Population estimates and factors influencing distribution of saiga

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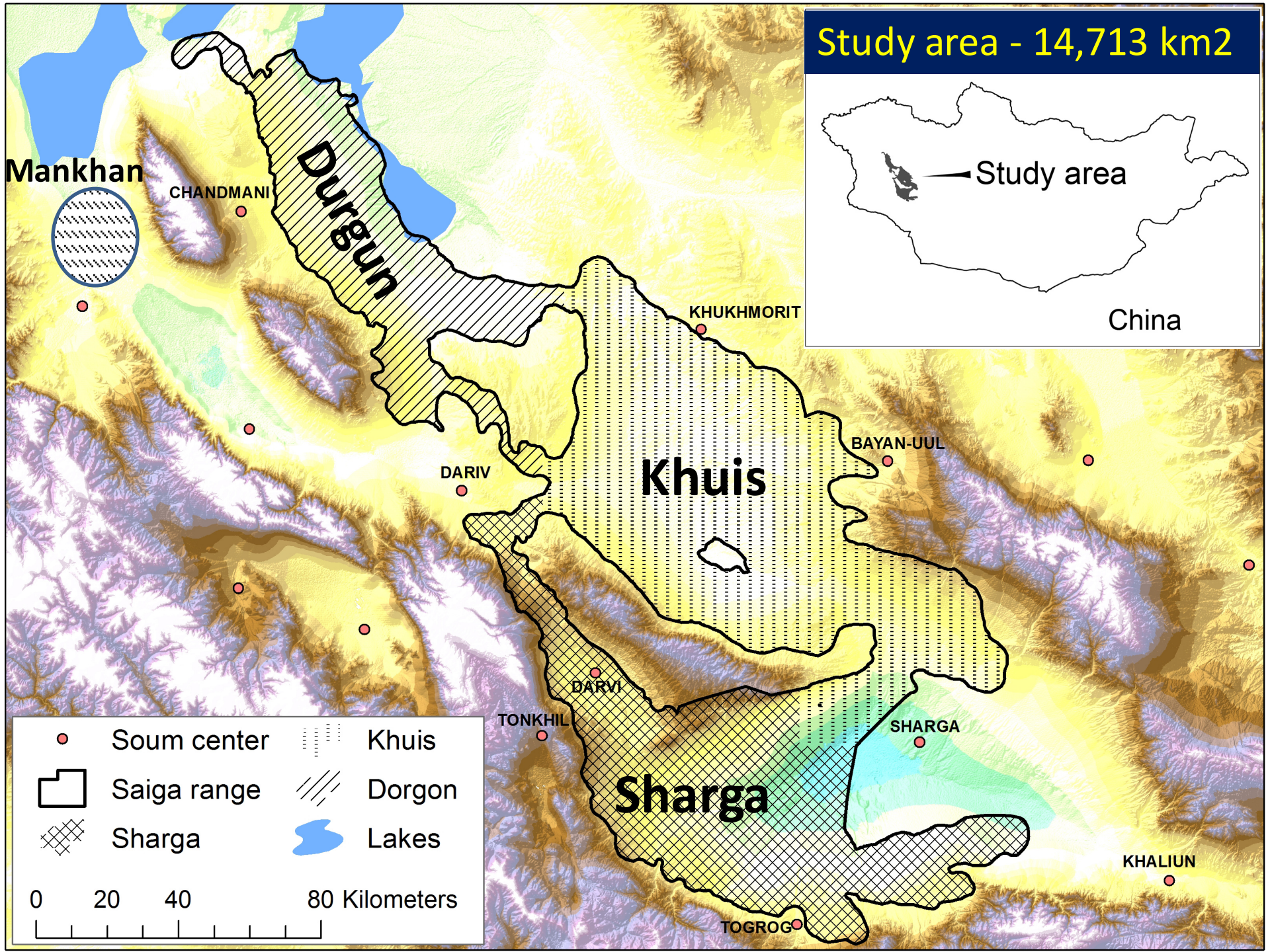
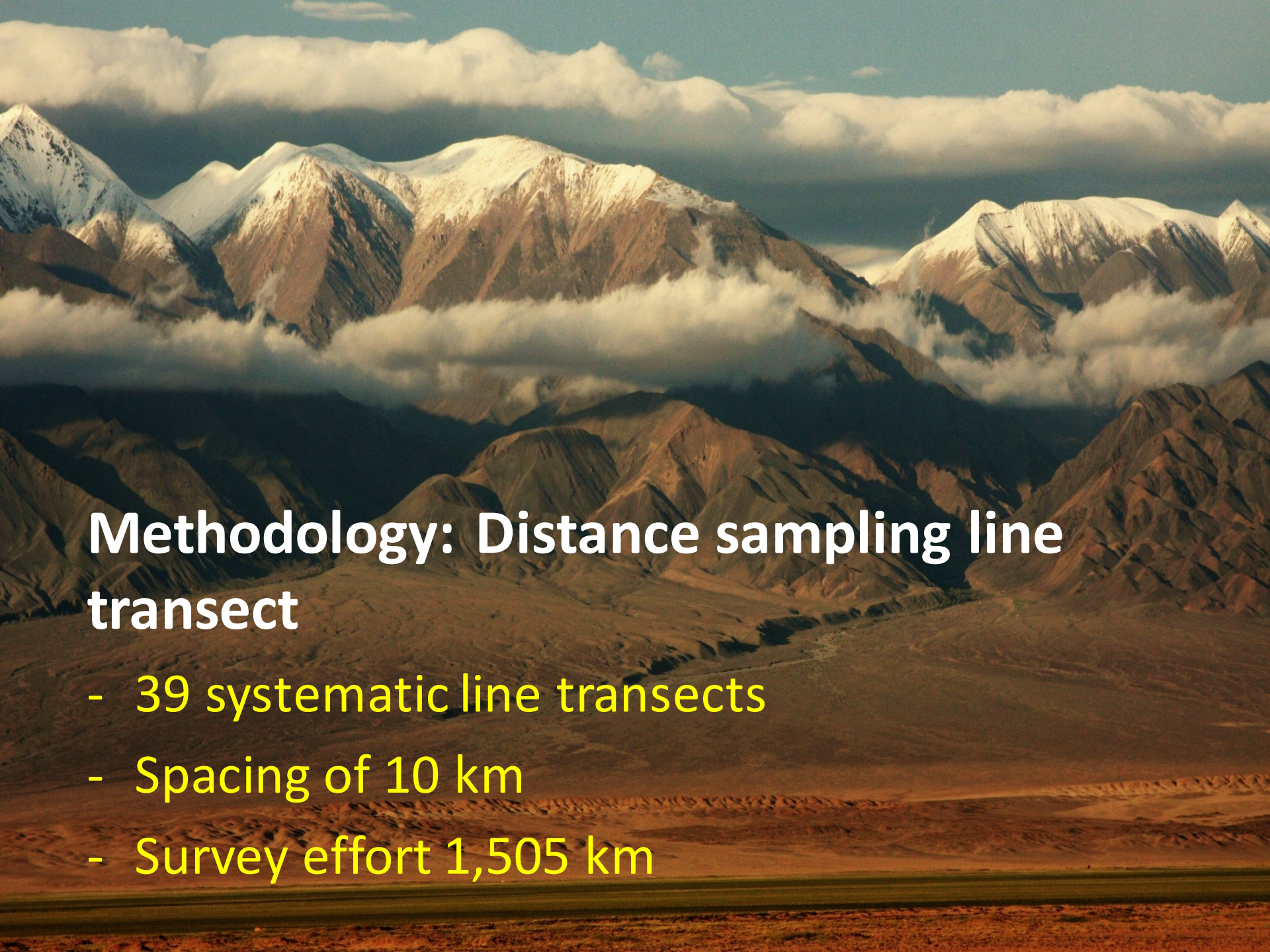
Research goals

