her region to compile the necessary data. The information was compiled and analyzed before the workshop using IUCN Red List Criteria (IUCN 2001) at the regional level. In this case each biome was considered a region. Results from the biome assessment and level of threat of each jaguar population were then presented during the workshop. Participants as well as the models developed during the workshop helped to complete each assessment which are presented in this issue. On the day before the workshop started, the organising committee and the IUCN/SSC CBSG/CatSG met throughout the morning and early afternoon to iron out last minute details and run through the program. Participants began arriving in the afternoon. Everyone was accommodated in the location where the workshop took place. The workshop facilities included a large plenary meeting room as well as six smaller rooms in which smaller working groups could convene. All rooms had plenty of wall space to hang sheets from the flip charts and electrical outlets for computers. The opening ceremony took place in the evening, followed by a general presentation on jaguars and people, then participants gathered for a welcoming cocktail. Action planning workshops are working meetings rather than symposia and are not the appropriate venue for lengthy presentations or research program updates. No project up-date presentations by researchers or other such presentation were scheduled. Participants were warned about this and were encouraged to e-mail their reports and information before or after the workshop or leave hard copies for participants at the workshop (two participants chose to do this). The

full four days of the workshop were dedicated to working on the action plan and models.

Workshop dynamics included splitting the group of participants into topic-based working groups and reconvening in plenary sessions to present results from working group deliberations and stimulate discussions. Working groups then registered the comments made in plenary. In this way every participant had the chance to give his/her opinion on all aspects of the workshop. During the plenary sessions presentations to guide the work as well as updates on biome red listing, population modeling, distribution maps and JCUs were given. Work on the models and biome red listing was done after-hours (Fig. 3) or exceptionally some participants were pulled out of a group to work on one of the topics. For both the population modeling and the red listing, questionnaires had been sent to participants two months before the workshop. Data and results had been analyzed, written up and were submitted to workshop participants for comments and approval.

One of the group's first activities on the first morning was to generate working group topics. After presenting him/herself each participant stated what he/she thought were some of the most important conservation threats to jaguars. Threats were listed on cardboard papers and set on a sticky wall. Threats were consolidated and six topic based working groups were created: Habitat loss and Fragmentation, Human/jaguar conflicts, Hunting, Education and Communication, Public policies, and Research.

A topic based approach was selected over a biome working group approach to ensure maximum exchange of experience and perspectives during the workshop. On the last day in the afternoon biome groups were formed in which participants could select and rank what they thought were the most important conservation targets for their biome.

Before breaking into working groups a plenary session exercise was organized for the participants to agree on a sentence expressing the main purpose of the action plan (stated above). Small groups, which merged into larger groups and then the full plenary created a vision of what they hoped the action plan would achieve. This final vision stated the purpose of the workshop was to "Reverse the trend of jaguar population declines in each of the five biomes where the species is encountered and reduce the category of threat in each biome in the next 10 years". This vision did not incorporate human values or the relationship between jaguars and people even though this was discussed at length.

Fig. 2. Biomes of Brazil. The jaguar occurs in all of them exept in the Pampa.

Step by step working groups set out to analyze the root of the problems facing the species, set conservation objectives and finally develop detailed conservation actions. Each working group brainstormed on all potential problems and their causes. The analysis was focused on priority issues and identifying the root causes of each problem. Clear problem statements were written. Once these problem statements were written and reviewed in plenary, working groups developed objectives to address the stated problems. Short and long term objectives were compiled, and after approval in plenary, actions to accomplish each objective were written up in detail. Each action included: 1) a short statement which can be understood by a non-participant reader, 2) the name of individuals responsible for organizing or monitoring the progress of each action, 3) a time line was set, potential collaborators listed, 4) resources needed mentioned and 5) indicators for monitoring purposes listed. In each working group CBSG facilitators used and shared with participants a diversity of tools and methods to help participants during each of these steps. The result presented in general plenary was a list of 69 objectives and 174 actions (Table 1).

Posterior to the workshop, organizers performed a consolidation of Problems, Objectives, and Actions, aiming a better understanding for policy makers, decision takers, and general readers. No change on the proposed actions was made. Problems, Objectives and Actions were mostly merged to facilitate the implementation. The final action plan resulted on 46 objectives and 167 actions after consolidation (Table 1). The final objectives are listed by theme as presented by the working groups:

Table 1. List of problems, objectives and actions identified in each working group (a. before organizers consolidation; b. after consolidation).

