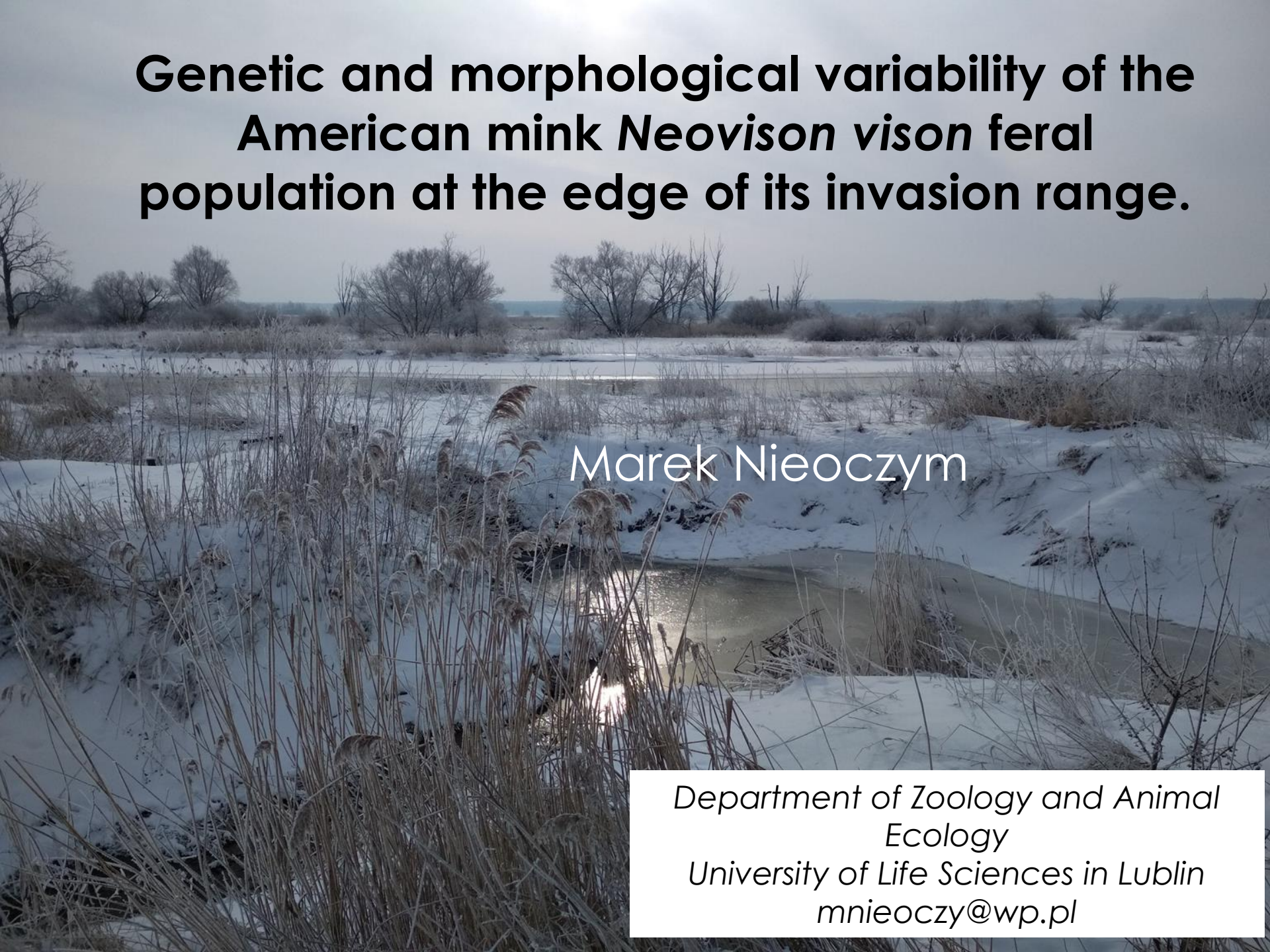
Genetic and morphological variability of the American mink *Neovison vison* feral population at the edge of its invasion range.