- Estimate saiga abundance across its entire range in western Mongolia
- Assess the human and environmental factors influencing saiga distribution


Study area - 14,713 km2
Study area
China
Mankhan
CHANDMANI
Durgun
KHUKHMORIT
BAYAN-UUL
DARIV
Khuis
DARVI
TONKHIL
SHARGA
Sharga
KHALIUN
TOGROG
Soum center
Saiga range
Sharga
Khuis
Dorgon
Lakes
0 20 40 80 Kilometers



Methodology: Distance sampling line transect

- 39 systematic line transects
- Spacing of 10 km
- Survey effort 1,505 km

Survey team

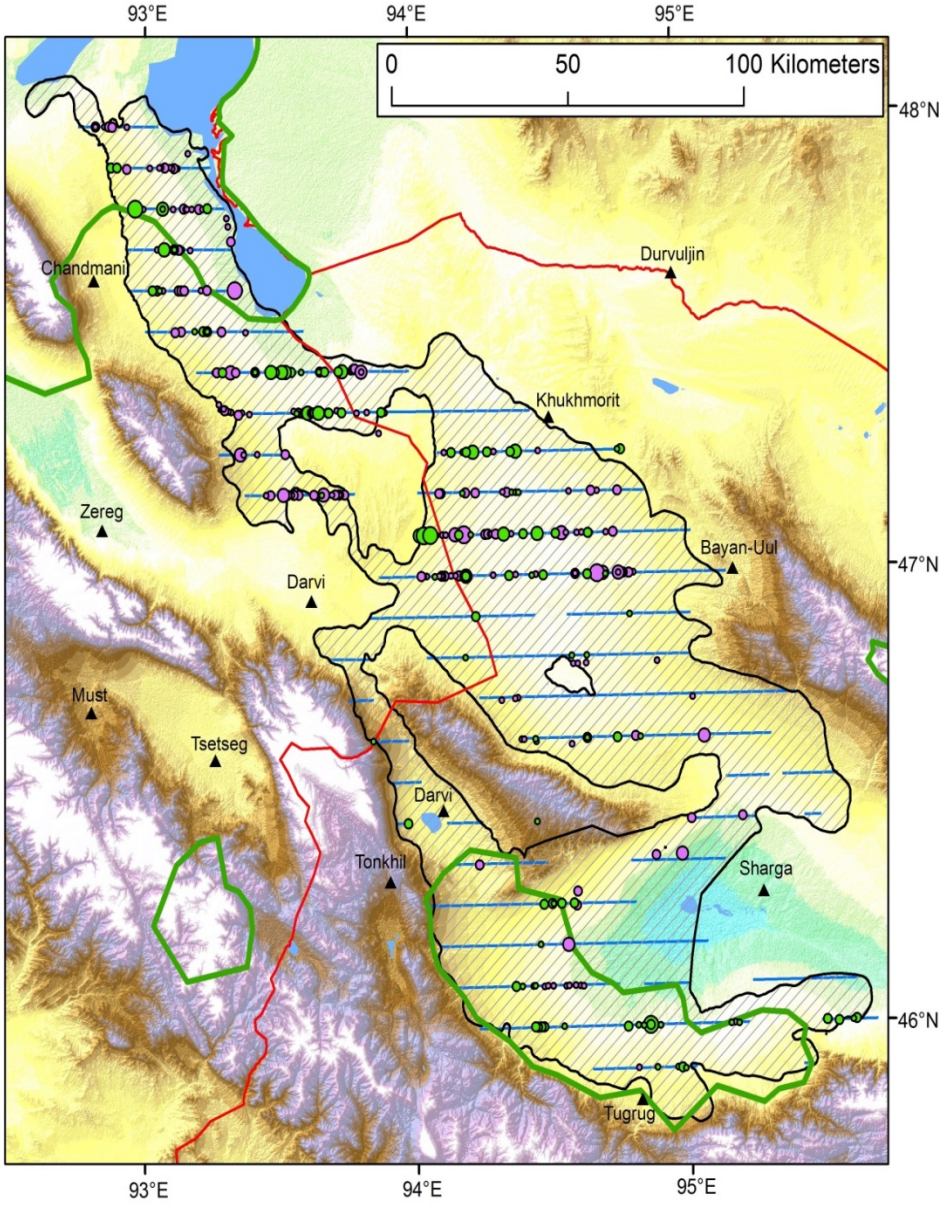
(WCS, WWF, Gobi-Altai EPA)

