



# Genetic monitoring of wolves in northern Slovakia

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&

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*Conference on Large Carnivores' Protection in the Carpathians*

# Slovak Wildlife Society



- Established in 1998
- Focus on carnivores (wolf, bear, lynx)
- Members of IBA, IUCN, SCB, LCIE

















## Living with Carpathian Spirits



Monitoring lynx in Štiavnické Mountains  
and Veľká Fatra National Park, Slovakia

Final Report

March 2015





# Large carnivore population monitoring



- Population data needed for hunting management and conservation
- Monitoring often done by different agencies / organisations.
- Results may differ widely - lack of consensus.



# Wolf numbers in Slovakia

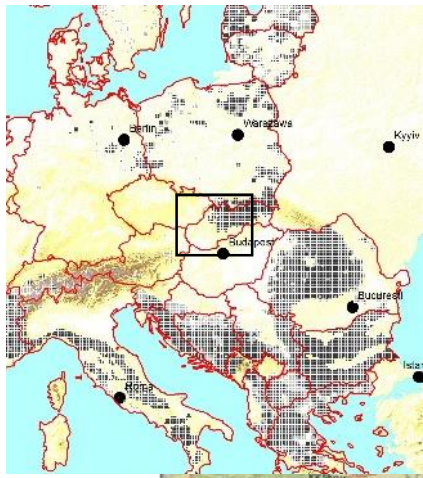


Environmentalists:  
< 150 individuals

Official game statistics:  
> 2,000 individuals



# Study area: Liptov







~ 2,000 km<sup>2</sup>

3 National Parks

~ 73 people/km<sup>2</sup>

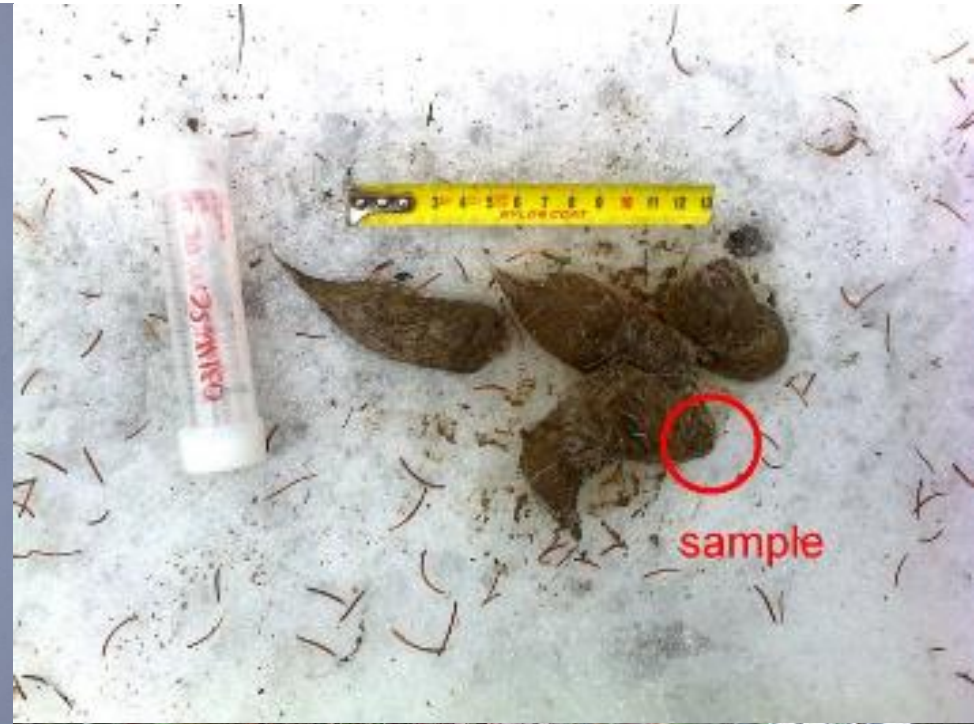




# Methods



12:01 26/JAN/2015



sample



“citizen science”

11:09 26/JAN/2015

Protected area staff and hunters



# Results (2010)

- Samples collected: 45 urine, 4 scat, 5 hair
- 8 microsatellites.
- Genotypes obtained from 48 / 55 (87%)
- Minimum 15 different individuals in study area (3<sup>rd</sup> – 18<sup>th</sup> February 2010).



Helmut Bayerl & Ralph Kühn



# Genetic tracking of wolves

- 11 / 15 individuals detected from multiple samples.



