ISSN 1027-2992

CAT news

N° 66 | Autumn 2017

SPECIES SURVIVAL COMMISSION

CAT SPECIALIST GROUP

CATnews is the newsletter of the Cat Specialist Group, a component of the Species Survival Commission SSC of the International Union for Conservation of Nature (IUCN). It is published twice a year, and is available to members and the Friends of the Cat Group.

For joining the Friends of the Cat Group please contact Christine Breitenmoser at ch.breitenmoser@kora.ch

Original contributions and short notes about wild cats are welcome
Send contributions and observations to ch.breitenmoser@kora.ch.

Guidelines for authors are available at www.catsg.org/catnews

CATnews is produced with financial assistance from the Friends of the Cat Group.

Design: barbara surber, werk'sdesign gmbh
Layout: Christine Breitenmoser and Tabea Lanz
Print: Stämpfli Publikationen AG, Bern, Switzerland

ISSN 1027-2992 © IUCN/SSC Cat Specialist Group

Editors: Christine & Urs Breitenmoser
Co-chairs IUCN/SSC
Cat Specialist Group
KORA, Thunstrasse 31, 3074 Muri, Switzerland
Tel ++41(31) 951 90 20
Fax ++41(31) 951 90 40
<urs.breitenmoser@vetsuisse.unibe.ch>
<ch.breitenmoser@kora.ch>

Associate Editors: Keith Richmond
Brian Bertram
Sultana Bashir
Juan Reppucci

Cover Photo: Asiatic cheetah, Iran
Photo Houman Jowkar

LUIS G. FONSECA[1], STEPHANNY ARROYO-ARCE[2*], IAN THOMSON[2], WILBERT N. VILLACHICA[1] AND ROLDÁN A. VALVERDE[3]

New records of jaguar predation on sea turtles, Pacific coast, Costa Rica

We report here new sites where jaguars *Panthera onca* prey upon sea turtles in Costa Rica. We conducted carcass counts (n = 228) along eight beaches located in Santa Rosa National Park NP, which makes part of Guanacaste Conservation Area, between June and August 2016. The olive ridley sea turtle *Lepidochelys olivacea* was the most common species predated by jaguars (50% carcasses), followed by the green sea turtle *Chelonia mydas* (30%) and the hawksbill sea turtle *Eretmochelys imbricata* (0.44%). The site with the most predation events (41%) was Nancite beach. Our results suggest that predation levels could be influenced by both prey availability (e.g. sea turtles) and jaguar distribution on each beach. This information will not only improve our knowledge regarding the distribution of jaguar predation across the country, but also increase our understanding about this predator-prey interaction.

In recent years, jaguar predation on sea turtles has drawn attention in Santa Rosa NP (Fig. 1). Although the park has an extensive coastline composed of several nesting beaches, this predator-prey interaction has only been documented at Naranjo and Nancite beaches, where predation occurs upon the green sea turtle and the olive ridley sea turtle (Carrillo et al. 1994, Alfaro et al. 2016, Escobar-Lasso et al. 2016a, b, c, d, Herrera 2016). Additionally, Herrera et al. (2016) documented a single predation event on a hawksbill sea turtle at Potrero Grande beach. In this study, we aimed to assess jaguar predation on sea turtles by expanding the current monitoring efforts to other nesting beaches along Santa Rosa NP.

Santa Rosa NP is located on the north-western Pacific coast of Costa Rica (10°48′ N / 85°39′ W). Four species of sea turtles nest along the park's 110 km stretch of coastline. It is considered one of the most important rookeries for the vulnerable olive ridley sea turtle in the Eastern Tropical Pacific (Cornelius & Robinson 1982), as mass nesting (also known as arribadas) occurs at Nancite beach (Fonseca et al. 2009). It also hosts a nesting population of the endangered green sea turtle, the vulnerable leatherback sea turtle *Dermochelys coriacea* and the Critically Endangered hawksbill sea turtle (Cornelius 1986, Fonseca et al. 2009, Herrera et al. 2016). These nesting sites are located on beaches where human activity is regulated and largely limited by difficult access, thus maintaining a preserved ecosystem characterised by rocky mountain systems, mangroves, lagoons as well as patches of dry deciduous and semi-deciduous dry forest (Alfaro et al. 2016, Escobar-Lasso et al. 2016d).

During 2016 data was collected from eight sites located along the coastal habitat of Santa Rosa NP (Fig. 2); Nancite beach was surveyed between 20 to 24 June 2016, while the remaining beaches were surveyed from 13 to 14 August 2016. Due to the remoteness and inaccessibility by land of several of the beaches, a small fishing boat was required for access. For each location, a field team of two to five researches surveyed by foot the entire length of each beach, covering the width of the beach from the high tide line to deep into the vegetation to maximise detection of all sea turtle carcasses, including those dragged into the forest. When a carcass was discovered, it was examined for evidence of jaguar predation (e.g. bite marks, drag marks, jaguar tracks). If it was determined to be the result of jaguar predation, the sea turtle species and geographic location was recorded.