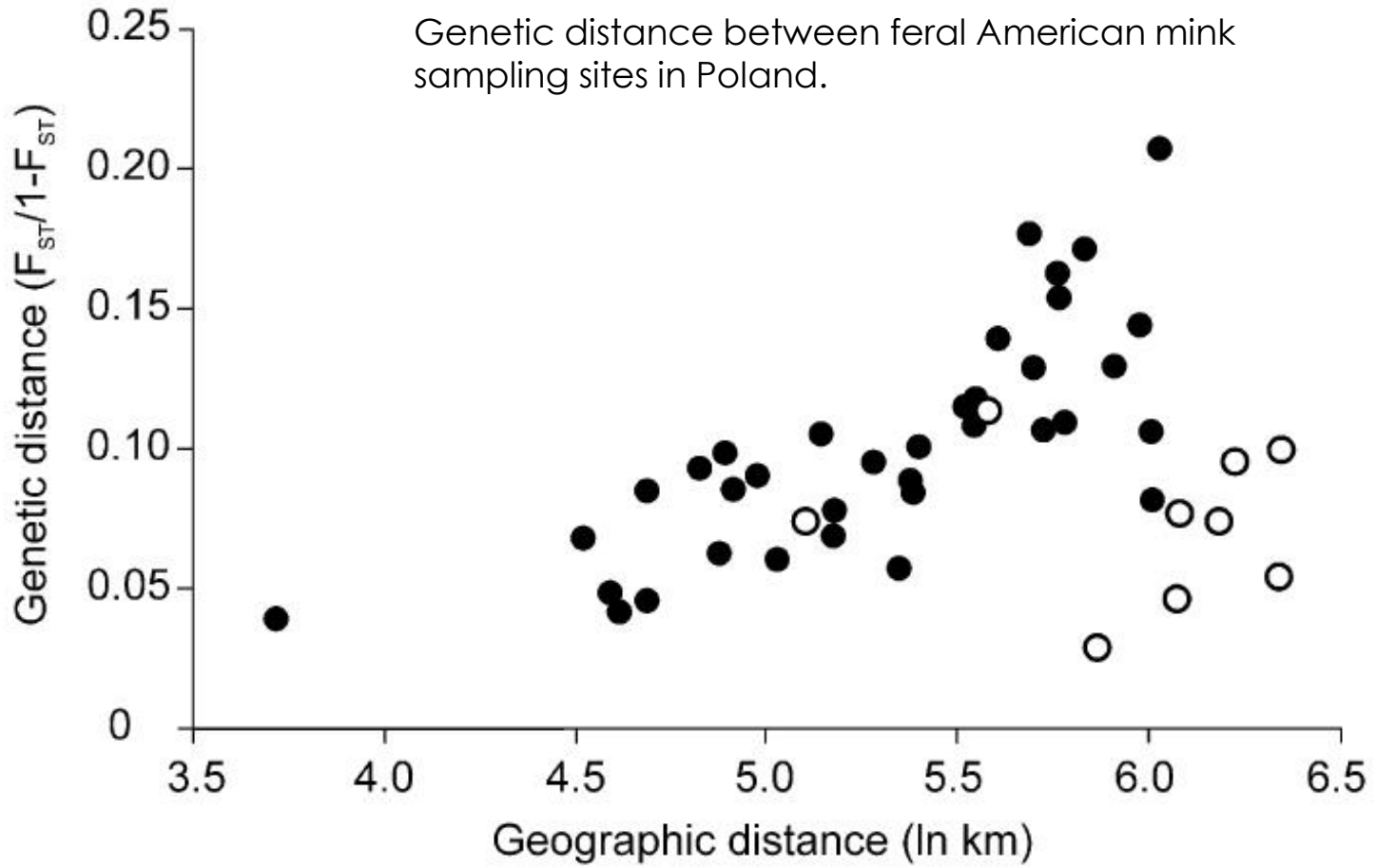


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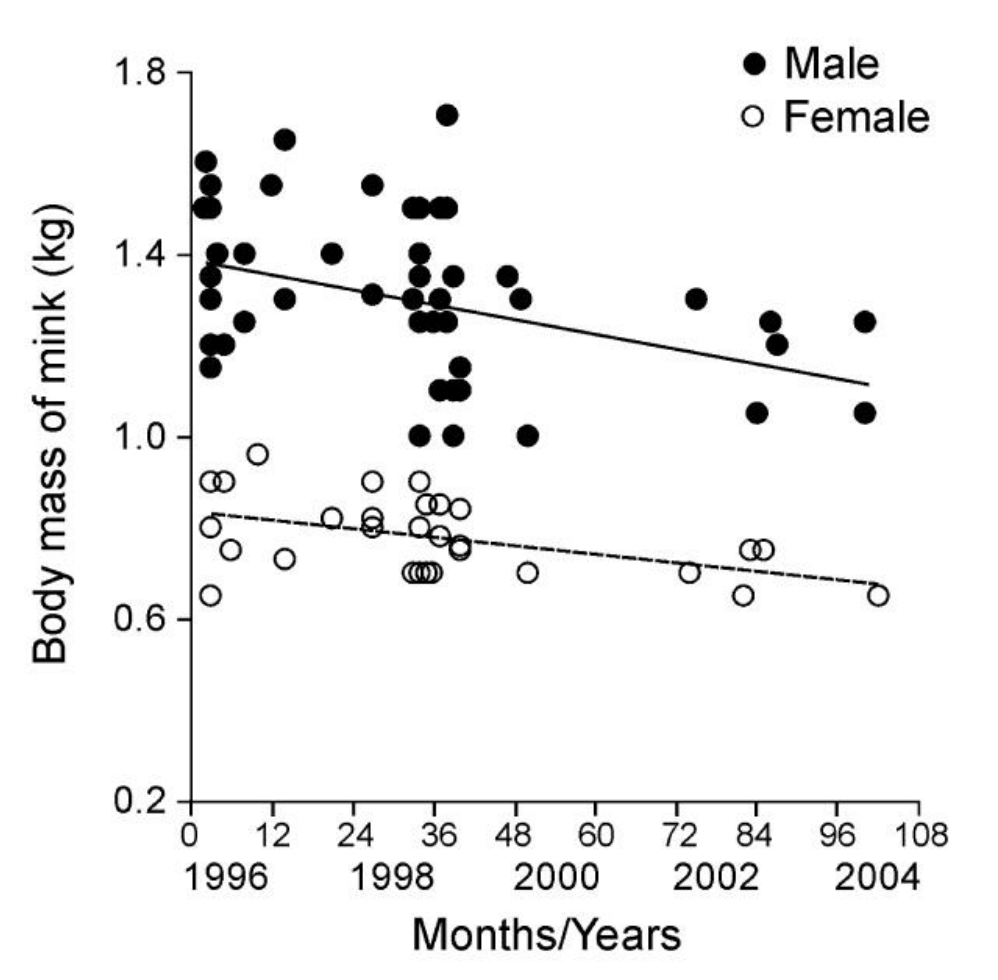
The main aim of the study is the initial verification of the hypothesis that the genetic differentiation of the wild American mink population in the south-eastern part of Poland has decreased.

Genetic distance between feral American mink sampling sites in Poland.



Zalewski A., Michalska-Parda A., Bartoszewicz M., Kozakiewicz M., Brzeziński M. 2010. Multiple introductions determine the genetic structure of an invasive species population: American mink *Neovison vison* in Poland. Biol. Con. 143:1355-1363. https://doi.org/10.1016/j.biocon.2010.03.009

Furthermore, the morphological variability of the American mink will be determined on the basis of measurements of the body length and weight.



Decline in body mass of male and female American mink in consecutive years of invasion of the Warta Mouth National Park.

