REPRODUCTIVE PATTERNS IN THE GENUS PANTHERA:
Does keeping big cats under human care influence litter size?

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ABSTRACT

Four out of the five big cat species of the genus *Panthera* are threatened with extinction according to the IUCN Red List. Their low reproduction rates and population densities make them particularly vulnerable to extinction. Here we analyze data from the Species360 ZIMS database to analyze the biological underpinnings of littersize for all five *Panthera* species to better understand factors that promote large litters. For lions we compare our findings with wild data from a long-term study in the Serengeti and Ngorongo crater. Results can contribute to improving conservation restoration efforts, captive breeding program and help broaden our understanding of life-history traits in endangered big cats.

METHODS

Data:

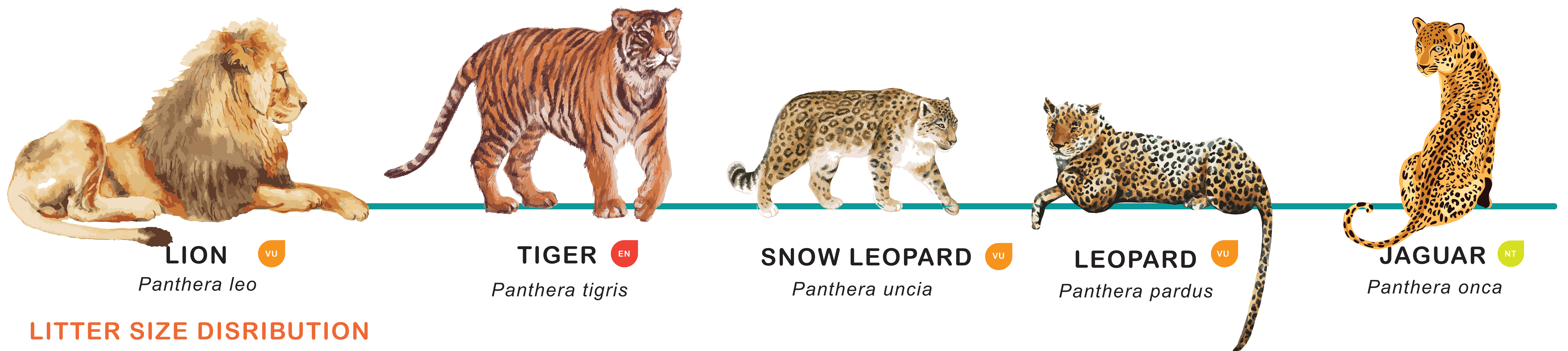SPECIES 360 ZIMS → ~6,000 litters, > 500 institutions, 6 continents [1]

+ WILD DATA → Long-term study in Serengeti/ Ngorongoro Crater (Lions) [2]

Model: We tested the effect of the age of dam, age of sire and species on litter size using a Poisson regression with log-link incl. random effects for dam/sire id and birth institution.

RED LIST STATUS

LION (VU) — *Panthera leo*
TIGER (EN) — *Panthera tigris*
SNOW LEOPARD (VU) — *Panthera uncia*
LEOPARD (VU) — *Panthera pardus*
JAGUAR (NT) — *Panthera onca*