# 10  
(n = 8)



# 14  
(n = 5)



## ENGAGING STAKEHOLDERS IN WILDLIFE MONITORING



## A PILOT STUDY OF WOLVES IN SLOVAKIA USING NONINVASIVE GENETIC SAMPLING

Robin Rigg, Tomáš Skrbinšek & John Linnell

FINAL REPORT  
December 2014



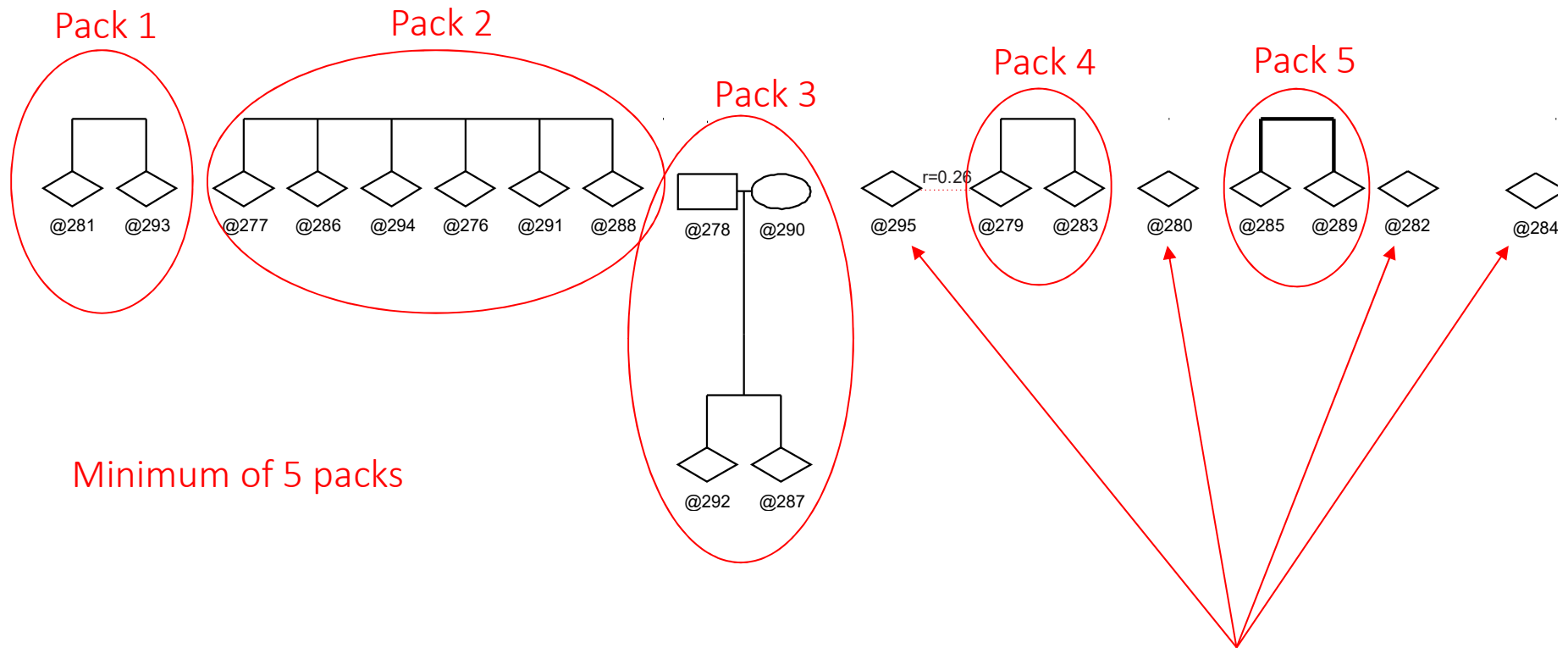


# Results (2013/14)

- Samples collected: 60 urine, 50 scat, 2 hair
- 13 microsatellites
- Genotypes obtained from 46 / 112 (41%)
- Minimum 20 different individuals in study area (Dec. 2013 – June 2014)
- 10 males, 10 females



