

Studies on the European mink demise in Belarus

Attempts of eradication of American mink in Belarus and Estonia

Recommendations for the mink situation in Spain

Sidorovich V.E.

**Vertebrate Predation Research Group
Institute of Zoology
National Academy of Sciences of Belarus**

1. Studies on the European mink demise in Belarus

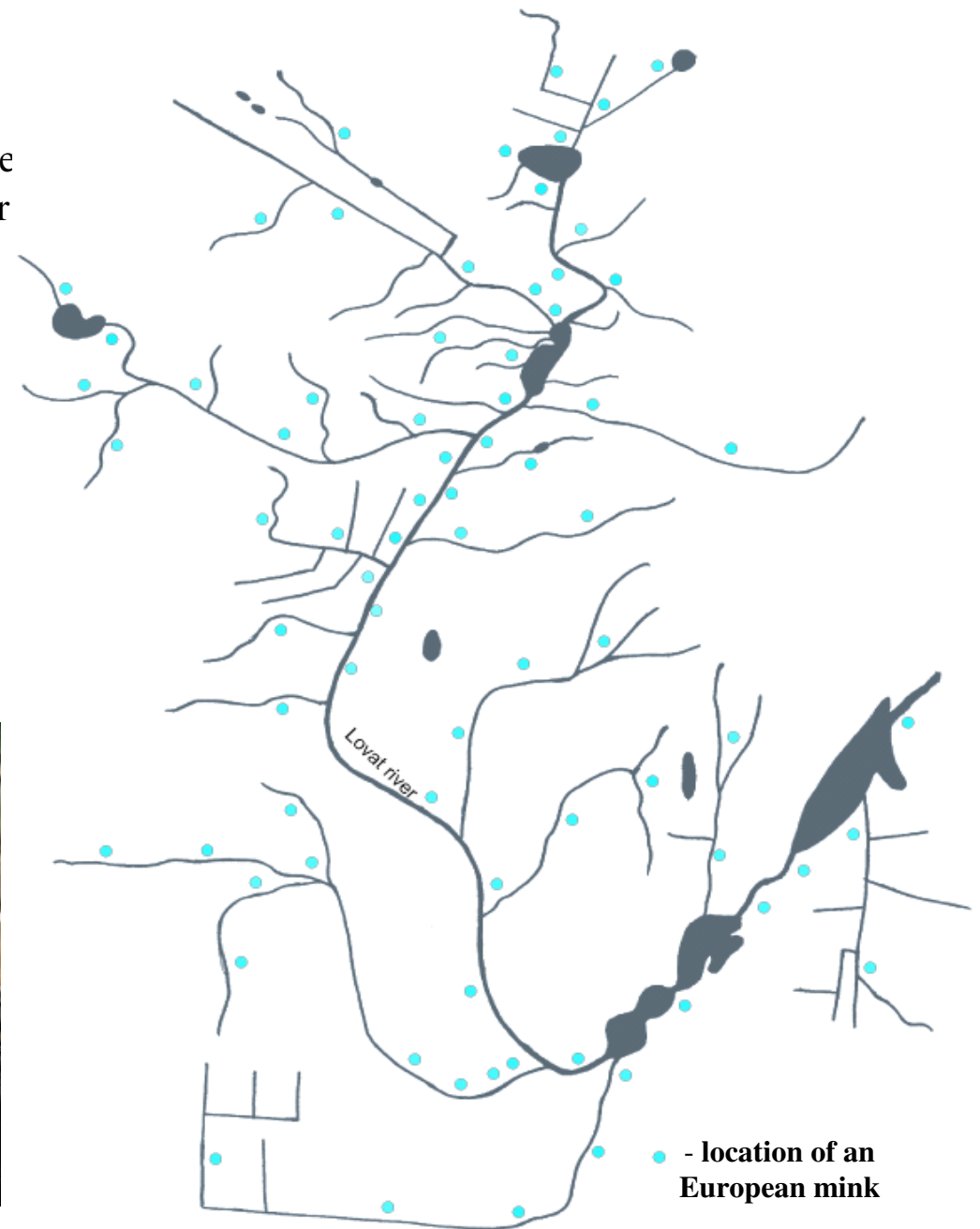


In 1986-2003 in the Lovat upper reaches, north-eastern Belarus the studies on the variety of pressing questions on the European mink population decline have been carried out.