2014 field surveys

Winter (Feb 04-15)

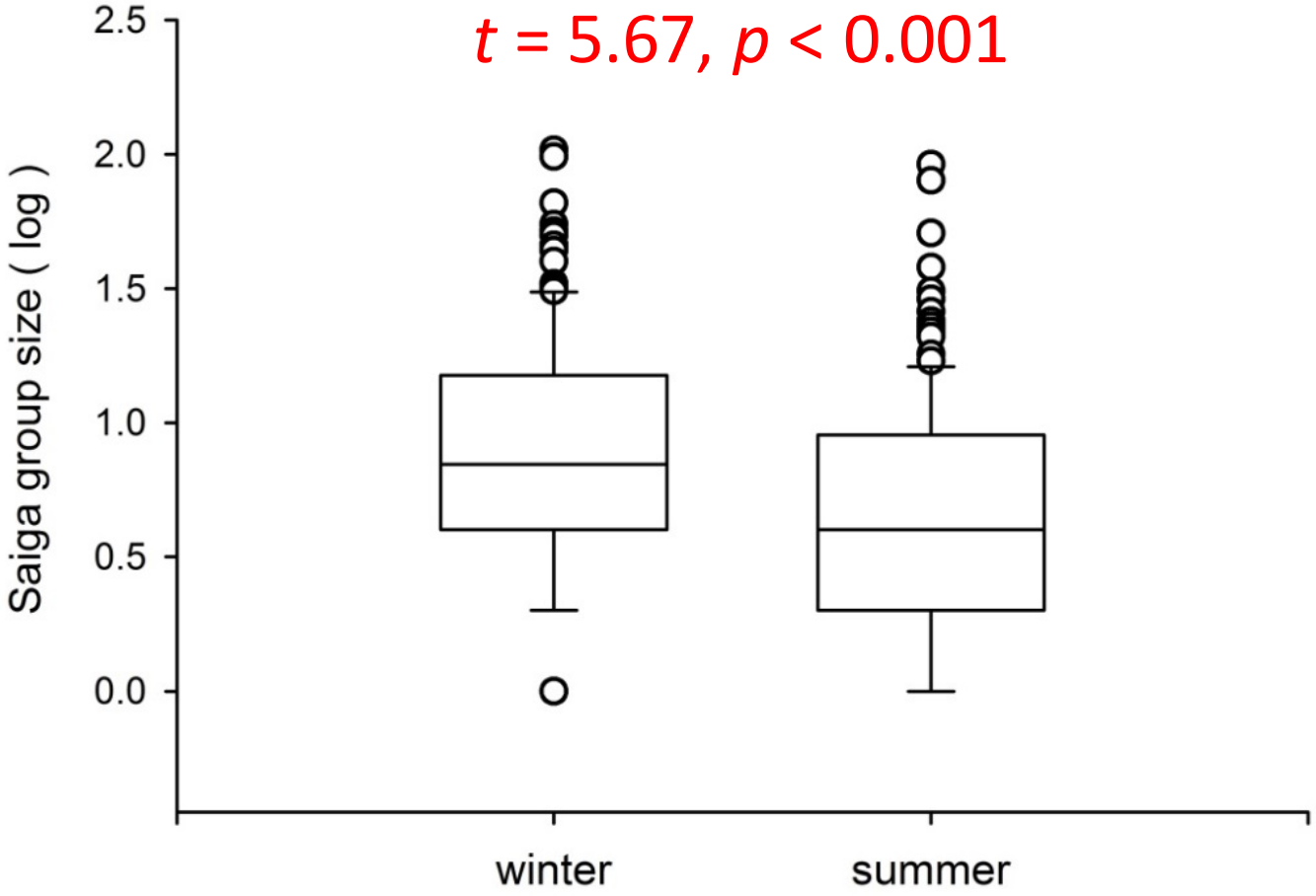
Summer (Aug 15 – 27)