LITTER SIZE DISRIBUTION
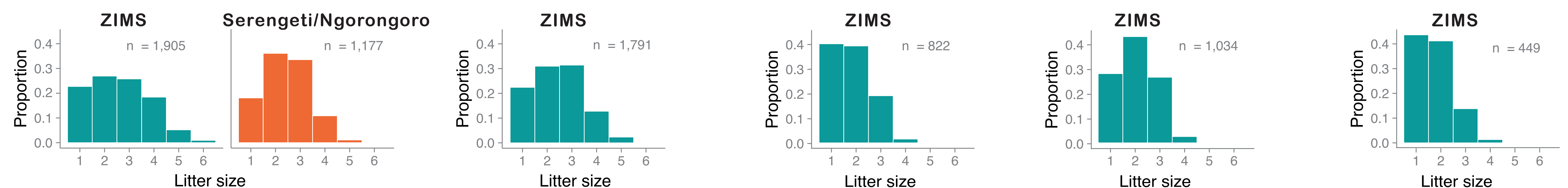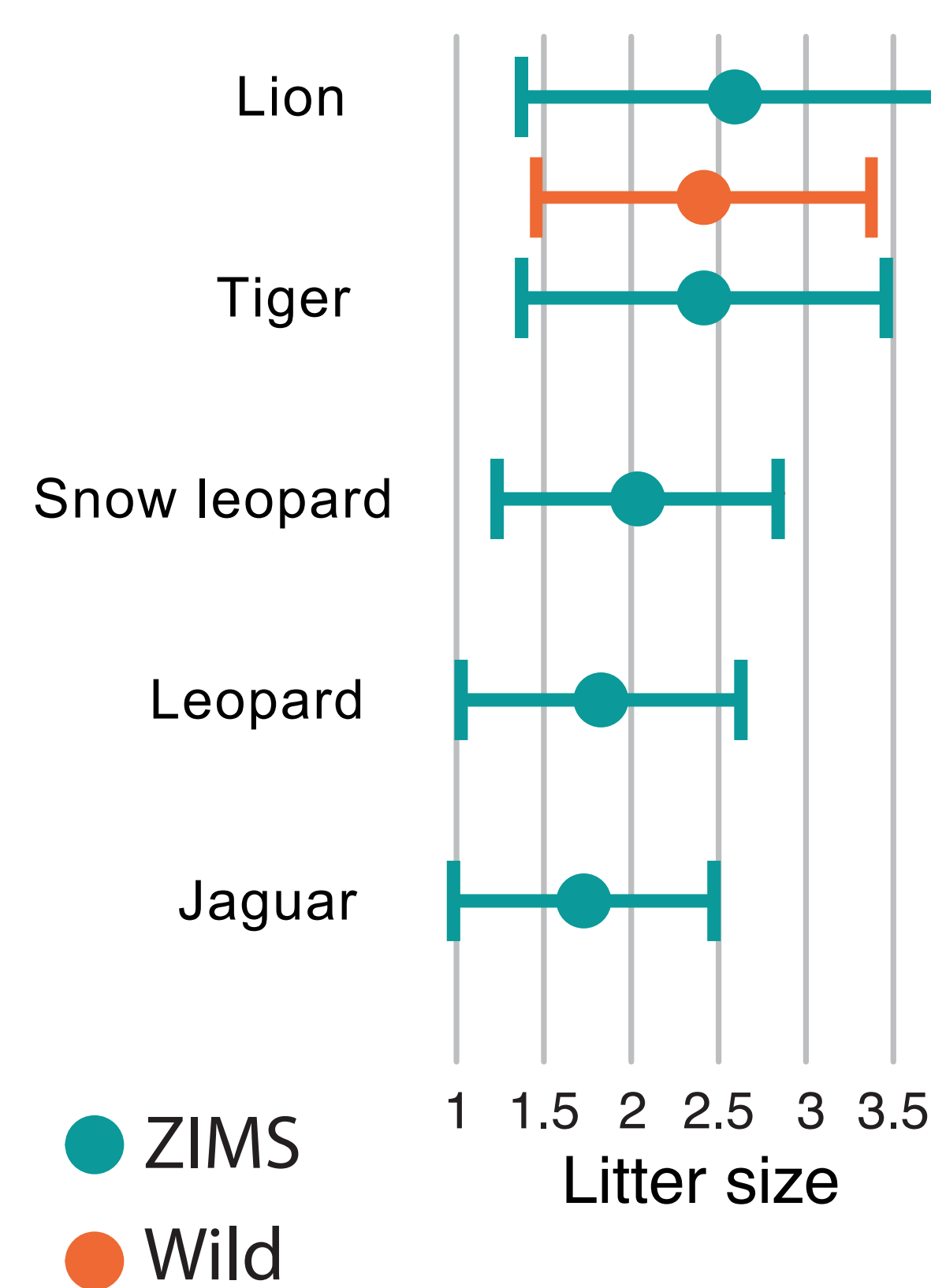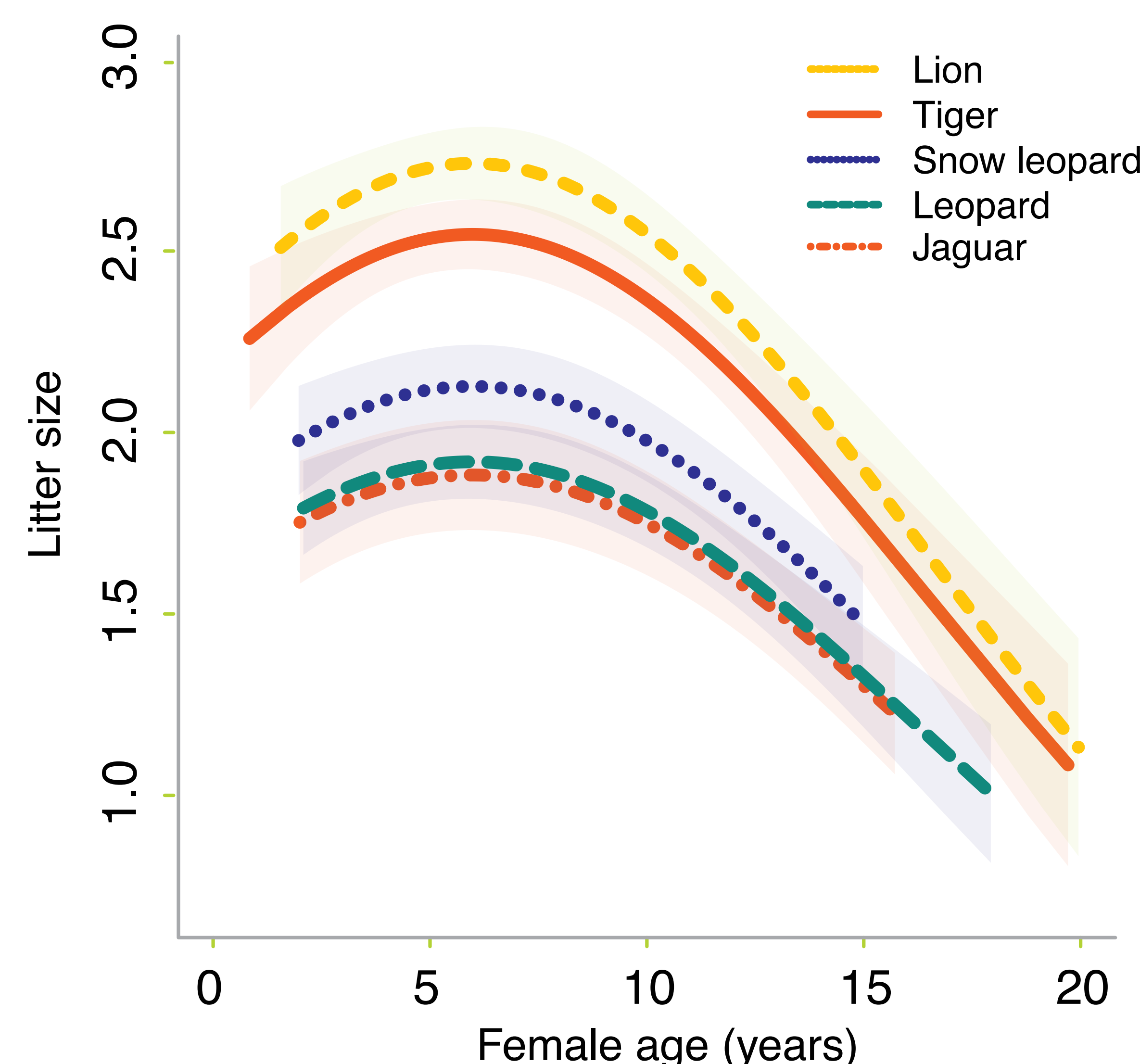