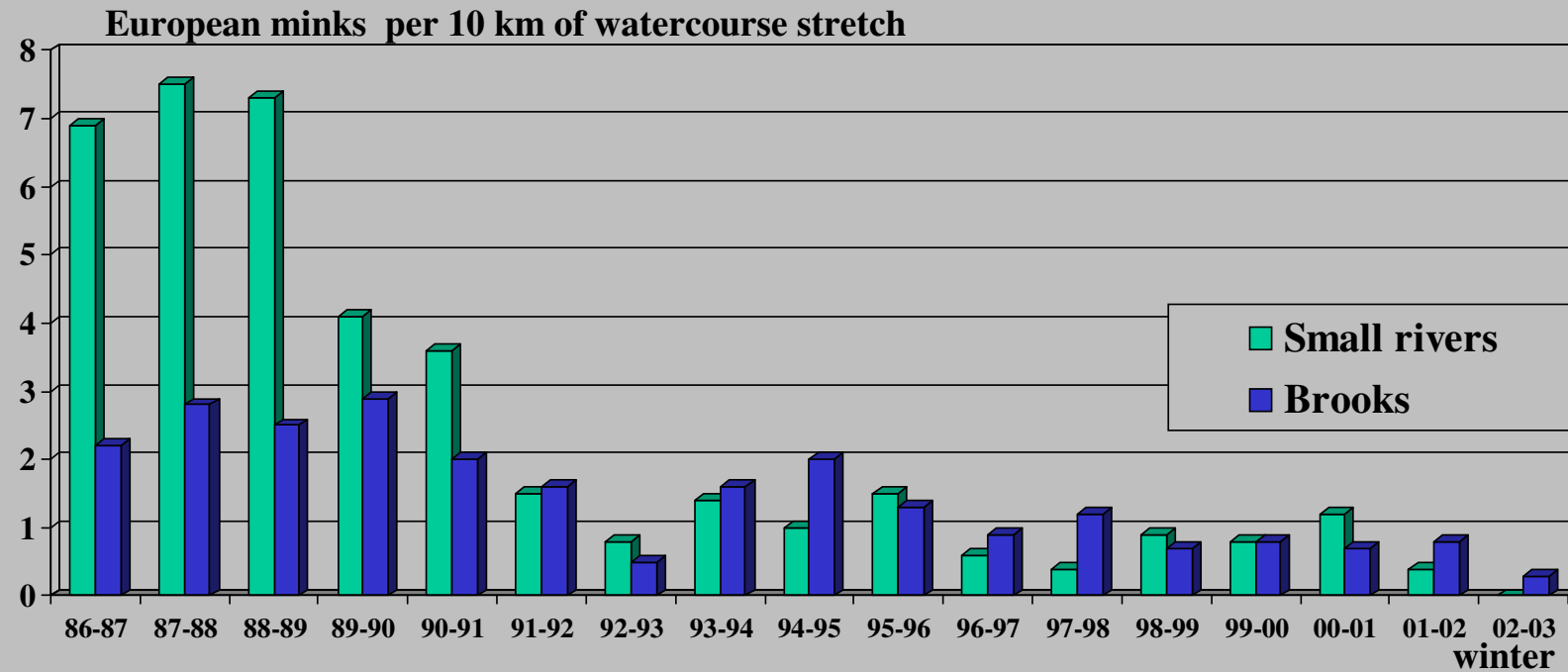
The **main research goals** were to get more knowledge on the European mink ecology and reveal the causes of the current decline of its populations. The mentioned population was investigated through its declining from the stage of the fairly stable dense population to the extinction. During the population decline, an influence of various unfavorable factors have been tested.

Typical distribution of the European mink before the American mink expansion in the Lovat river head during the winters of 1986-1989



Distribution of the European mink when the American mink got high density in the Lovat river head during the winter of 1997-1998





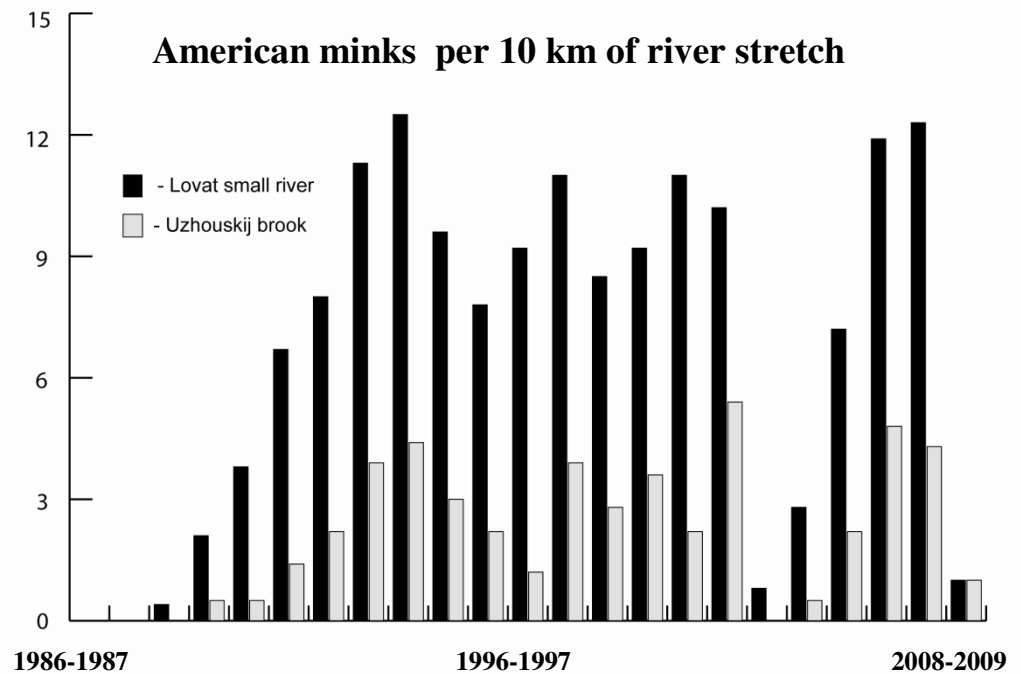
Dynamics of the European mink density in the Lovat river head, north-eastern Belarus, 1986-2003





In the Lovat river head as well as everywhere in Belarus, the decline in European minks was tightly correlated with the American mink expansion. There was no any exception in that observed in Belarus.

Due to a high reproduction rate, the expansion of the American mink population ran fairly fast. All females bred every year with a high fertility about 7.4 embryos per pregnant female on average. The high reproduction rate led to the fast occupation of the suitable habitats by the American mink.





Habitat deterioration and pollution

In the the Lovat upper reaches during the late 1980s and early 1990s in, when the European mink numbers decreased rapidly, all types of aquatic ecosystems in the area looked fairly pristine and they were not polluted, and this indicates that changes in environment were not responsible for the decline in the European mink population.





Conversely, the riverine habitats in the Lovat river head as well as in any other river catchments, where the European mink disappeared, were densely populated by beavers which construction activity leads to a marked increasing in habitat carrying capacity for the species.



Prey abundance and availability



Supply with aquatic prey was checked,
and it was found to be sufficient.



Prey abundance and availability



As it has been revealed, frogs were a very important prey of the European mink, and just this prey species was plentiful there. For instance, as a result of a detailed census that was carried out along 200 m section of the Lovat river in December 1995, 79 kg of common frogs were caught in nets. It comprised about 395 kg per one km of the river stretch.