A total of 228 sea turtle carcasses were recorded as predated by jaguars, of which 113 corresponded to the olive ridley sea turtle, 68 to the green sea turtle and one to the hawksbill sea turtle; the remaining 46 carcasses were not classified to the species level due to their advanced level of decomposition (Supporting Online Material SOM Table T1). It is important to highlight that, since the age of the carcasses was not estimated, it was not possible to determine when the predation event occurred. Therefore, our data correspond to predation events that occurred over different nesting seasons.

Nancite beach was the site with the most predation events (41% carcasses), followed by Colorada beach (32%). The difference in predation levels could be linked to the number of sea turtles nesting on each beach (e.g. predation would be greater on beaches with a higher nesting population). However, our results cannot confirm this theory since nesting levels are only known for Nancite

Fig. 1. Male jaguar predating on a olive ridley sea turtle, Santa Rosa NP, Guanacaste Conservation Area, Costa Rica (Photos L. G. Fonseca).

beach. Jaguar presence could be another factor associated to predation levels. In this regard, it is expected that those beaches with a higher jaguar density would also have the highest levels of predation. Differences in the availability of prey species among the beaches could also help to explain the differences in predation levels reported in this study. As described by other authors (e.g. Arroyo-Arce & Salom-Pérez 2015), it is expected that jaguars select sea turtles when the availability of their main prey species is scarce. However, jaguars could also opportunistically predate upon sea turtles as the energy cost and risk of injury associated with the predation are lower than compared to other species (Escobar-Lasso et al. 2016b).

Although jaguar predation was already documented in Santa Rosa NP, our study highlights the existence of other beaches where it was unknown that jaguars preyed upon sea turtles. Future research should not only expand the monitoring efforts to the remaining nesting sites located in the area, but also evaluate the impact of jaguar predation on the local sea turtle nesting populations. It would also be important to evaluate the habitat features (e.g. prey availability, nesting season, human presence, geography) that may be influencing current distribution of jaguar predation in Santa Rosa NP. Further understanding of these issues will be required for an effective management of the area and conservation of these predator and prey species.

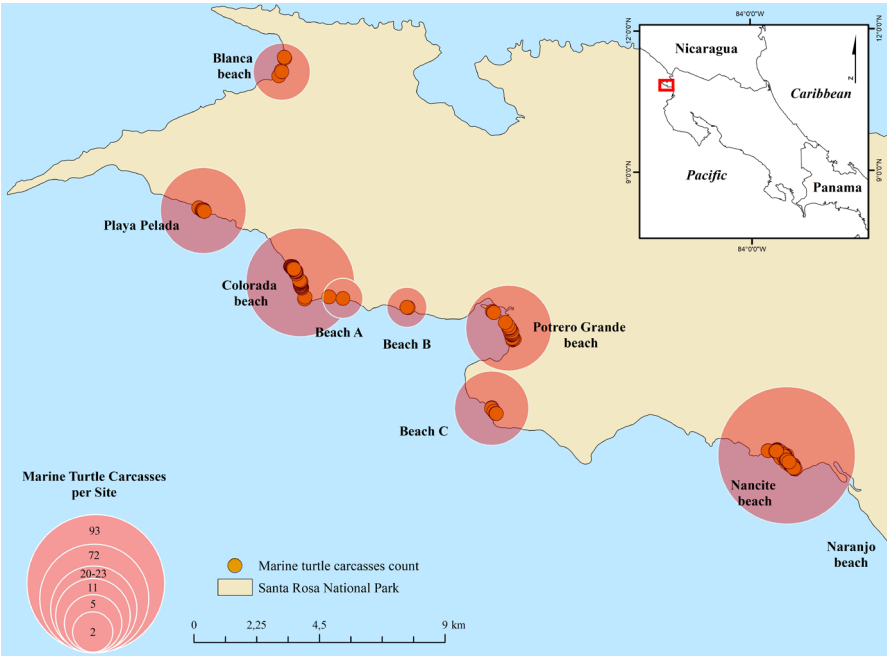

Fig. 2. Spatial distribution of sea turtle carcasses predated by jaguars in Santa Rosa NP, Guanacaste Conservation Area, Costa Rica.

Acknowledgements

We would like to thank the Guanacaste Conservation Area, especially its director Róger Blanco, for giving us permission to conduct this work and for their logistical support. We also like to thank the reviewers for their comments on the manuscript.