Distribution and grouping patterns of saiga during winter and summer surveys in 2014

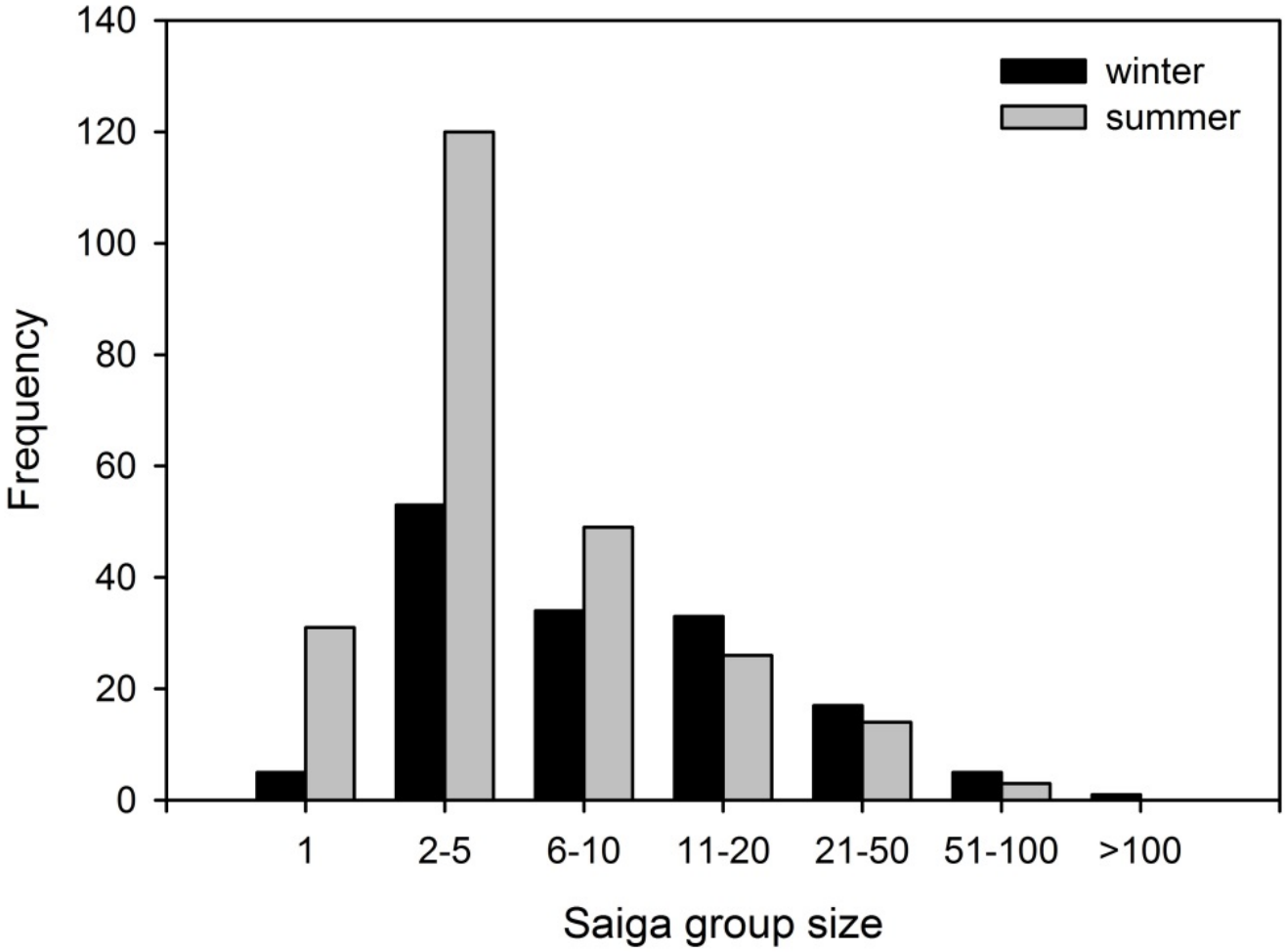


- 148 groups (1,934 individuals) in the winter
- 243 groups (1,738 individuals) in the summer