A. ZALEWSKI, M. BARTOSZEWICZ 2012. Phenotypic variation of an alien species in a new environment: the body size and diet of American mink over time and at local and continental scales, *Biological Journal of the Linnean Society*, 105, 3: 681–693, https://doi.org/10.1111/j.1095-8312.2011.01811.x

NATIVE GEOGRAPHIC RANGE



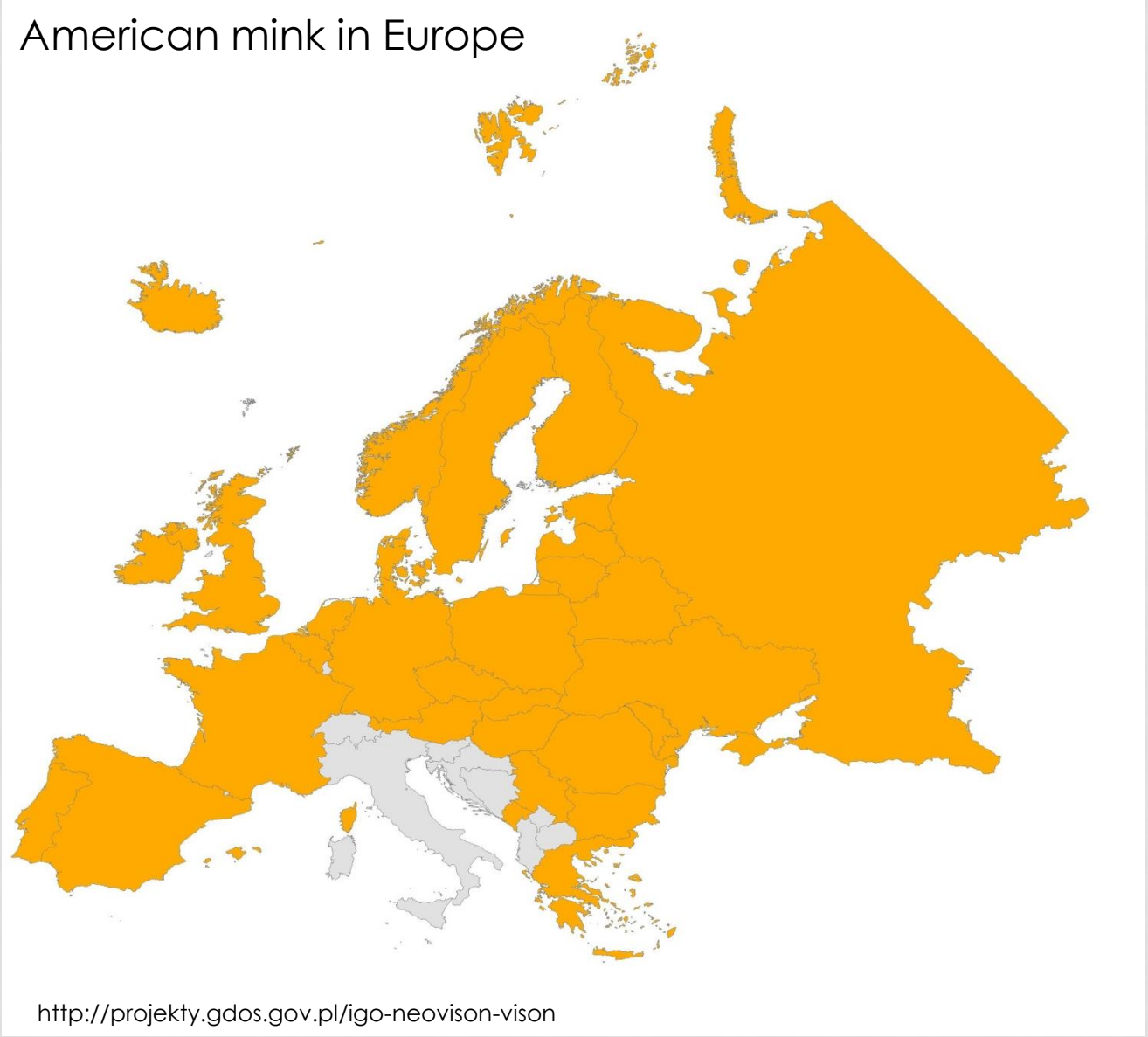
IUCN (International Union for Conservation of Nature) 2016. Neovison vison. The IUCN Red List of Threatened Species. Version 2021-1

IUCN: „American mink is listed as **Least Concern** because it has a wide distribution and is relatively common across this range. Although local declines have occurred, the species is secure in many areas."

But some wildlife biologists are concerned that wild American mink populations in North America are not only threatened by disease and competition for resources with these feral American mink, but also by hybridising with them (Kidd, A. G., et al. 2009).



The American Mink was introduced in many parts of Europe and Asia. Feral populations of American Mink also occur in South America (Argentina and Chile).