Working group	Problems	Objectives	Actions
Communication and education	5[a]/6[b]	16[a]/13[b]	37[a]/31[b]
Public Policies	7[a]/7[b]	12[a]/11[b]	27[a]/27[b]
Research	13[a]/4[b]	20[a]/4[b]	45[a]/43[b]
Habitat loss and fragmentation	7[a]/6[b]	7[a]/6[b]	20[a]/20[b]
Hunting	5[a]/5[b]	6[a]/5[b]	13[a]/13[b]
Conflicts	5[a]/5[b]	8[a]/7[b]	32[a]/33[b]
TOTAL	**42[a]/33[b]**	**69[a]/46[b]**	**174[a]/167[b]**

Fig. 3. Participants of the Jaguar Conservation Workshop in Atibaia, São Paulo state, Brazil, in November 2009 (Photo R. C. de Paula).

A) Communication and Education

1. To spread information on jaguar conservation and preventive methods for livestock depredation to ranchers, farmers, people living within jaguar distribution range, in schools of rural areas, and in technical rural schools and to landowners in 10 years.
2. To implement communication and educational programs based on jaguar conservation for traditional local populations in 2 communities per biome in 7 years.
3. To create and implement educational programs based on jaguar conservation in all the captive institutions maintaining the species in 3 years.
4. To inform the regulations of tourism activities based on jaguar observation to tourism entrepreneurs in 3 ½ years.
5. To have tourism enterprises incorporating educational proposals and basic information on jaguars in 3 years.
6. To inform the negative impacts of inappropriate practices of jaguar tourism based on observations in 3 years.
7. To establish partnerships between educators and conservationists in 2 years.
8. To have educational projects aiming jaguar conservation elaborated by educators in at least one research project per biome in 6 years.
9. To have the general society aware of jaguar conservation problems in 4 years.
10. To reduce the social motivation to jaguar persecution and poaching in 4 years.
11. To have conservationists recognizing the importance of communication and using it as a tool for conservation in 2 years.
12. To publish the scientific findings in popular 'language' in 5 years.
13. To create and maintain a press office within the agency responsible for jaguar conservation in 2 years.

B) Public Policies

1. To have the Brazilian Government recognizing the jaguar as symbol for national biodiversity conservation in 3 years.
2. To have financial government resources set specifically for research and conservation of jaguar and its habitats in 5 years.
3. To implement the use of all possible government conservation tools (map of priority areas, national species action plans, protected areas management plans, economic-ecological zoning, etc.) in all government decisions (approval of large entrepreneurs, protected area creation, etc.) in 2 years.
4. To manage regional policies according to the biome specificities and jaguar conservation needs in 5 years.
5. To define and establish rules for the sustainable extraction of renewable natural products in 2 years.
6. To define aggregation values to sustainable extracted renewable natural products and farming and ranching products with low impact to the environment and to the jaguar populations.
7. To integrate research institutions, funding agencies, government, and non-government institutions on the execution of jaguar conservation actions in 5 years.
8. To elaborate a protocol of procedures to communicate and direct to the inspecting agencies the action and/or programs to enforce the legislation related to jaguar conservation.
9. To manage along to the Judiciary a plan to promote an effective punishment to environmental crimes.
10. To elaborate funding proposals for thematic projects through a network of jaguar researchers and institutions.
11. To establish rules for the tourism involving jaguar.

C) Research

1. To attend the lack of knowledge through research and to have these information constantly updated in 10 years for the following: demographic aspects (density estimates and mortality, dispersal, and birth rates); social structure; health parameters; reproductive biology (especially litter size, age of first female breeding, fecundity, mortality in the first year); interpopulation gene flow; genetic variability; habitat use and trophic ecology.
2. To evaluate and monitor impacts and threats to jaguar populations (specially related to the habitat loss and fragmentation, epidemiology and toxicology) in at least one population per biome in 10 years.
3. To survey and evaluate the socio-environmental and economic variables leading into jaguar-human conflicts in 5 years.
4. To increase the collaboration and exchange of information among several actors performing important role on jaguar research and conservation in 10 years.