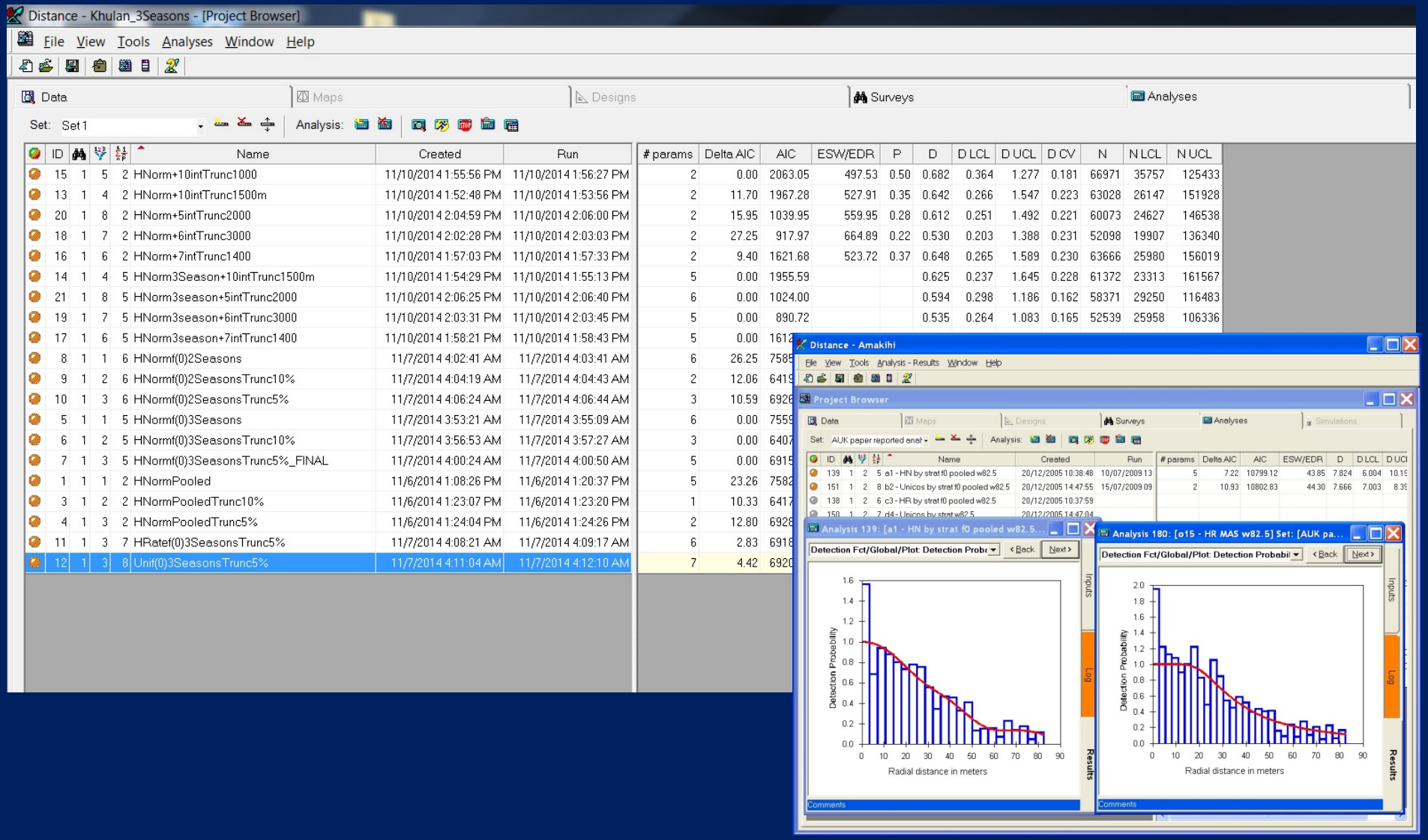
Comparison of saiga group sizes between two seasons