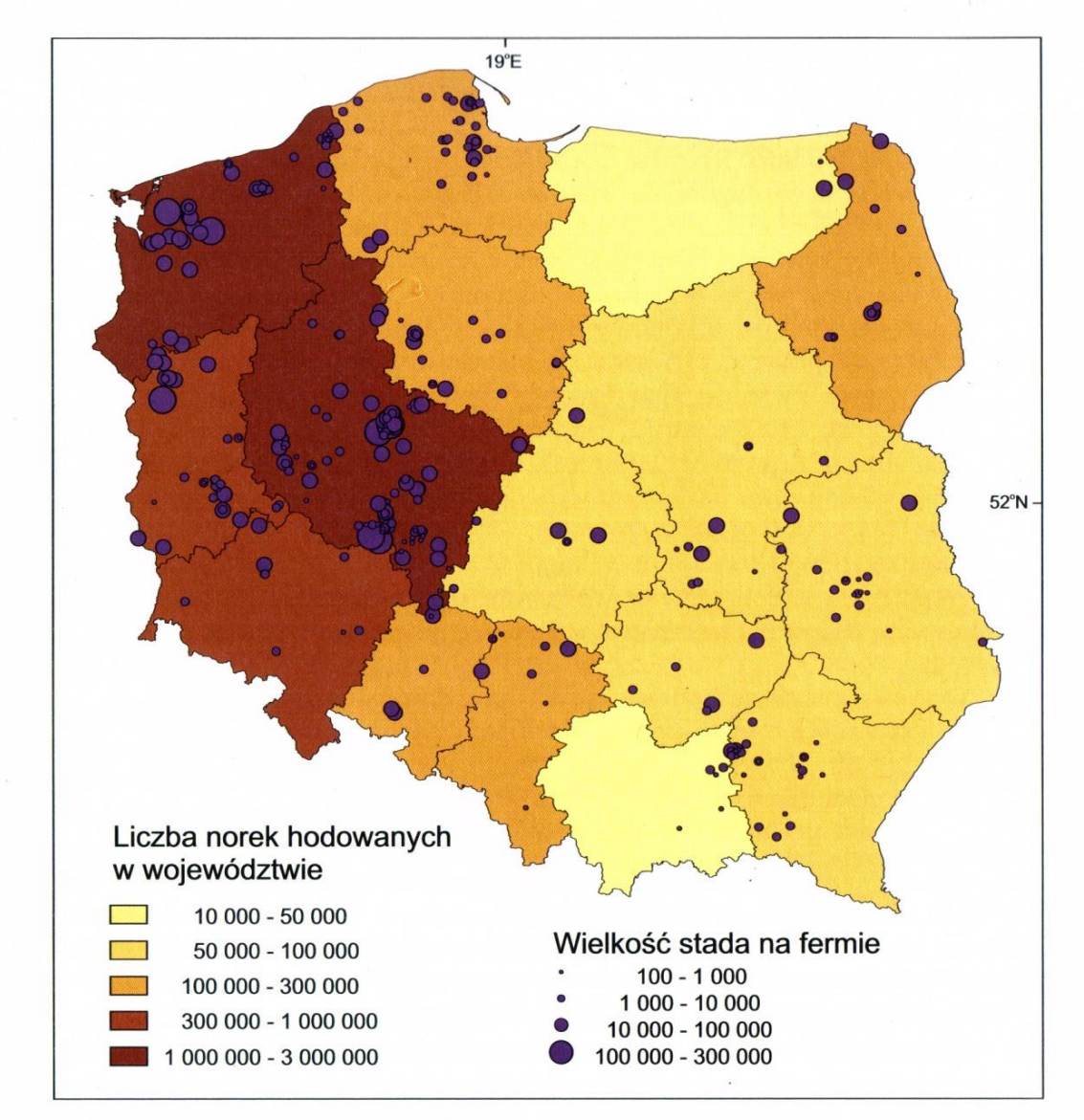
American mink in Poland

1. Invasive alien species in Poland:

- moderately invasive alien species
- widespread species
- increasing numbers

2. In 2001, American mink was entered into the list of game animals in Poland.

Size of female breeding stocks of American mink kept on a farm in provinces of Poland