Influence of the American mink expansion, but which kind of its impact is the most detrimental?

- **Diseases and parasites brought by American minks?**
- **Altered reproduction in European minks due to an interbreeding with American minks?**
- **Aggressive encounters from American minks towards European minks?**
- **Competition for prey with American minks harder affecting European minks?**



Radiotracking study



During 1996-2001 in the Lovat river head we have fixed radiocollars on 38 European minks. 18 of them were radiotracked longer than 6 months up to two years. At the same time transmitters were fixed on 77 American minks, and 45 of them sufficiently were radiotracked.



Radiotracking study as a tool to reveal aggressive encounters

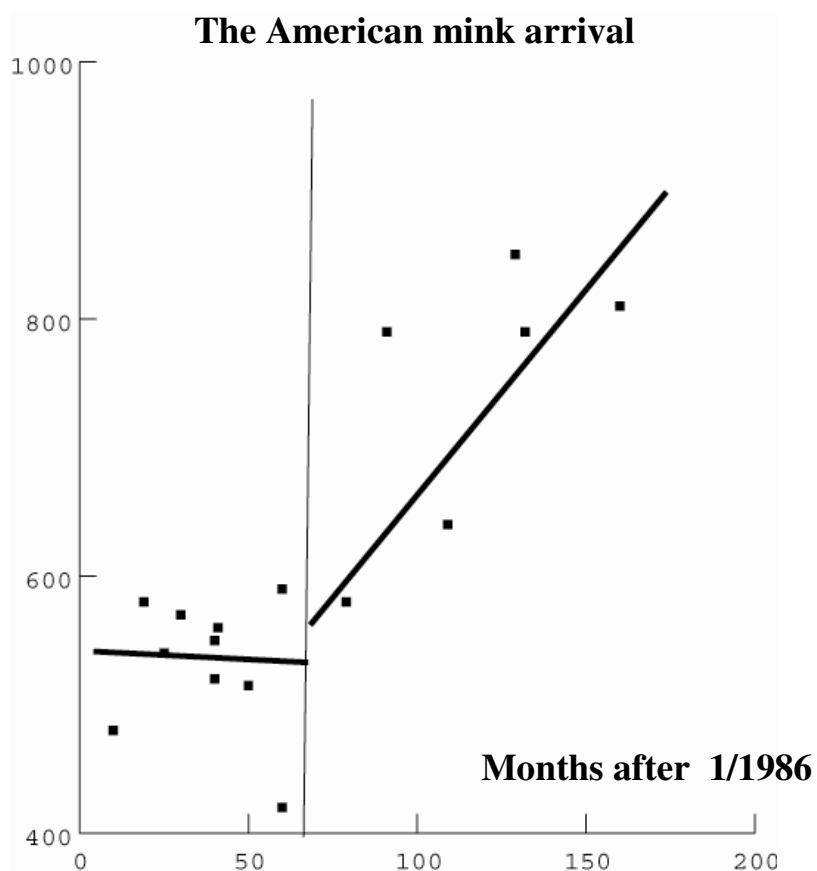


It has been revealed that aggressive encounters between naturalised mink and native mink are common, and the data obtained suggest that just attacks by naturalised mink could lead to the quick European mink disappearance. These aggressive encounters were mostly initiated by American mink males, and were directed towards European mink of either sex. Only once an aggressive attack from a female American mink towards a female native mink was recorded.

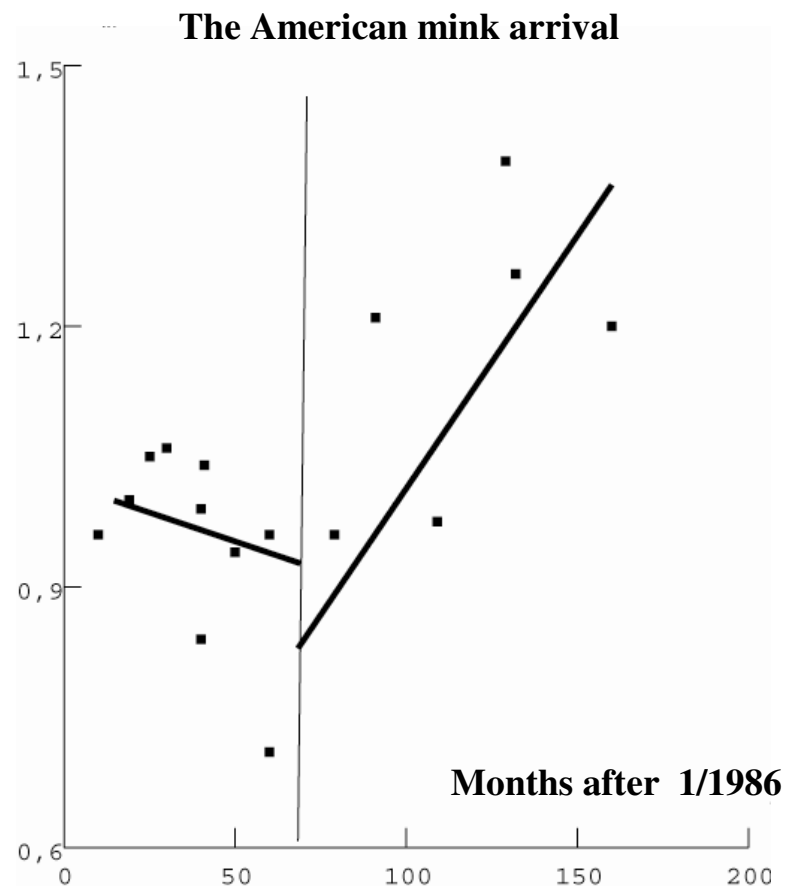




Change in the female European minks after the American mink arrival in the Lovat upper reaches, NE Belarus, 1986-1997