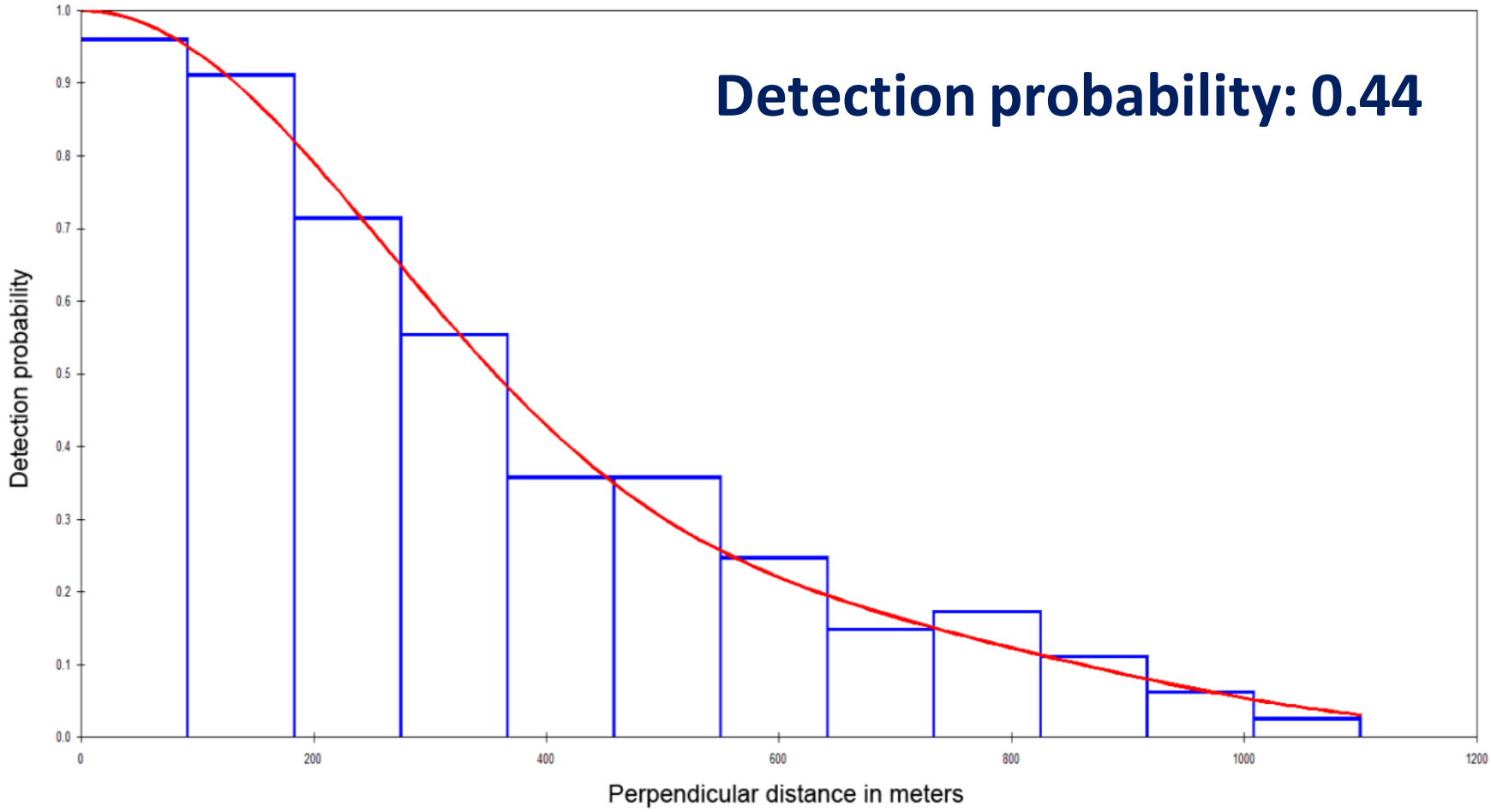
Saiga grouping patterns



Data analysis: Distance software 6.2

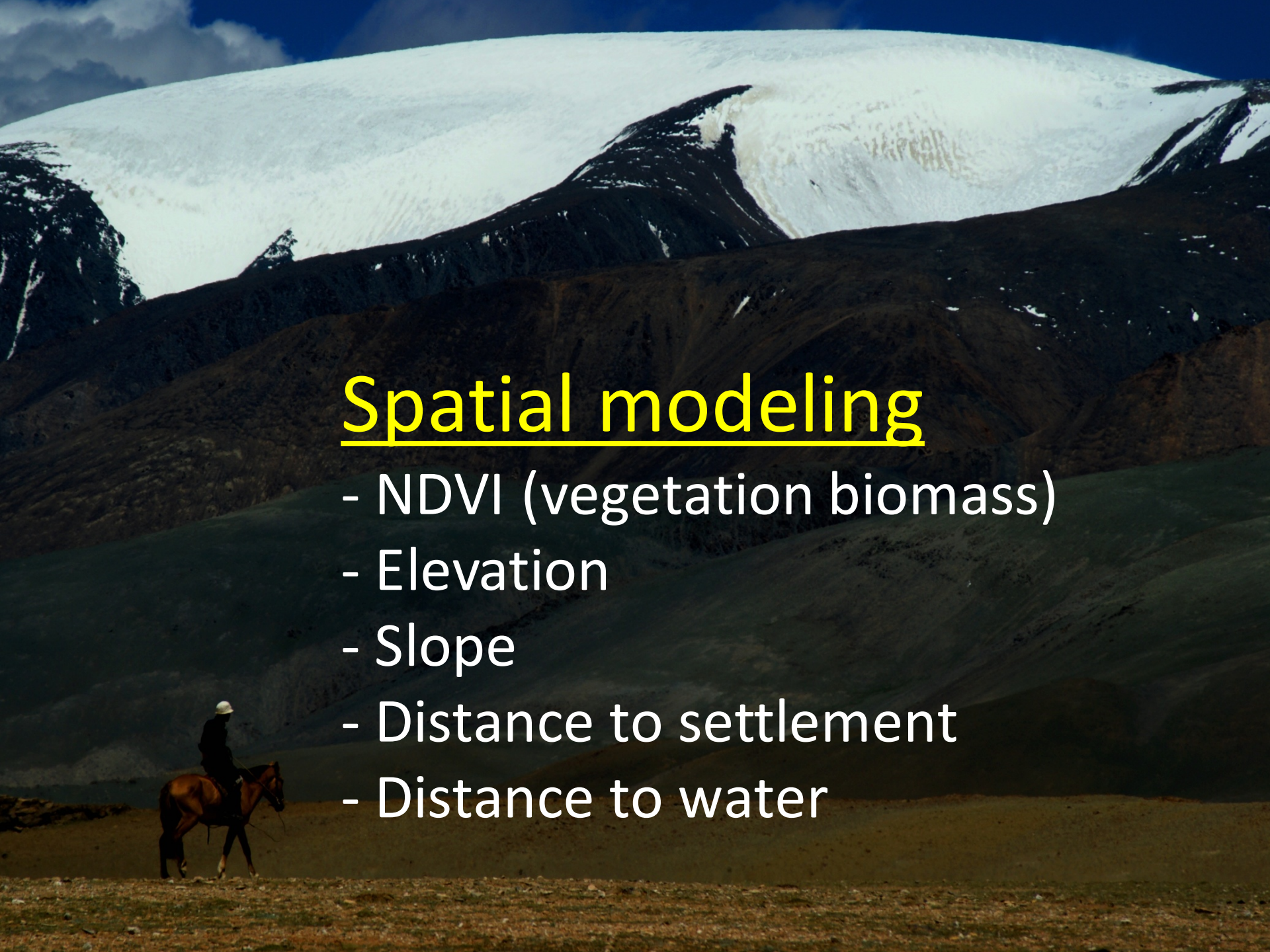


Detection probability functions derived from pooled data for saiga groups



Estimates of saiga density (*D* per km2) and abundance (*N*)