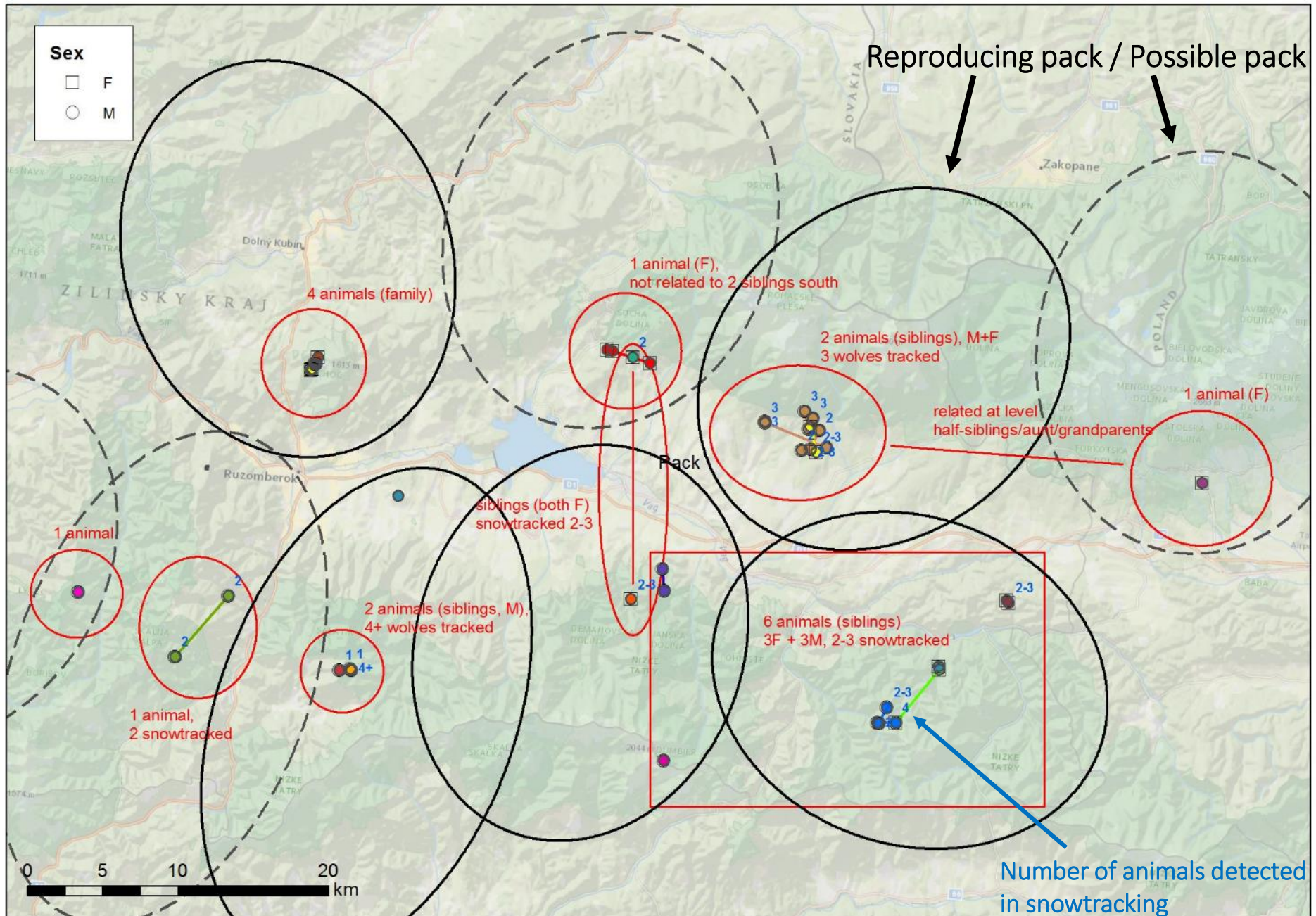
# Pedigree analysis



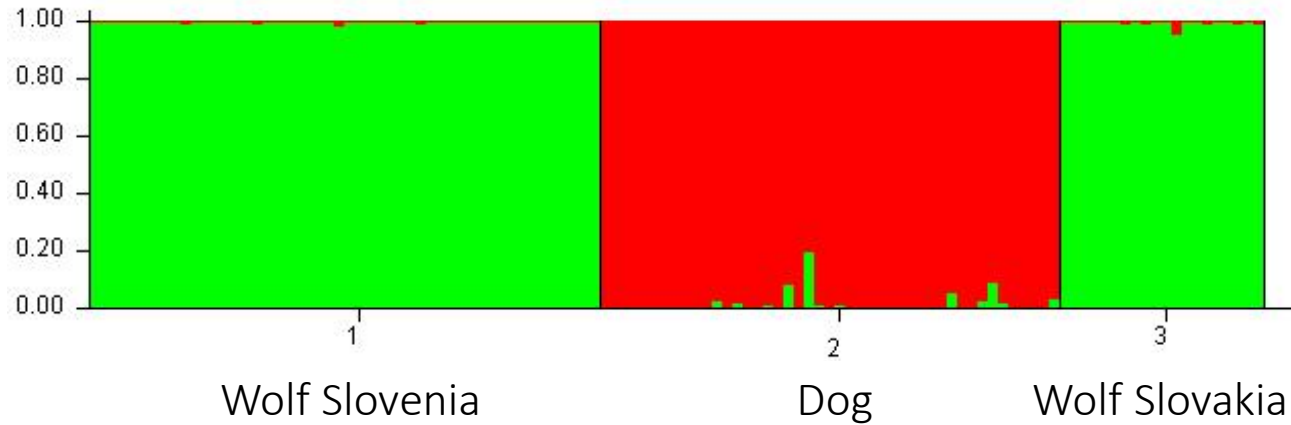
Total of up to 9 packs  
(min. 20 – max. c.45 inds.)

4 unrelated / low relation animals  
- most likely additional packs  
(but could be lone dispersers)

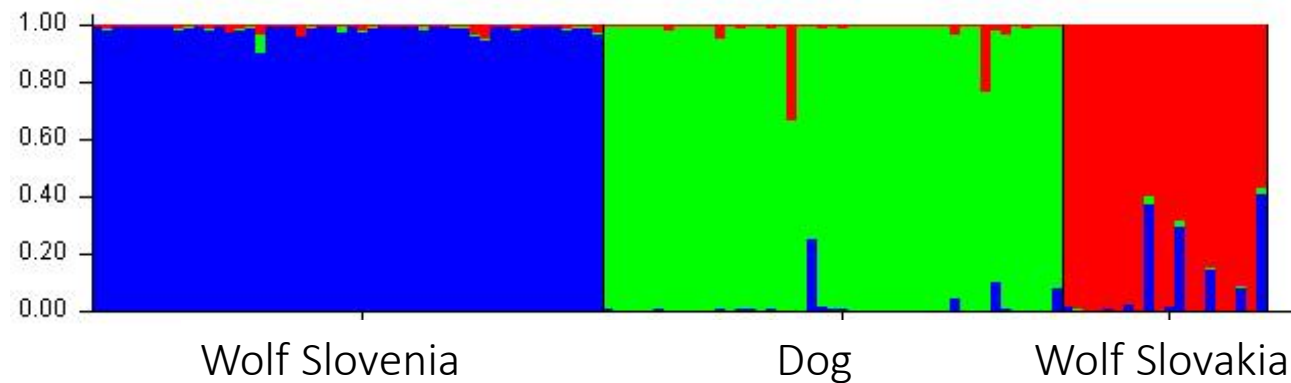




# Test for wolf-dog hybridization



*Assumed 2 clusters  
(wolf / dog)  
no hybridization detected*



*Assumed 3 clusters  
(wolf SLO / dog / wolf SK)  
clear structure SLO - SK*



# Comparison of genetic diversity

Locus#	Population1	Population2	Mean	s.d.	Tot. Het.
1	0.83152	0.74103	0.78627	0.06399	0.83731
2	0.70101	0.80128	0.75115	0.07090	0.77646
3	0.73690	0.67742	0.70716	0.04206	0.80775
4	0.77475	0.70641	0.74058	0.04832	0.76937
5	0.79636	0.76410	0.78023	0.02281	0.83659
6	0.70242	0.61878	0.66060	0.05915	0.70507
7	0.74000	0.38254	0.56127	0.25276	0.68551
8	0.52343	0.70256	0.61300	0.12666	0.65457
9	0.59697	0.73542	0.66619	0.09790	0.65101
10	0.46222	0.64359	0.55291	0.12825	0.64584
11	0.72929	0.71026	0.71977	0.01346	0.74851
12	0.70482	0.28592	0.49537	0.29621	0.63932
13	0.75581	0.61923	0.68752	0.09657	0.72534
14	0.67212	0.72821	0.70016	0.03966	0.73001
15	0.72018	0.71266	0.71642	0.00532	0.74521
16	0.72081	0.38974	0.55528	0.23410	0.65725
17	0.54586	0.71282	0.62934	0.11806	0.68654
18	0.72970	0.79659	0.76314	0.04730	0.76822
19	0.51859	0.54744	0.53301	0.02040	0.64964
20	0.80982	0.54023	0.67503	0.19063	0.79864
21	0.66606	0.66923	0.66765	0.00224	0.66526
Mean	0.68755	0.64216	0.66486	0.03210	0.72302
s.d.	0.10163	0.14013	0.12088	0.02722	0.06559