References

Alfaro L. D., Montalvo V., Guimaraes F., Saenz C., Cruz J., Morazán F. & Carrillo E. 2016. Characterization of attack events on sea turtles (*Chelonia mydas* and *Lepidochelys olivacea*) by jaguar (*Panthera onca*) in Naranjo sector, Santa Rosa National Park, Costa Rica. International Journal of Conservation Science 7, 101-108.

Arroyo-Arce S. & Salom-Pérez R. 2015. Impact of jaguar *Panthera onca* (Carnivora: Felidae) predation on marine turtle populations in Tortuguero, Caribbean coast of Costa Rica. Revista de Biología Tropical 63, 815-825.

Carrillo E., Morera R. & Wong G. 1994. Depredación de tortuga lora (*Lepidochelys olivacea*) y de tortuga verde (*Chelonia mydas*) por el jaguar (*Panthera onca*). Vida Silvestre Neotropical 3, 48-49.

Cornelius S. E. 1986. The sea turtles of Santa Rosa National Park. Fundación de Parques Nacionales, Costa Rica. Fundación de Parques Nacionales, San José, Costa Rica. 64 pp.

Cornelius S. E. & Robinson D. C. 1982. Abundance, distribution and movements of olive ridley sea turtles in Costa Rica. II. U.S. Fish and Wildlife Service, Washington D. C. 40 pp.

Escobar-Lasso S., Fonseca L. G., Gil-Fernández M., Villachica W. N., Arroyo-Arce S., Thomson I. & Sáenz J. 2016a. First record of consumption of olive ridley sea turtle by a cougar. Cat News 64, 04-05.

Escobar-Lasso S., Fonseca L. G., Villachica W. N., Herrera H., Valverde R. A., Quiros-Pereira W., Pesquero M. & Plotkin P. T. 2016b. First field observation of the predation by jaguar (*Panthera onca*) on olive ridley sea turtle (*Lepidochelys olivacea*) at Nancite Beach, Santa Rosa National Park, Costa Rica. Mammalogy Notes 3, 20-23.

Escobar-Lasso S., Gil-Fernandez M., Herrera H., Fonseca L. G., Carrillo-Jiménez E., Sáenz J. & Wong G. 2016c. Scavenging on sea turtle carcasses by multiple jaguars in Northwestern Costa Rica. Therya 7, 231-239.

Escobar-Lasso S., Gil-Fernandez M., Sáenz J., Carrillo-Jiménez E., Wong G. & Fonseca L. G. 2016d. Inter-trophic food provisioning between sea and land: the jaguar (*Panthera onca*) as provider of sea turtle carcasses to terrestrial scavengers. International Journal of Conservation Science 7, 1081-1094.

Fonseca L. G., Murillo G. A., Guadamuz L., Spínola R. M. & Valverde R. A. 2009. Downward but stable trend in the abundance of arribada olive ridley sea turtles (*Lepidochelys olivacea*) at Nancite beach, Costa Rica (1971-2007). Chelonia Conservation and Biology 8, 19-27.

Herrera H. 2016. Actividad diaria y depredación de tortugas marinas por el jaguar (*Panthera onca*) en el Parque Nacional Santa Rosa, Costa Rica. Thesis, Universidad Nacional, Costa Rica. 83 pp.

Herrera H., Escobar-Lasso S. & Carrillo-Jiménez E. 2016. Predation on the hawksbill turtle Eretmochelys imbricata by the jaguar *Panthera onca* in the Pacific coast of Costa Rica. Mammalogy Notes 3, 13-16.

Supporting Online Material SOM Table T1 is available at www.catsg.org.

[1] Biocenosis Marina, Trinidad de Moravia, San José, Costa Rica

[2] Coastal Jaguar Conservation, 126-3100 Santo Domingo, Heredia, Costa Rica
*<sturnina@gmail.com>

[3] Sea Turtle Conservancy, 246-2050 San José, Costa Rica; and Department of Biological Sciences, Southeastern Louisiana University, Hammond, Louisiana 70402, USA

Fonseca L. G., Arroyo-Arce S., Thomson I., Villachica W. N. & Valverde R. A. 2017. New records of jaguar predation on sea turtles, Pacific coast, Costa Rica. Cat News 66, 36-37. Supporting Online Material.

SOM T1. Records of jaguar predation on sea turtles nesting in Santa Rosa National Park, Guanacaste Conservation Area, Costa Rica. Total numbers of documented sea turtle carcasses are displayed.

Site	*Lepidochelys olivacea*	*Chelonia mydas*	*Eretmochelys imbricata*	Not identified	Total
Nancite beach	93	0	0	0	93
Colorada beach	3	51	0	18	72
Potrero beach	11	2	0	10	23
Pelada beach	1	12	0	7	20
Beach C	4	0	0	7	11
Blanca beach	0	2	0	3	5
Beach A	0	0	1	1	2
Beach B	1	1	0	0	2
Total	113	68	1	46	228