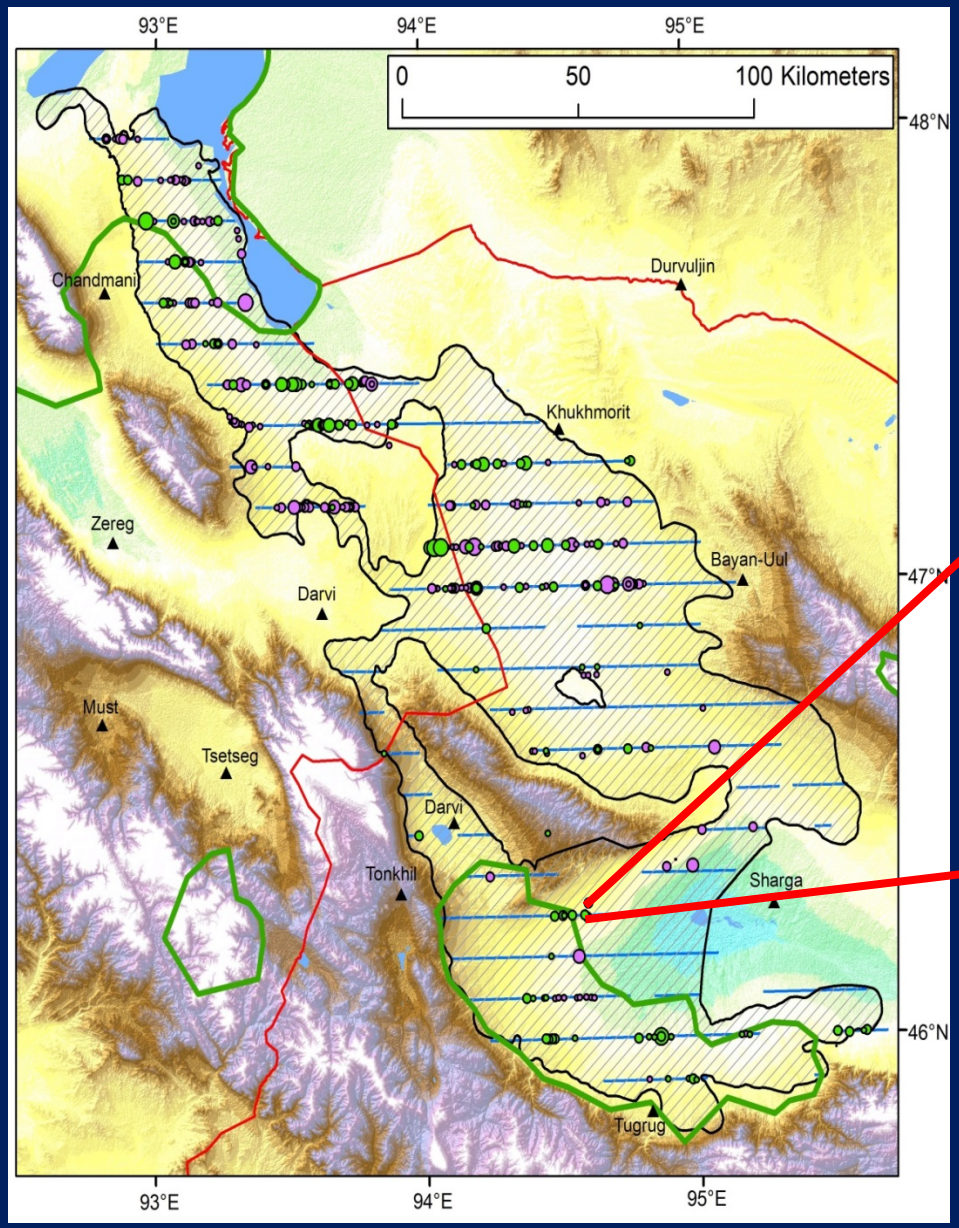
Season	***D***	**95% CI**	***N***	**95% CI**	**(%CV)**
Winter	1.20	0.78 – 1.83	17,696	11,584 – 27,034	21.50
Summer	0.81	0.56 – 1.17	12,202	8,371 – 17,265	18.24
Average	**1.01**	**0.75 – 1.35**	**14,869**	**11,066 – 19,978**	**15.00**