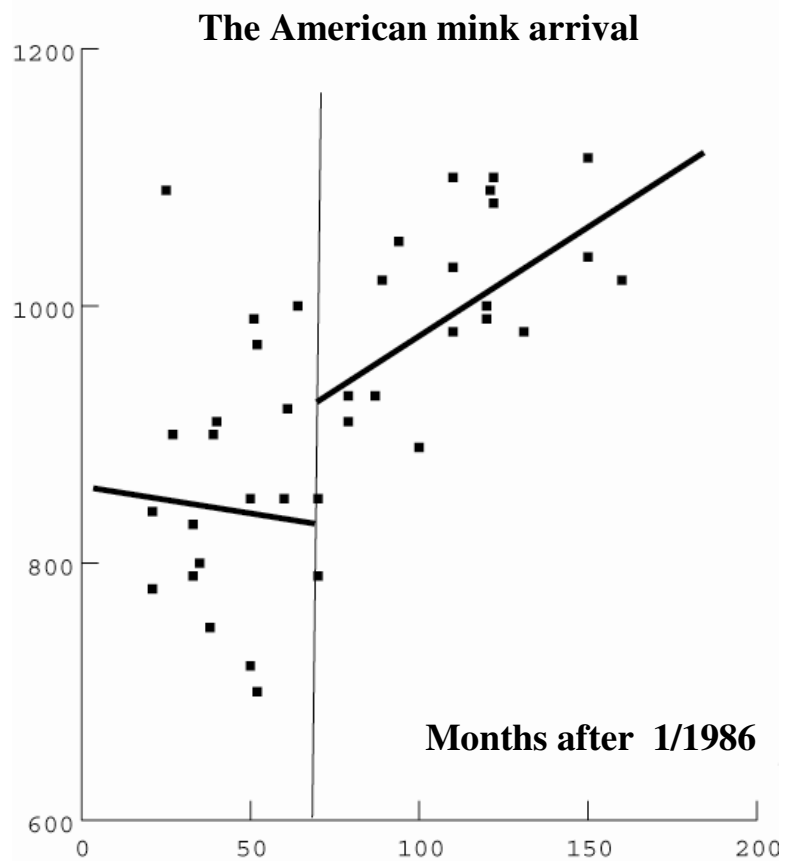
Body weight, g



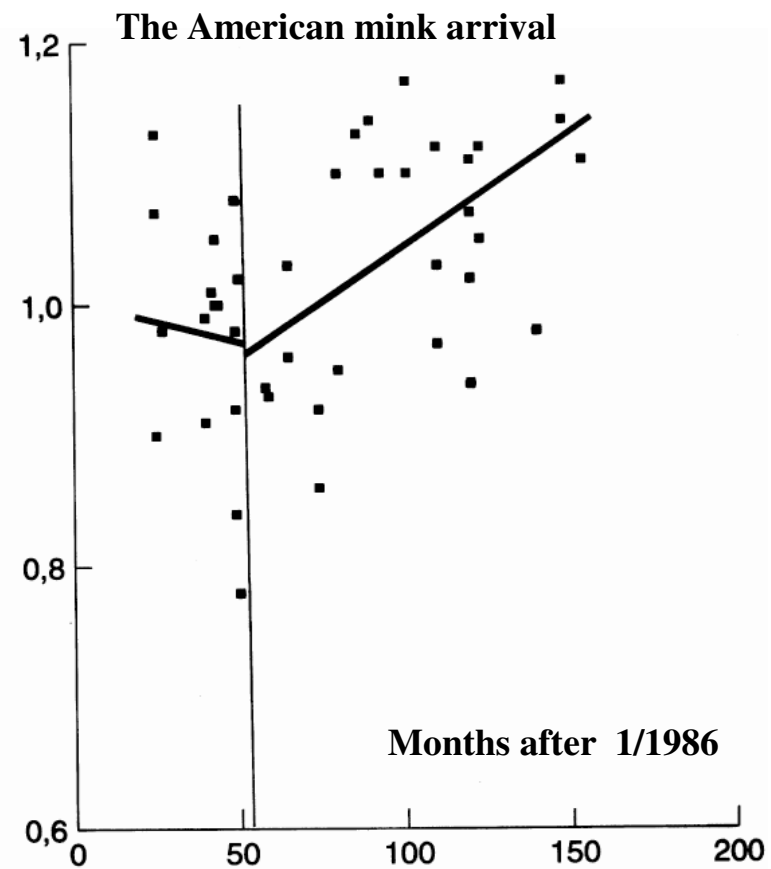
Body condition index



Change in the male European minks after the American mink arrival in the Lovat upper reaches, NE Belarus, 1986-1997



Body weight, g



Body condition index



In effect of the aggressive behaviour of American minks the majority of European minks ranged or stayed at brooks as habitats of the poorest quality. We never found a European mink litter at a brook, whereas 33 litters were found along small rivers and glacial lakes. It is possible that females are not able to inhabit such small streams continuously as there are insufficient resources available to allow them to raise a litter. In the conditions of a high density of American minks, brooks appeared the last habitats available for European minks, but in this habitat type the species female can not provide sufficient reproduction.



Demographic results

The proportion of juveniles in the European mink population was very low (28.6%), and the juvenile-adult ratio was 0.4. In contrast, in the expanding population of American mink the proportion of juveniles and the juvenile-adult ratio was significantly higher: 83.0% ($G=27.1$, $P < 0.01$) and 4.0, respectively.



So, habitat loss by European mink due to the pronounced aggressive behaviour of American mink as well as connected with that crash of reproduction in European mink were the cause of the native species demise.



This inference suggests that merely eradication of the alien species may prolong presence of the European mink in a given habitat. Such an eradication may be either complete or partial, but regular.