Zalewski A., Brzeziński M. 2014. Norka amerykańska. Biologia gatunku inwazyjnego

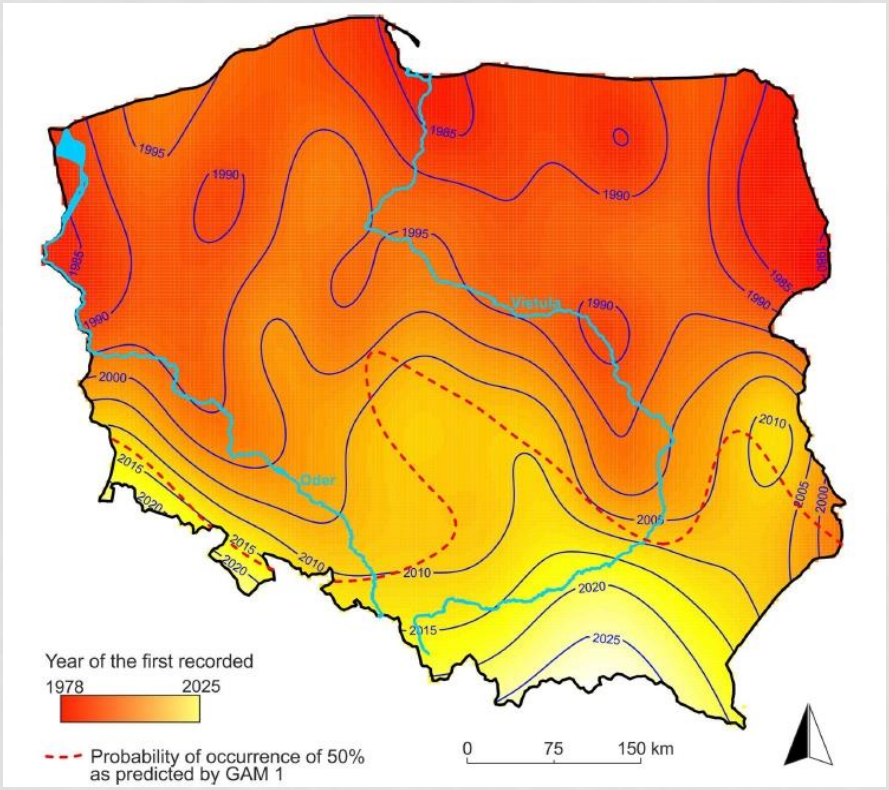
Wild American mink in Poland

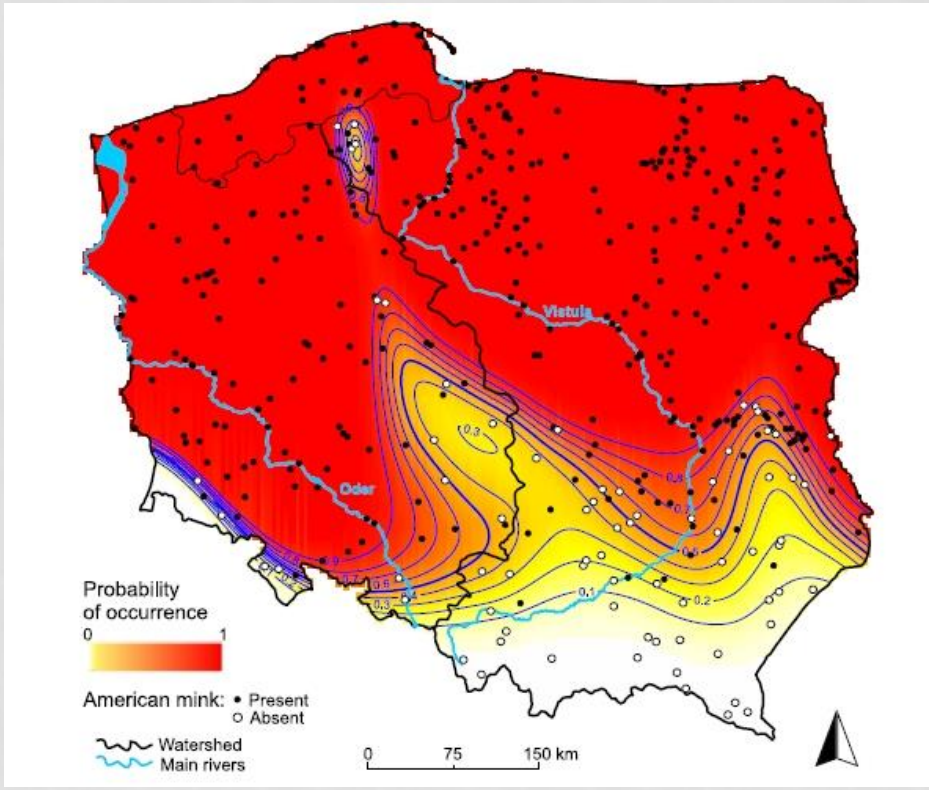


http://projekty.gdos.gov.pl/igo-neovison-vison

From the beginning of the 1980s to the end of the 1990s American mink invaded over 50% of Poland. Since that time extensive new areas have been colonised, and the mink population has expanded to the south.

Predicted year of the first record of American mink in Poland





Brzeziński, M., Żmihorski, M., Zarzycka, A. et al. Expansion and population dynamics of a non-native invasive species: the 40-year history of American mink colonisation of Poland. Biol Invasions ***21,*** *531–545 (2019). https://doi.org/10.1007/s10530-018-1844-7*

The origin of feral American mink

1. Introduction by humans (e.g. in the former USSR).
2. Escape and release (by of animal rights activists) of breeding individuals.
3. Feral animals colonize new areas by migrating along water courses.