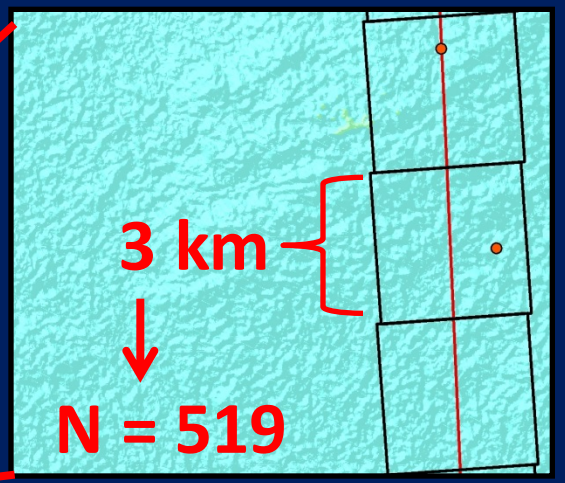


Spatial modeling

- NDVI (vegetation biomass)
- Elevation
- Slope
- Distance to settlement
- Distance to water

Spatial modeling approaches





Model development

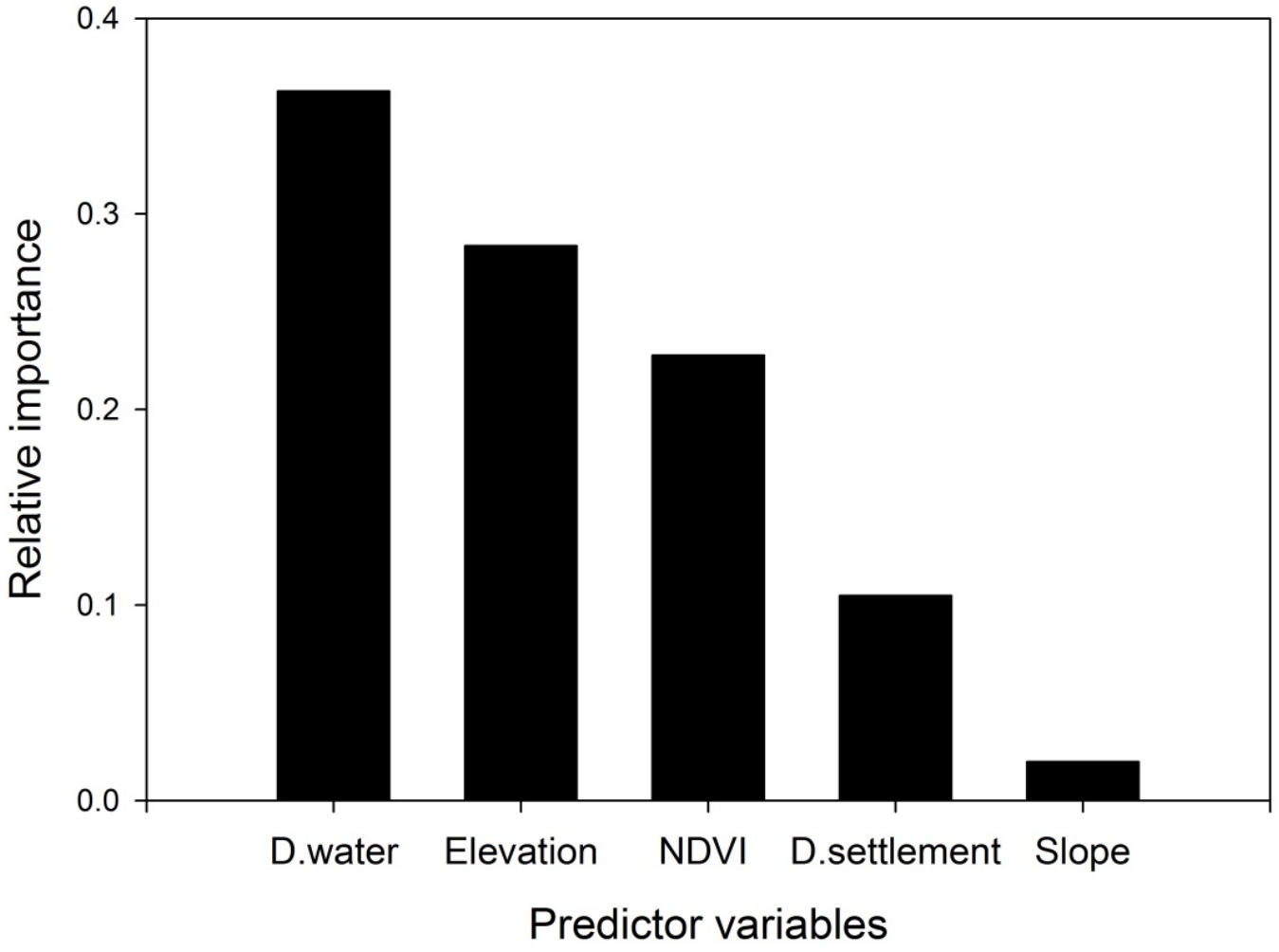
- Generalized Linear Model
- Poisson error distribution
- Model selection: AIC

Factors affecting distribution of saiga
(Generalized Linear Model)

Factors	Estimates
NDVI	+++
Elevation	---
Distance to water	+++
Distance to water2	---

Significant codes: +++ Positive Estimates <0.001
--- Negative Estimates <0.001

Importance of predictor variables explaining spatial distribution of saiga



Summary

Population estimates

- The average estimate was 14,869 animals across the saiga's entire range of 14,713 km2 area, or a density of about 1 saiga/km2.

Spatial modeling

- Spatial distribution of saiga best explained by the model included covariates of NDVI, elevation, and distances to water.

Acknowledgement

Saiga Conservation Alliance, U.S. Fish & Wildlife Service