2. Attempts of eradication of American mink in Belarus and Estonia

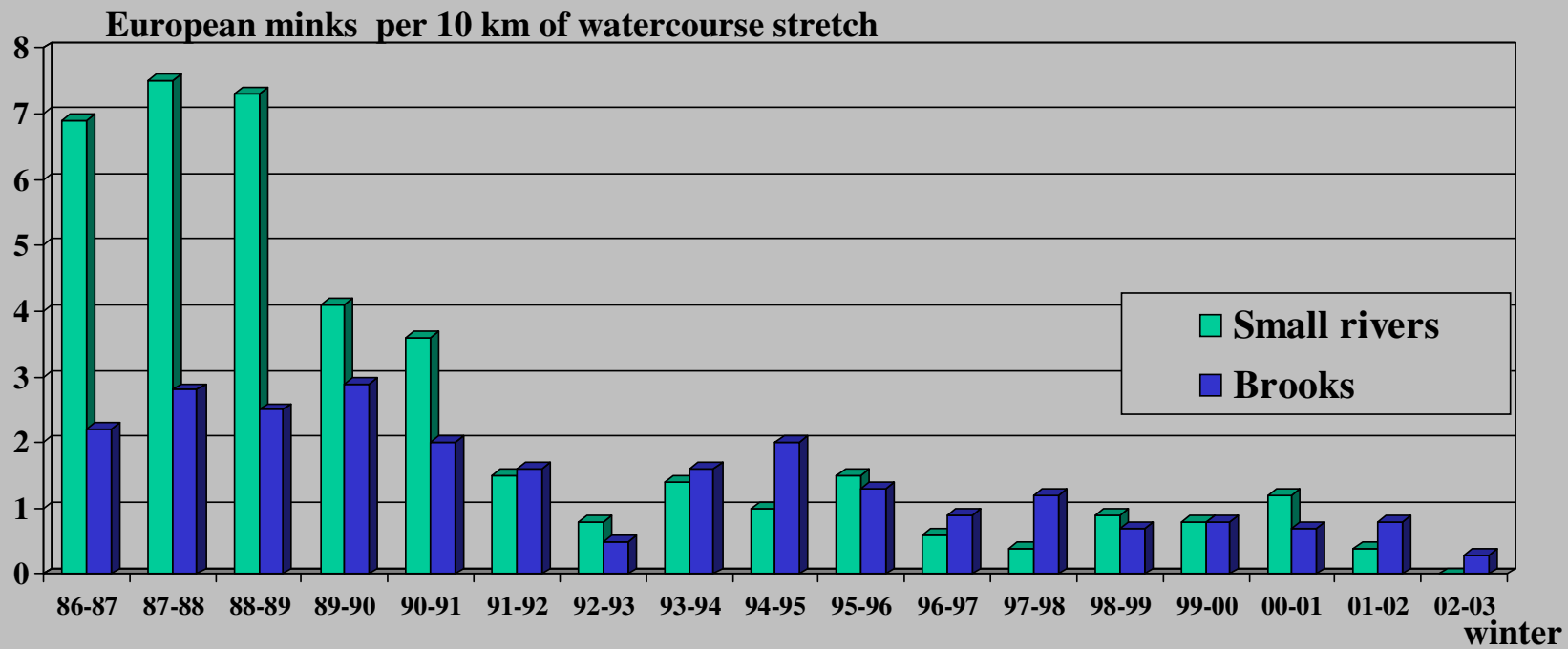


North-eastern Belarus, the Lovat upper reaches



The American mink eradication actions that were carried out in the Lovat river head, north-eastern Belarus were conducted on a limited area of about 400 km² and they aimed a small research experiment, but were not directed on a marked practice result in the European mink conservation in the region.



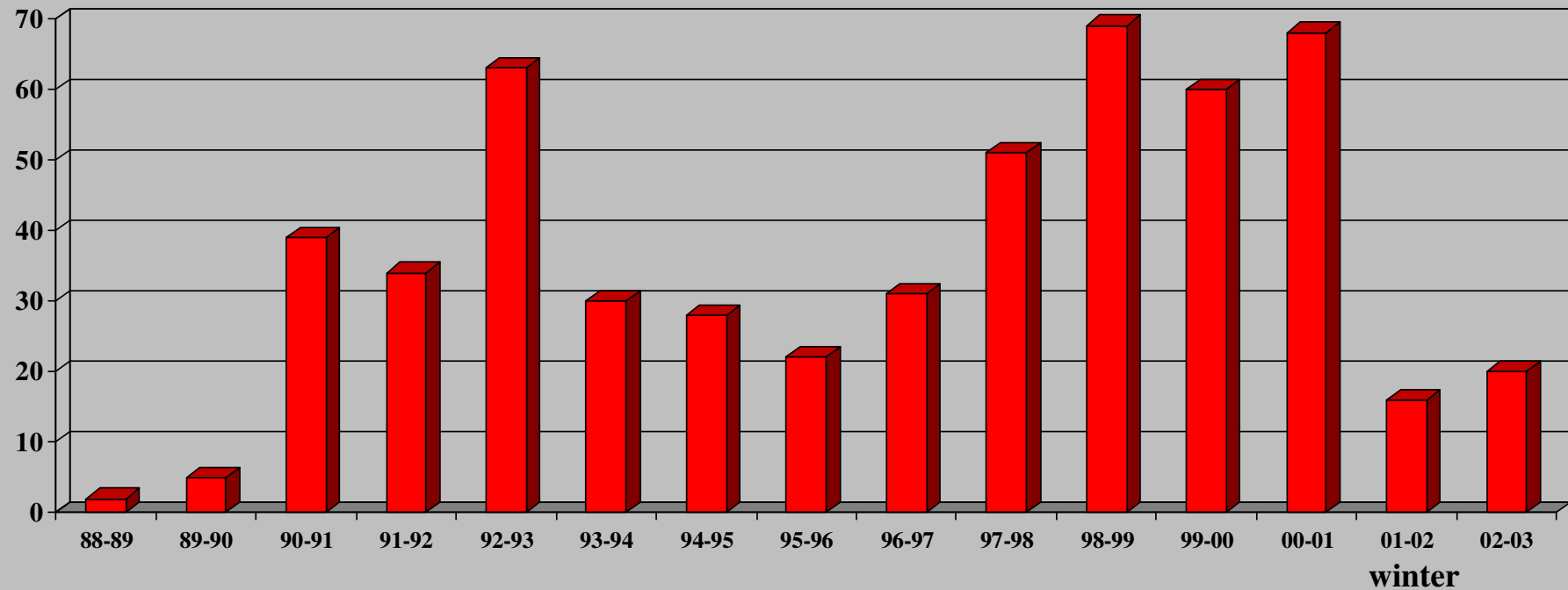


Dynamics of the European mink density in the Lovat river head, north-eastern Belarus, 1986-2003