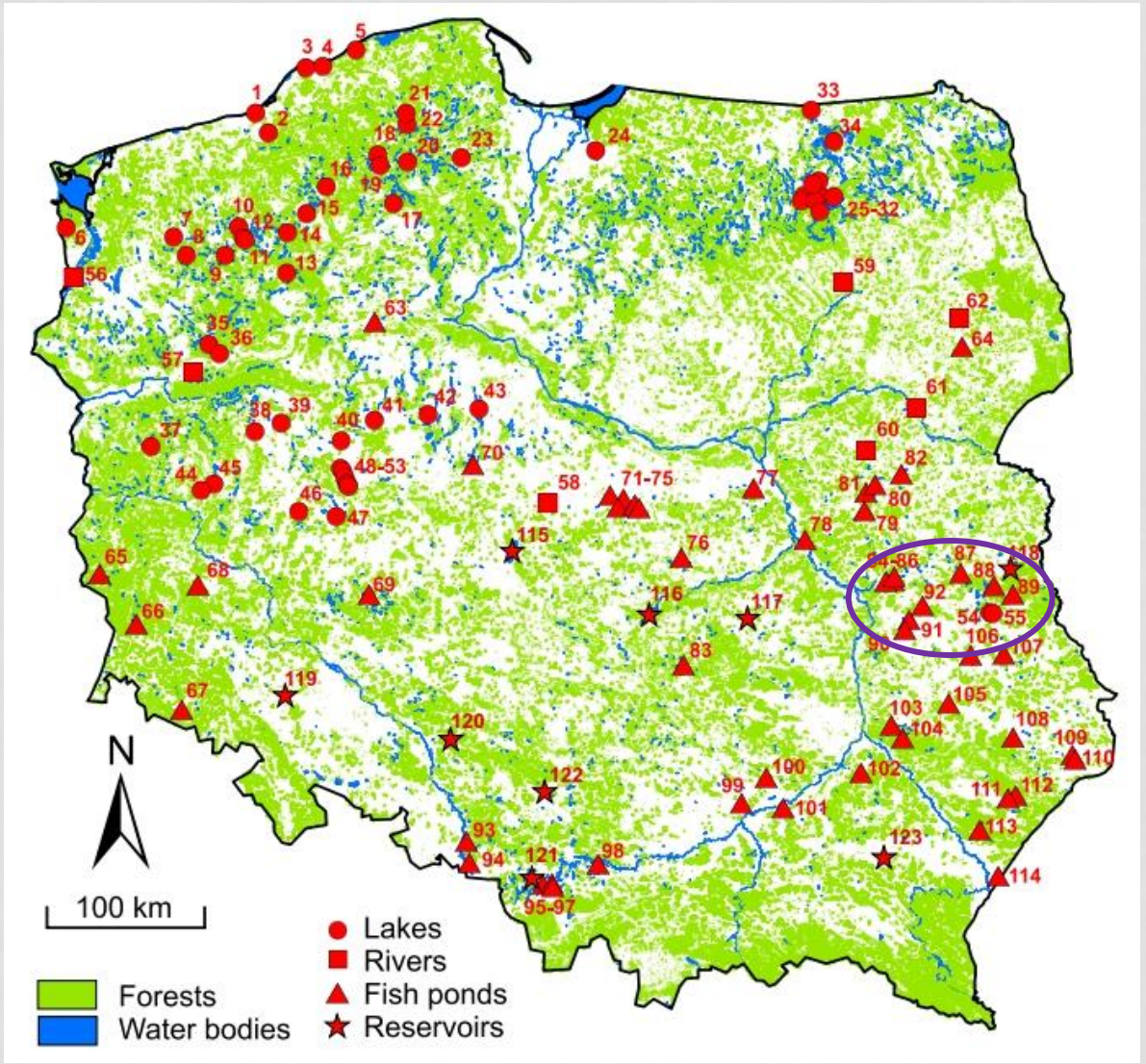
The origin of American mink in Poland

Studies conducted in Poland proved that wild minks in the eastern part originate from animals who came from Belarus and Lithuania, while the majority of minks settling in western Poland were animals which escaped from fur farms in Poland and Germany.

The preliminary results concerning the distribution and abundance of wild American mink on the fishponds of the Lublin region, i.e. the results of the American mink capturing.

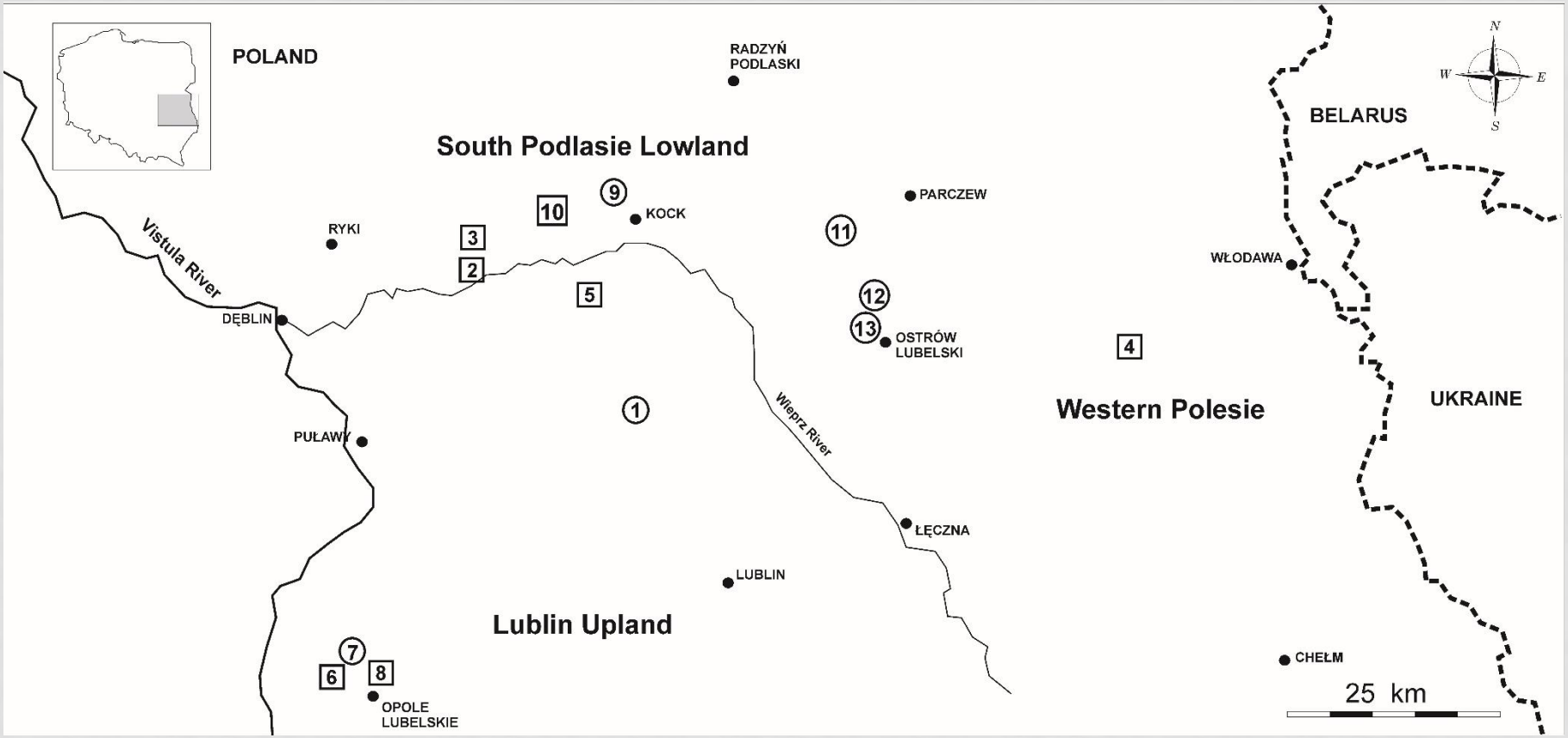


American mink is found along streams, lakes, reservoirs, fishponds and sea coast as well as in swamps and marshes. It prefers densely vegetated areas.



Brzeziński M, Żmihorski M, Nieoczym M, Wilniewczyc P, Zalewski A. The expansion wave of an invasive predator leaves declining waterbird populations behind. *Divers. Distrib*. 2020;26:138–150. https ://doi.org/10.1111/ddi.13003

The American minks were caught on the 13 fishpond complexes in the southern part of the South Podlasie Lowland, the Lublin Upland and the Western Polesie in central-eastern Poland.



Square – fishpond complex where at least on mink was trapped; circle – fishpond complex where no mink was caught.