Fig. 1: Histogram of littersize distribution of Panthera species in ZIMS and the Serengeti for lions

MEAN LITTER SIZE

AGE-SPECIFIC LITTER SIZE

CONCLUSION

Lions have the largest litters, followed by tigers, snow leopards, leopards, and jaguars.

Litter sizes are significantly different between wild and captive lions (p<0.001), the ZIMS population showed a greater mean and greater variance with a higher proportion of single cubs and 4-5 cubs.

The dam's age is a good predictor of litter size, whereas we did not find a significant effect of the sire's age. All *Panthera* species show similar reproductive senescence patterns with decreasing litter size after the age of approx. 6-7.

Our results are a preliminary first step to fill knowledge gaps of reproduction parameters in big cats.

If you want to learn more, follow the research of the Species360 Conservation Science Alliance at: https://conservation.species360.org or email the author at: johanna.staerk@species360.org

Fig. 2: Mean litter sizes and standard deviation (error bars) from ZIMS data (blue) and for lions from the Serengeti/ Ngorongo Crater (orange).

Fig. 3: Reproductive senescence in female. The reproductive patterns across Panthera species is highly similar: litter size tends to increase until they reach an age between 6-7 years, after which litter size decreases.

Ref.: [1] Species360 Zoological Information Management System (ZIMS) (2020), zims.Species360.org. [2] Packer C. and Pusey, A.E. (1995). The Lack Clutch in a Communal Breeder: Lion Litter Size is a Mixed Evolutionarily Stable Strategy *The American Naturalist* 145:5, pp.833-841.