Lovat river head, north-eastern Belarus

American minks eliminated

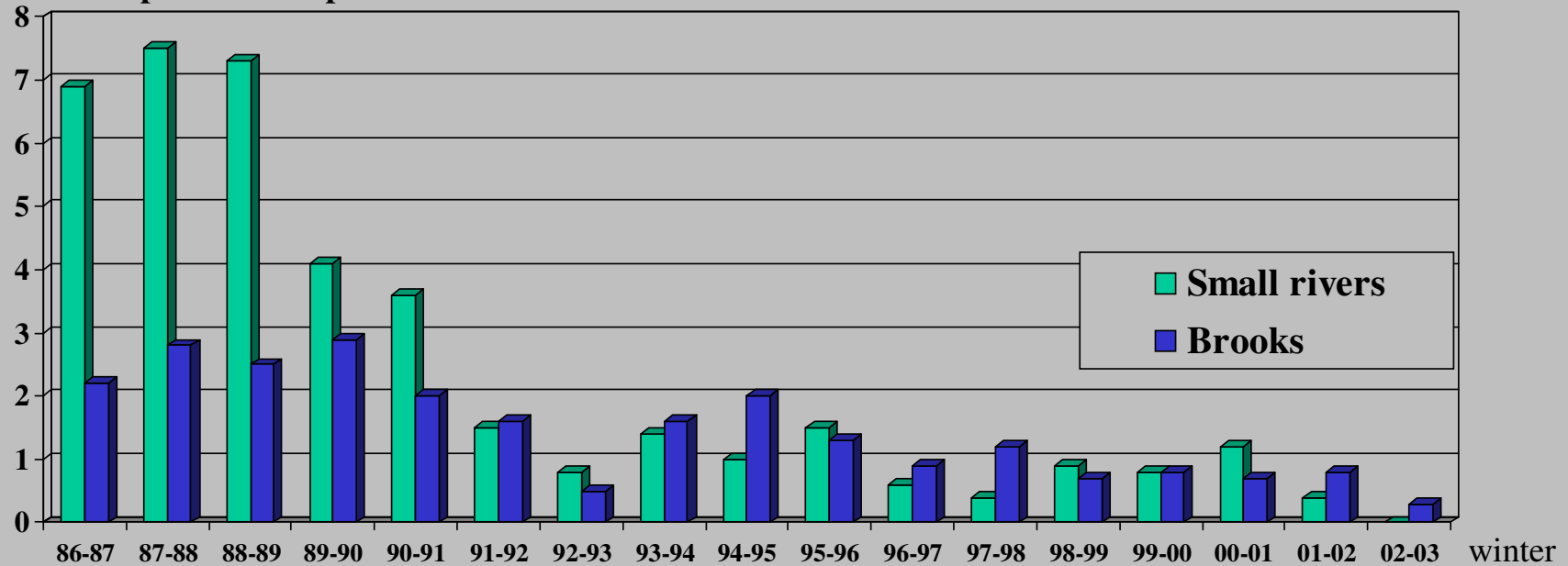


In 1993 and 1997-2001 in order to preserve the local population of European mink, quite strong eradication actions of the alien species were fulfilled.