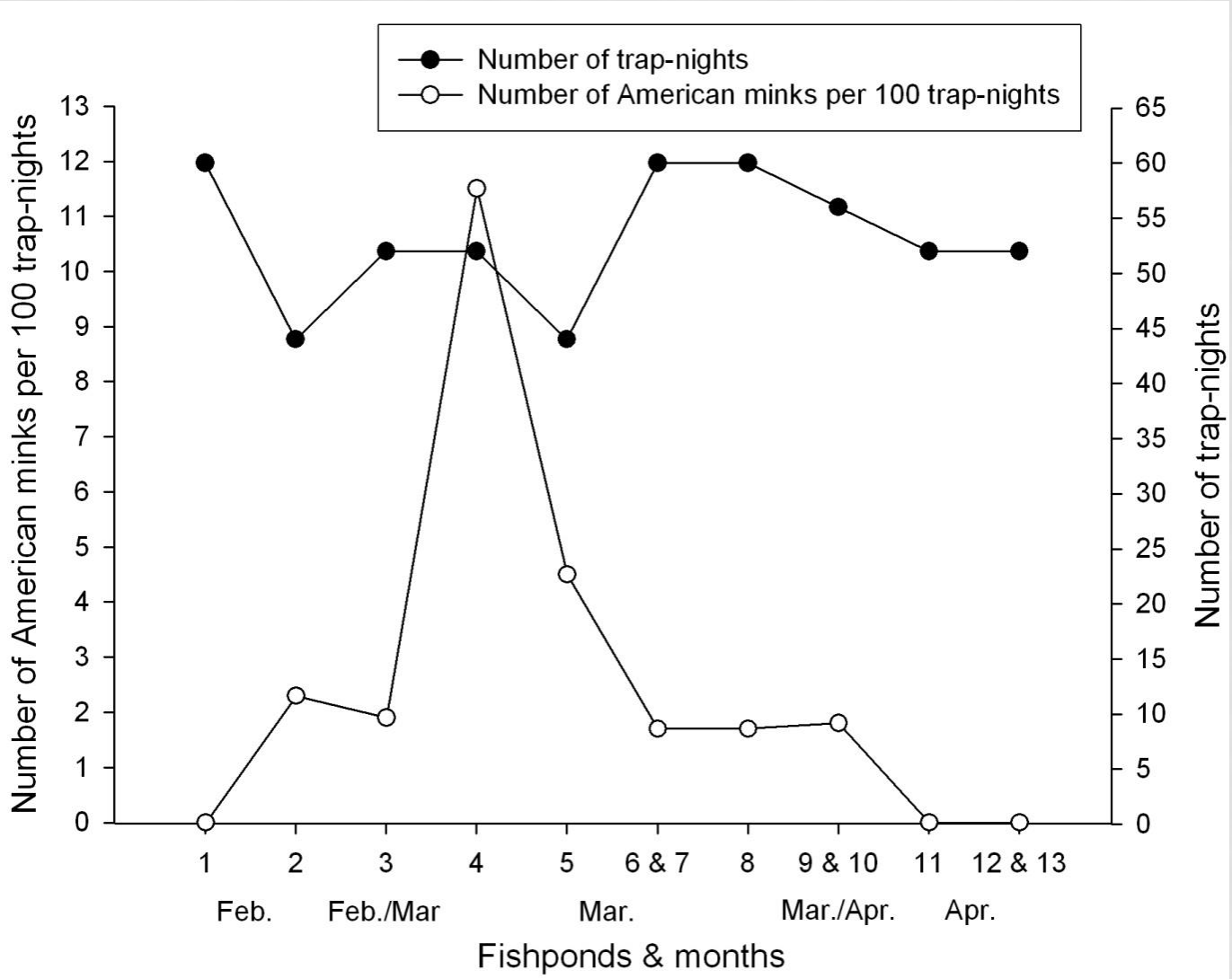






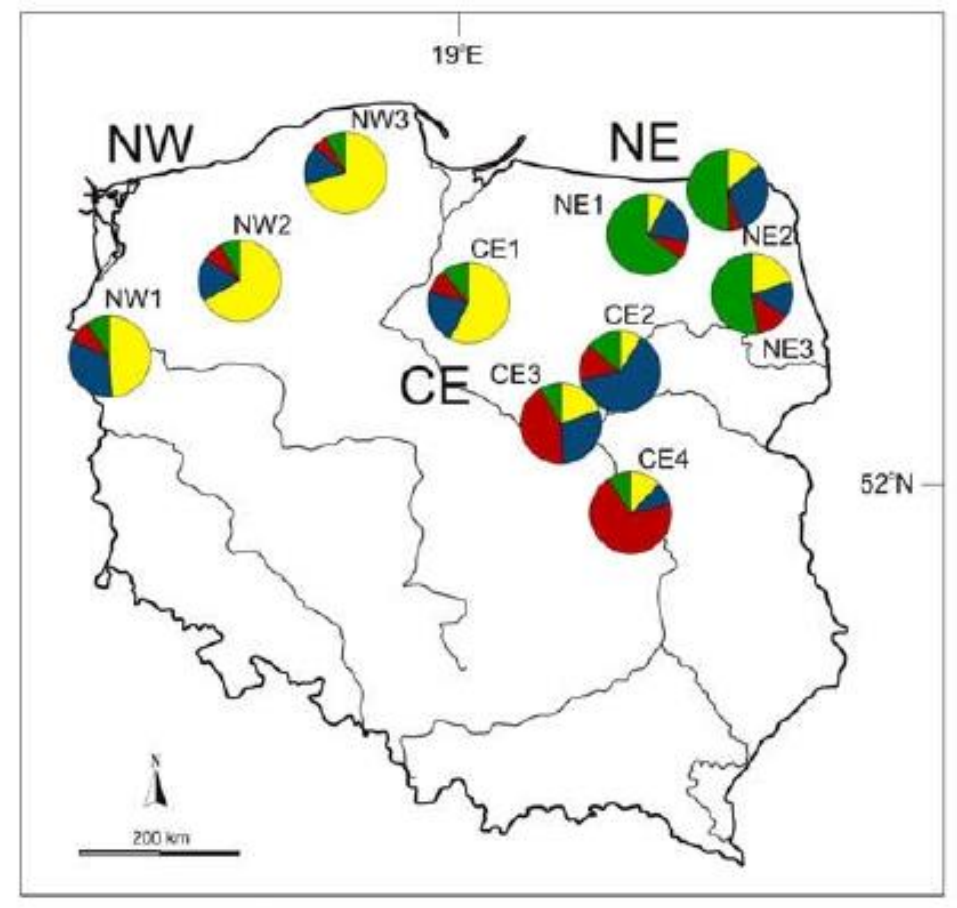
Selected details of the studied areas, methods and obtained results.