D) Habitat loss and fragmentation

1. To identify and make official the jaguar priority areas in 1 year.
2. To identify and indicate at least one area per biome (under the pressure of deforestation and extraction of renewable and non-renewable natural resources) to propose the creation of protected area of full protection, within the polygons of priority areas.
3. To maintain or re-establish gene flow among isolated jaguar populations as well as populations that have reached a critically small size.
4. To avoid or mitigate the impact of human occupation within the jaguar priority areas.
5. To reduce or compensate the environmental impacts in areas of influence of energetic entrepreneurs (dams, wind fields), within the jaguar priority areas.

6. To reduce mortality rates of jaguars and prey species from habitat loss related to roads construction, road killing, and burns within the jaguar priority areas.

E) Hunting

1. To create a database (constantly updated) containing technical and scientific information on hunting occurrence (local x regional, temporal frequency), its types (sport-hunting, subsistence, retaliation, etc.), the impacts on jaguar populations, impacts on prey species, the relative importance of local hunting in each biome/region for jaguar conservation, in 8 months.
2. To fill the knowledge gaps on poaching/hunting through increasing research and publications specifically on hunting occurrence (local x regional, temporal frequency), its types (sport-hunting, subsistence, retaliation, etc.), the impacts on jaguar populations, impacts on prey species, the relative importance of local hunting in each biome/region for jaguar conservation, in 10 years.
3. To increase and improve the law enforcement capacity within the official agencies in 10 years: by increasing the number of agents, by improving infrastructure and logistics, by providing specific training, by increasing the operational patrolling area through network operations, and to make it feasible a support from trained civilians.
4. To increase the number of protected areas and to increase the size of areas already under protection where jaguars have been confirmed within 10 years.
5. To gradually increase the public awareness about biology and ecology of jaguars and prey species in 10 years.

F) Conflicts

1. To reduce the number of individuals removed due to real or supposed livestock depredation in 10 years.
2. To create a network for the stakeholders involved in jaguar conflicts in 2 years.
3. To have tourist activities related to jaguars regulated and monitored, and to create economic benefits to motivate the proper management in 10 years.
4. To enforce the control and to raise efficiency on the combat for decreasing jaguar persecutions and removals in 5 years.
5. To identify, quantify and qualify the causes of removals of young jaguars in each biome in 3 years.

Table 2. Reference table for the monitoring of the implementation of the NAP.

Not attended		Partially attended		Accomplished
Not initiated	Just initiated	Ongoing	In final stage	concluded
0%	1-33%	34-66%	67-99%	100%
0	1	2	3	4

6. To elaborate destination protocols to removed animals in 1 year.
7. To elaborate studies of rehabilitation and reintroduction viability for jaguars in 10 years.

The objectives were ranked for each biome among the 69 proposed for the entire country ending in a maximum number of 10 objectives listed per biome. The list of the priority objectives is listed below based on the objective number within each working group:
Amazon: D4, C1, A1, B3, E2, B7, F2, B10
Caatinga: C1, A8, A1, E5, B4, F1, C3, D5, B1
Cerrado: C1, F1, D2, D3, D5, B2, E3, B10, C2
Atlantic Forest: C1, E3, F1, D3, B3, B9, A9, D4, E4, D2
Pantanal: B4, D4, A1, E3, C1, B6, F1, F3, E2
A proposal for implementation of the action plan was presented and discussed in the final general plenary, on the last day of the meeting together with the presentation of a suggested working group to support the implementation committee. The committee is composed of a general supervisor, an assistant and a working (support) group composed of the coordinators of each working group topics and coordinators for each biome. Thus, the implementation committee includes a total of 13 people. The NAP supervisor has the function of evaluating the general implementation through the updates of the working group and biome coordinators. Each coordinator will track the implementation state of each action by liaising with the person named as the articulator for this action during the workshop. The implementation will be monitored following the time line proposed for the actions and the accomplishment will follow the indicators proposed. The implementation was planned following the guidelines below:
1. The implementation monitoring will be conducted following a reference table (Table 2). The numerical classes synthetize the implementation status of an action.
2. Annual meetings of the implementation committee will keep the working group coordinators attentive to deadlines and to necessary change adjustments or even delays in the action when necessary;
3. The elaboration and presentation of annual reports based on working group themes and biome updated implementation reports;
4. Maintain a regular information flow to both the participants of the NAP and jaguar stake holders;
5. Observation and articulation of actions to improve the effectiveness of the implementation of actions common to themes and biomes;
6. Maintain constant communication among all involved partners for a successfull implementation of the NAP.

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