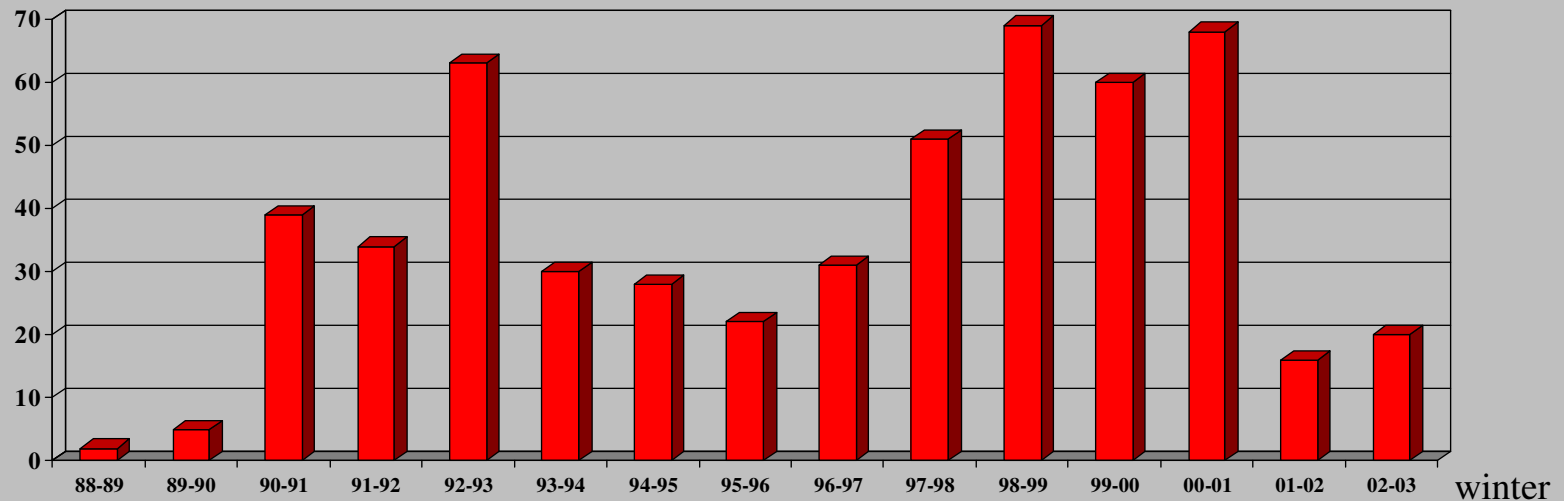


Lovat river head, north-eastern Belarus

European minks per 10 km of watercourse stretch



Dynamics of the European mink density, 1986-2003



American minks eradicated per winter, 1988-2003



Some recommendations that ensued from the studies, trapping tactics and skills that gained in the Lovat river head, north-eastern Belarus:

- (1) In the case of a partial eradication, to be enough effective for some marked recovering in European mink population structure and reproduction, at least, 80% of American mink population should be eliminated each year;
- (2) Such a rate of eradication of American mink should be reached on the post-mating period, i.e. March-April;
- (3) To reach the necessary rate of American mink elimination on this post-mating period, the eradication action should include several (2-4) trapping sessions and the eradication should be started in mid-autumn. So early start and fairly long duration of the eradication action are the guarantees of its efficiency, i.e. if an extra effort is necessary there is time for that;
- (4) Each trapping session should be 15-20 days long;



Some recommendations that ensued from the studies, trapping tactics and skills that gained in the Lovat river head, north-eastern Belarus:

(5) An expert on the American mink should be involved in the eradication action, while the efficiency of local trappers only is considerably lower, because detailed knowledge on the species population ecology are necessary to be effective enough;

(6) It is much more effective, if trapping sessions are conducted during the most active periods in American mink. In north-eastern Belarus such periods are as follows: the late October-mid November (young dispersal, home range reestablishing before the coming winter, much foraging during and after molting etc.); February (mating); April (home range reestablishing before the coming breeding and summer, much foraging during and after molting etc.);

(7) Track survey in the habitats should be done before the eradication start and between each trapping sessions. Track information will much correct trapping efforts, to reach enough results (replacing and increasing trapping efforts) and economizing time and money (if the result have been already reached).



Trapping efficiency in the Lovat river head, north-eastern Belarus:

1998-1999: 48 days of eradication, every day approximately from 3 to 24 baited box-traps and from 9 to 17 leg-hold traps fitted at streams. Having the population density about 4-9 American mink per 10 km of stream stretch or about 48 inds per 100 km², there were eradicated 69 American mink or about ***8.8 inds per 100 trap-nights***.

1999-2000: 40 days of eradication, every day approximately from 9 to 23 baited box-traps and from 7 to 12 leg-hold traps fitted at streams. Having the population density about 1-7 American mink per 10 km of stream stretch or about 31 inds per 100 km², there were eradicated 51 American mink or about ***4.6 inds per 100 trap-nights***.

2000-2001: 33 days of eradication, every day approximately from 5 to 29 baited box-traps and from 3 to 11 leg-hold traps fitted at streams. Having the population density about 1-5 American mink per 10 km of stream stretch or about 20 inds per 100 km², there were eradicated 63 American mink or about ***7.0 inds per 100 trap-nights***.

Hiiumaa Island

- Area 1000 km², 60 % covered by forests
- 22 km from mainland
- American mink originates from farm
- 295 km of rivers, 300 km of ditches
- 3 hunting organizations with 9 hunting districts



Phases of Eradication

- **December 1998** - 18 local trappers, Coniber traps, mink lures; 6 minks trapped
- **February 1999** - 16 local trappers, Conibers + live traps; 5 minks trapped
- **March - April 1999** - expert team from Belarus, legholds - 33 minks trapped
- **August 1999** – expert team from Belarus, legholds – 2 minks trapped
- **November – December 1999** – expert team from Belarus, there was no mink tracks were found in the island
- ***Comments on the presence of a few male minks afterwards***

Hiiumaa island, western Estonia

Eradication by local trappers, approaches and lessons

In December 1998 and February 1999 16-18 local trappers, who were familiar with the island, captured 11 American minks (5 and 6, respectively) that comprised about 10% of the island population of the species each trapping session.

That elimination rate was approximately, at least, 3 fold lower than the population recruitment, and, therefore, the eradication actions did not reach any efficiency.

Each trapping session was long enough.

There was no trapping in the most effective periods, i.e. November and April, when American mink is very active and moves a lot.

The eradication tactics of the local trappers was biologically quite passive and did not take into account the species ecology enough. The tactics were one of the follows:

- (1) searching for the signs of American mink presence and, when an individual presence revealed in a particular place, trapping in such a place until the individual elimination was undertaken, i.e. that was an individual-target eradication without using an emphasis on the population-active periods and population-important habitats;
- (2) trapping in random places that are easily available to check with a vehicle without using an emphasis on the population-active periods and population-important habitats.

Hiiumaa island, western Estonia

Own efforts, approach

In the period of 37 days in the late March and April 1999 there were captured 33 American minks that comprised about 80-90 % of the island population of the species at that period. There was no preliminary introducing in the island habitats. The island map was only the information available.

Biologically related tactics were used. The American minks were captured in the population-important places in the population-active period.