No.	Fishpond complex	River	Surrounding landscape	Number of captured individuals	Number of traps	Period (day and month)
1.	Samoklęski	Minina	fields	0	12	1-6 Feb.
2.	Sobieszyn	Wieprz, Świnka	meadows, wetlands	1	11	18-22 Feb.
3.	Wólka Sobieszyńska-Podlodów	Świnka	forest	1	13	25 Feb.-1 Mar.
4.	Stary Brus	Mietułka	forest, meadows, fields, wetlands	6	13	3-7 Mar.
5.	Rawa	Minina	forest, meadows	2	11	9-13 Mar.
6.	Jankowa	Leonka	forest, meadows	1	10	18-22 Mar.
7.	Pomorze	Chodelka	forest, meadows	0	5	18-22 Mar.
8.	Wola Rudzka (Pustelnia, Kulig, Grabówka)	Chodelka, Poniatówka	forest, fields	1	15	24-28 Mar.
9.	Kock	Czarna	fields, forest	0	8	29 Mar.-2 Apr.
10.	Kawęczyn	Struga	fields	1	6	29 Mar.-2 Apr.
11.	Siemień	Tyśmienica, Piskornica	forest, fields	0	13	8-12 Apr.
12.	Tyśmienica	Tyśmienica	forest, meadows	0	8	15-19 Apr.
13.	Babianka	Tyśmienica	forest, meadows	0	5	15-19 Apr.



The index of mink trapping success for 6 fishpond complexes was from 1.7 to 4.5 individuals per 100 trap-nights and for fishponds and surrounding wetlands in Stary Brus (Western Polesie) was equal to 11.5 individuals per 100 trap-nights.

The planned research aims to determine whether the minks captured in south-eastern Poland are related to the populations from north-eastern Poland, especially to the population of the Vistula River.



Previous studies of the genetic differentiation of wild American minks showed the presence of at least four subpopulations occurring in western and north-western, central and north-eastern Poland

Zalewski A., Michalska-Parda A., Bartoszewicz M., Kozakiewicz M., Brzeziński M. 2010. Multiple introductions determine the genetic structure of an invasive species population: American mink *Neovison vison* in Poland. Biol. Con. 143:1355-1363. https://doi.org/10.1016/j.biocon.2010.03.009

The process of colonization of new areas by American mink.

Is the area colonized by a small group of animals that increase in numbers in subsequent breeding seasons, or if there is a continuous influx of minks from neighbouring areas?

1.

In the first case, the genetic differentiation of the newly created population will be low and there will be a low genetic similarity between the newly created population and the neighbouring populations.

2.

In the second case, the newly formed and adjacent populations will not show a significant difference in genetic variation.

Conclusions

Results of the present study enables further wide-ranging research aimed at determination of the occurrence and distribution of the wild American mink population in south-eastern Poland as well as continuation of the genetic and morphological studies to assess its descending. Explanation of the process of new areas colonization by mink will allow preparation of guidelines for limitation of its expansion rate.







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National Science Centre in Poland

(No. DEC-2020/04/X/NZ8/00615).

I thank the owners, managers and employees of fishponds as well as hunters from local Hunting Associations and the regional management of the Polish Hunting Association in Lublin, Chełm and Biała Podlaska for the permits and support.

I would like to sincerely thank M. Brzeziński, R. Ceglarski, R. Dziedzic, A. Zalewski, and A. Żmuda for scientific and professional assistance during the research project.

Genetic and morphological variability of the American mink Neovison vison feral population at the edge of its invasion range.

Thank you!

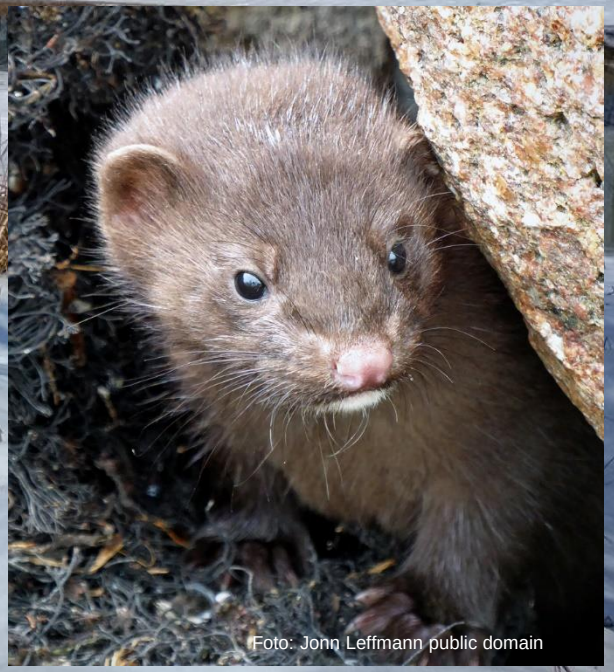


Foto: Jonn Leffmann public domain