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NUMBERS OF OTTERS AND APPROACH TO POPULATION ESTIMATION IN BYELORUSSIA

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Abstract: Estimates of current otter numbers in Byelorussia were made. Tracks and other otter sign were surveyed for, and water bodies characterised into different types. A computer database was used to handle the figures. The number of otters in Byelorussia has substantially decreased since 1988. We attribute this fact to excessive poaching. Further decrease in the numbers of otters seems possible because in some areas, there are severe disturbances in population structure. More efficient protection measures are urgently needed for this species. At present more otters could be supported but this is likely to be impacted by a large-scale drainage amelioration project for Northern Byelorussia.

Estimates of otter numbers currently (1989 - 1991) in Byelorussia were made, based on recommendations by Teplov (1952) and Ternovsky (1973), as well as on our own data.

To evaluate numbers of otters on a particular body of water (river, lake, canal and pond), this body of water is subjected to intensive survey. In winter with snow and ice, ponds are surveyed on foot; in summer a boat is used (kayak or inflatable boat), or more rarely, surveyors walk along the bank. In case of summer survey, those bodies of water are only examined which have places where otters necessarily leave their tracks. These are usually sand drifts near the bank which are typical for many Byelorussian rivers. On these sand drifts, otters often mark the site with excrements, eat food, dry hair, or have a rest at night. In addition, otter's footprints are easy to see at all artificial bodies of water (canals and ponds). Here otters leave their footprints on sand or mud drifts, on barren ground exposed through shallowing, on ground under numerous small bridges, near locks, arid other water-development works.

When a body of water is surveyed along the bank, otter's tracks are recorded. The length of a hind paw print is measured, and in the case of excrements the sex is identified. With males, urine traces lie far ahead of the faeces, while with females it lies slightly behind. Using these signs we have distinguished between neighbouring individuals (inhabiting adjacent zones) to count their numbers for a particular body of water. Numbers of young individuals in a litter which already follow their mother (over 3 months old) has been found in a similar way, while differentiating by sex and hind footprint size, in sites of joint marking with excrements. In some cases, the number of young individuals in litters has been counted by means of footprints on passages, or by visual observation. In case a litter is detected while the number of cubs is unknown, we have assumed the average number of 2,4 (n = 133) which is typical for Byelorussia (Sidorovich 1990).

The method described to evaluate otter numbers, may be considered exact and unbiased proceeding from the following: The tracks of otters are constantly renewed owing to their activities and to precipitation. Normally, otters do not need to travel long distances within several days. Typically, they stay at a particular place for several days. Moreover, as is clear from repeated observations of otter activities using their tracks as well as from hunting practice, it is common that otters stay at a particular area for a long time (up to several years). In doing so, however, otters may move away from the place at times and then return home. For this reason, this method is unlikely to show more otters than actually live at the place. The risk of underestimating the numbers is not too high. Proceeding from basic probability considerations, the probability that individuals of the same sex and with almost the same hind footprint length (at differences of 1 cm and less) live in adjacent areas has been found as low

as 0,01 - 0.95. In addition, our observations suggest that adult males do not live in the vicinity of one another.

Otter population density has been calculated per 10 km of length for water courses (rivers, canals), while for non-running bodies of water, (lakes, ponds) it has been calculated per 5 km of the bank length. Because of this, a length of 1 0 - 20 km has been selected as a unit. In some cases, however, the unit section might be less than 10 km with a short water course, or more than 20 km (20 - 40 km) with a low density of population. Unit sections to count numbers of otters in case of non-current waters have been selected in similar manner.

Another necessary factor to extrapolate the numbers on a certain territory, apart from count of the numbers for particular bodies of water, is a typology of bodies of water at otter sites. A typology of this sort has been developed (Sidorovich, 1988) depending on potential density of population which corresponds to ecological capacity of a water body. This problem has been investigated for six years for those territories where otter hunting is banned (Berenzinsky biosphere preserve, Naliboksky hunting reservation) and hence the density of otter population has been formed naturally, depending on the ecological capacity of the environment. The following can be said about the typology developed. The typology of rivers as main permanent sites of otters, is based on water height, current speed, flood rate, or flood-lands. It is in these factors that rivers grouped by density of population of otters, differ from one another, while important factors within each group being bank's structure and beavers' building activities (Sidorovich 1988). Canals are grouped in terms of their water height and age, and also of density of population of beavers which is determined by forest and bush density of riverside biotopes. As to non-current bodies of water in Byelorussia, otters stay here only for iceless seasons; for this reason, those bodies of water have not been taken into account when extrapolating.

The surveys to take stock of otters are scheduled in such a way that diverse bodies of water are represented to evaluate the density of population for different sites.

The data on population density of otters for particular bodies of water in Byelorussia, are placed into the databank of near-water mammals of Byelorussia. This databank includes:

1. databases, i.e. data about numbers of otters and other near-water mammals which are properly arranged, formalized and loaded into the computer's memory;
2. algorithms and programs to process the data (data input, accumulation, update, search, manipulation, statistic processing);
3. technology and personnel to maintain and support the databank.