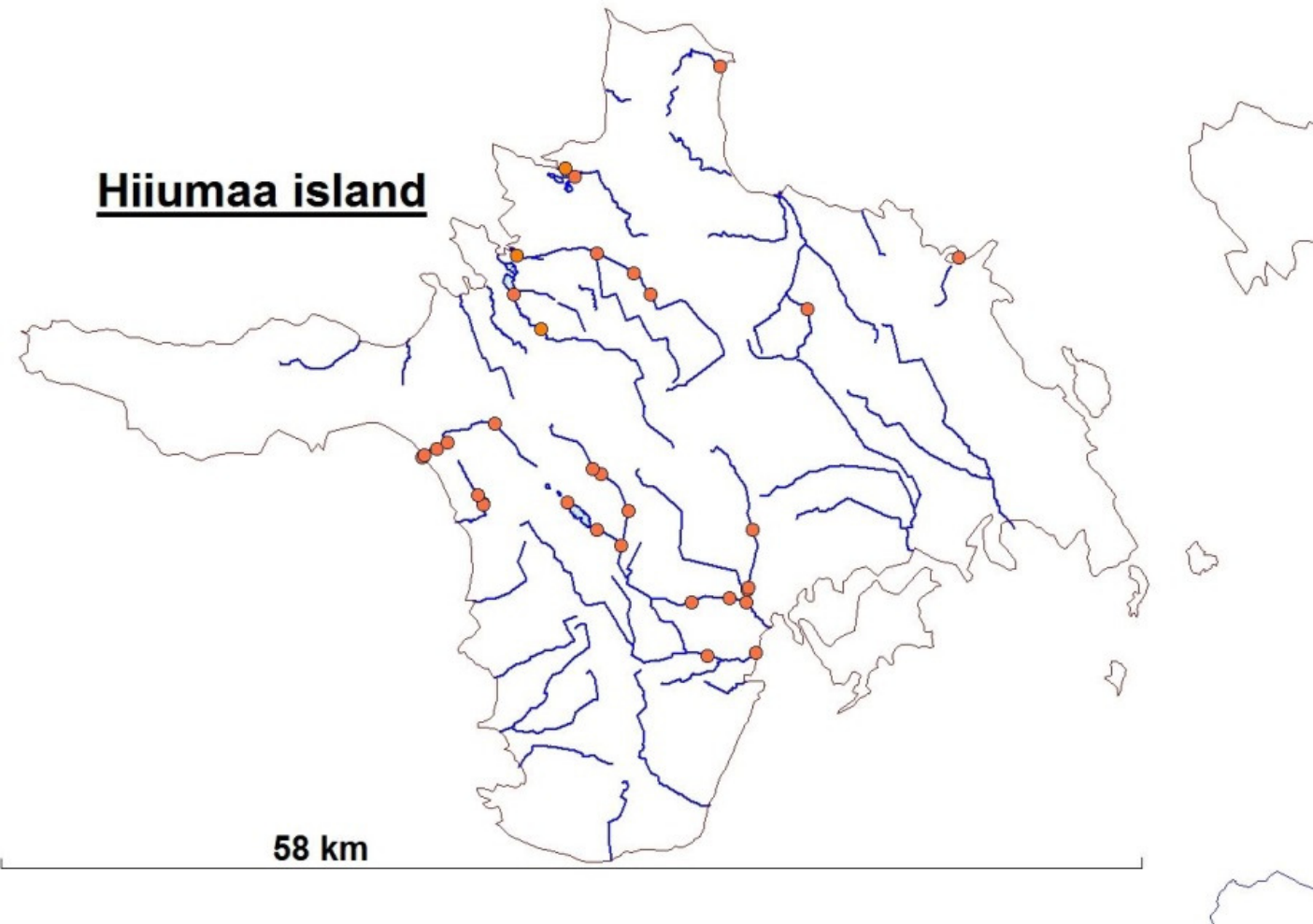
Hiiumaa island, western Estonia

Trapping efficiency

37 days, every day approximately from 10 to 45 (average 30-40) leg-hold traps were fitted at stream banksides. Having the population density about 0.7 American mink per 10 km of stream stretch, there were eradicated 2.5 inds per 100 trap-nights.



Sites of Trapped Mink



Foundation "Lutreola"

3. Recommendations for the mink situation in Spain

(1) In Spain, projects on eradication of the American mink were carried out about ten years, but still the alien mink species expands and occupies new areas of the European mink range, therefore the native mink demise may happen in not many years. So, within this project the team has seemingly the last chance to show that a large scale eradication action is able to rescue the native mink population, at least, in some regions of Spain. So, this new action should very seriously be established and based on possible maximum of resources, efforts and respective professional skills and knowledge;

(2) Quite often mountain and rocky habitats of minks, too hard grounds on banksides, nearly absence of snow cover condition eradication actions of American mink to be complicated. Therefore, high expertise is critical for success of eradication. At the same time, living of American mink in well-defined river valleys only makes the alien species eradication seem to be workable ;

3. Recommendations for the mink situation in Spain

(3) In my point of view, taking into account the current situation, a lot efforts should be directed to find the main ways of expansion of American mink into the given local population area of European mink and all such an expansion source should be maximally blocked. In such an expanding ways a continuous year-round eradication of the American mink should be organized. It looks like the task of the same importance as the task of eradication of the alien mink species within the current range of that local population of the European mink;

(4) Medium-sized river catchment or more or less water-abundant small river catchment should be an unit area for each eradication action in order to impact detrimentally on the whole population of the alien mink. Also, in this case you mitigate situation for the whole local population of the European mink that is an unit of the species existence;

3. Recommendations for the mink situation in Spain

- (5) Eradication actions should be emphasized for population-active periods and in population-important habitats;
- (6) Each eradication action should be planned by the way to get finished just before the next breeding season;
- (7) Large-scale track survey, controlling of specially prepared places to see mink tracks (e.g. raft-sites), using of many camera-traps are strikingly important for planning and coordinating of eradication actions of American mink;
- (8) Mink life hidden in specific Spanish banksides needs longer trapping session (3-4 weeks) and repeated trapping sessions with track survey between them. Conversely, basing on short-term (even large-scale and intensive) trapping actions that fulfilled by local trappers (volunteers, forest guards, hunters etc.) only without professional experts is a pitfall approach.

Thank you for the attention.