Dinaric Mts. ~ Slovakia

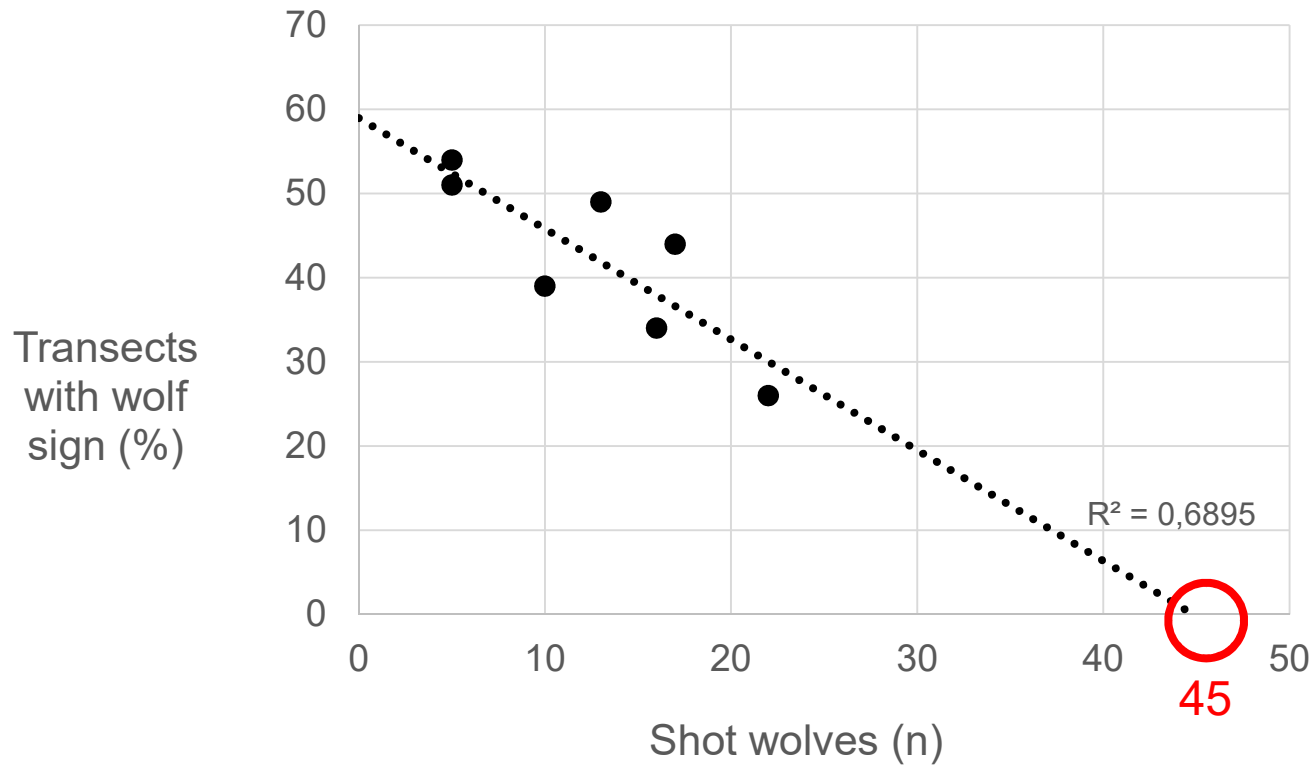
# Outcome

- DNA results accepted by hunting and conservationist bodies.
- Presented at 2015 CIC General Assembly, Pravets, Bulgaria.
- Included in new *Programme of Care for the Grey Wolf in Slovakia* (2016).





# Wolf hunting v abundance (2009 - 2016)



# Summary and implications

- 5 – 9 reproducing packs.
- Relatively good population genetic status.
- No wolf-dog hybridization detected.
- Minimum 20 individuals in study area (maximum ~ 45) .
- Official game statistics (2,123 individuals as of 31.3.2014) are ~ 6-times over-estimated.
- Extrapolating: ~ 340 wolves in Slovakia after winter hunting.



# Next steps

- Capture-mark-recapture  
(More participation of hunters and foresters)
- Expand geographic scope.
- Transboundary: coordinate monitoring with neighbouring countries of the Carpathians.
- Population-level management.

# Thank you

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