The main software used is ASPED-5 programme complex, developed by the Computation Center of the Byelorussian Academy of Sciences. Detail on how this programme is employed and the type of data recorded may be obtained from the authors. For each observation data on 20 items are entered, covering locality, water body, and resident animals. The results discussed below, have been obtained using this databank.

Abrupt variations in numbers are not typical for otters. For this reason, calculations to evaluate average values of density for diverse bodies of water, use otter account data over several (2 - 3 years). These average density values for particular bodies of water have been extrapolated to the total of bodies of this sort, which gives numbers of otters within a certain territory as a result of simple arithmetical computation. In our opinion, the extrapolation of this kind is exact because differences in environment of diverse bodies are taken into account.

In our previous study (Sidorovich 1988), numbers and density of otters were evaluated in Byelorussia for 1984 - 1988. The number of otters for that period was about 12 000, while the average density, in basins of big rivers, ran from 2,1 to 6,5 individuals per 100 km^2.

Now we re-calculated the numbers and density for basins of big rivers according to 1989 -1991 data. The results are given in Tables 1 and 2. For the whole of Byelorussia otters number about 7000 individuals, while the density ranges from 1,1 to 3,7 individuals per 100 km^2. The distribution with water bodies of different kind is shown in Table 3.

Table 1: Density of otter population on different types of bodies of water in Byelorussia over period of 1.04.1989 - 1.07.1991

Type of Body of Water	Min	Max	Mean	SD
Big rivers with diverse floodlands (n = 26)	1,2	4,0	2,19	0,62
Slow-current medium-size rivers with high medium flood rate (n = 10)	0,6	4,2	1,32	0,82
Moderate-current medium-size rivers with low flood rate (n = 23)	0,7	4,3	2,16	0,50
Moderate-current medium-size rivers with medium flood rate (n = 41)	1,2	5,0	2,47	0,42
Slow-current small rivers with heavily swamped floodlands (n = 9)	0,0	2,0	0,71	0,52
Moderate-current small rivers with moderately swamped floodlands (n = 31)	0,0	3,2	1,27	0,50
Rapid-current small rivers with slightly swamped floodlands (n = 34)	0,0	6,0	1,84	0,99
Relatively deep soil reclamation canal (n = 48)	0,0	1,5	0,18	0,23
Canalized small rivers for forest reclamation and other forest canals (n= 13)	0,0	1,9	0,62	0,44
Deep canals (water supply, navigation) (n = 7)	0,3	1,4	0,77	0,35
Glacial lakes (n= 1 6)	0,0	2,5	0,42	0,82
Water storages (n = 8)	0,0	1,3	0,56	0,37

NOTES
1. Density of population is given in individuals per 10 km of length for water and in individuals per 5 km of bank length for non-current waters.
2.In case of non-current waters, density of population is given for the iceless period because otters do not dwell there when ice-bound.

Table 2: Numbers and density (n/100 km^2) of otters in Byelorussia

Basin of big river	Numbers	Density
Zapadnaya Dvina	2000	3,7
Niemen	1200	2,2
Dnieper (including Sozh and Berezina)	2800	3,0
Pripyat	900	1,2
Zapadny Bug	200	1,1
Total in Byelorussia	7000	

Table 3: Distribution of otters between water courses of different type, in individuals

Water Type	Zap. Dvina	Niemen	Dnieper	Pripyat	Zap. Bug
Big rivers	146	161	548	124	35
Medium rivers	391	445	744	256	45
Small rivers	1360	368	1262	267	79
Forest reclamation canals	34	92	119	70	23
Soil reclamation canals	30	87	135	203	41

It is obvious that numbers of otters in Byelorussia has substantially decreased by 41 % compared with 1984 - 1988. We attribute this fact to excessive poaching.

Winters of 1988 - 89 and 1989 - 90 were relatively warm and snowless. Those periods were favourable for otters in terms of food, but at the same time, the hunting was extremely successful. Besides, the lack of snow cover severely complicated protection of otters, for which reason poaching became popular during those winters. Successful otter hunting by means of traps in periods like those, is determined by the following: The lack of snow allows poachers to set as many traps as they did in autumn; the traps might be left for a comparatively long time (4-10 days) without major fears that someone will trace footprints and take the traps away together with the bag. The lack of frost substantially simplified setting traps and keeping them operating.

Further decrease in the numbers of otters seems possible because some fragments of the population show severe disturbances in structure, such as low density of population and deficiency of adult males which brings about considerable deterioration in reproduction within the population (Sidorovich 1990). Because of this, more efficient protection measures are urgently needed for this species, particularly, to make a network of special otter preserves on the most capable pond systems. *Lutra lutra* is generally regarded as endangered in Europe (Chanin 1985; Reuther &Festetics 1980; Foster-Turley et al. 1990).

Considerable possibilities are still available to increase numbers of otters because, to our estimations, the ecological capacity of Byelorussia allows for about 19 thousand individuals (Sidorovich 1988). However, this ecological capacity is likely to dramatically decrease as a consequence of a large-scale drainage amelioration project for Northern Byelorussia.

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