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MUSKRAT CONTROL IN THE NETHERLANDS

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ABSTRACT: Muskrats were introduced into Europe and have now spread over this part of the world. Their success as a colonizing species is discussed, as well as the problems they create in a man-made environment. Due to their successfulness, a strict control program has been changed to a management program in order to keep numbers below the level at which intolerable damage occurs.

The territory of the Netherlands covers 33,612 km^2 and has a population of about 13,000,000 people. The main part of this densely-populated country has been cultivated and waste land now covers only about 1,000 km2. A large part of the country is "polderland." That means that former swamps and lakes have been reclaimed and are kept dry by drainage. A polder is created by making a ring dike around a swamp or a lake. This dike, in turn, is surrounded by a drainage canal. The water from the area which is to be reclaimed is pumped into that drainage canal and finally discharged to the sea. These artificial drainage canals are at a higher elevation than the inner polderland.

It will be clear to you that, for this form of land development, a complex system of ditches and canals is necessary. Apart from this artificial water status, a large part of the country consists of deltas of the Rhine and Meuse Rivers, giving the southwestern part a special appearance. To keep these rivers in check, dikes have also been constructed with a retaining function at high tide. And, finally, on the higher-situated soils, we find the drainage canals from Germany and Belgium, and a large number of brooks and canals give these relatively dry lands a rather large supply of water.

Since, with the exception of the Wadden Sea, the whole country is the work of men's hands or has at any rate strongly been influenced by this, a natural ecosystem is out of the question. Though a number of valuable semi-natural areas have developed in the course of the centuries, the area they cover is small. We can, in fact, speak of a greatly disturbed situation due to highly intensive farming and an enormous growth in the last few decades of, especially, the chemical industry. Such a situation, of course, needs continuous management, both technologically and politically. This implies that there should be an adequate reaction against foreign elements which may thwart the complex network of regulations.

One of these is the muskrat (Ondatra zibethicus L). The history of this species in Europe is presumably known (Hoffmann, 1958; Errington, 1963). In order to build up a market for fur in Europe, the animal was bred in Czechoslovakia in 1905 and reared on breeding farms in Belgium and France during the twenties. Early during the forties muskrats which had escaped from the latter countries and had gone wild reached our southern frontiers. The eastern population therefore grew enormously, and the immigration of these animals to beyond the Dutch/German border started around 1968. In a short time, the entire Western Europe had, in fact, been colonized by the muskrat which could be found there in large numbers.

The success of this colonizer can be attributed to several reasons (Doude van Troostwijk, 1976). The mild Atlantic climate, characteristic of Western Europe, was a factor of great importance. It further appeared that the muskrat's food preference includes many natural plants and nearly all cultivated crops so that its need of food can be satisfied in nearly all habitats. There are innumerable kilometers of banks, especially in countries like the Netherlands, where holes can be burrowed so that accommodation is not a restricting factor either. Epizootics have not yet been observed in muskrats in Western Europe and endo- and ectoparasitism also play a minor part, as does predation.

Reproduction does not deviate greatly from that described for the areas of origin in the United States and Canada. In the Netherlands the reproduction period lasts from March until into September, averaging three litters with about six young each. Apart from this, the muskrat has shown great adaptability towards extreme circumstances. Not only can it endure severe winters well and react adequately upon droughts, but even strongly polluted and/or brackish water does not prevent populations from being established (Koenders, 1968). The most important factor, however, is the indication that the animal has found an unoccupied ecological niche in Western Europe. From this area, no examples are known of inter-specific competition with related species, such as the water vole (Arvicola terrestris) or other species living in the same habitat.

All these factors have made it possible for the muskrat to spread its range in a relatively short time, locally reaching very high population densities. But what are the consequences of the fact that the muskrat, a foreign wildlife element, has become established in this artificial European landscape? It is clear that the large numbers of muskrats will interfere with human interests. Such interference is indicated by the term "harmfulness".

Muskrats can cause several forms of damage. Briefly, these are agricultural damage, damage to fisheries, damage to nature, and damage to the status of water. The three first forms of damage can be observed locally and do not generally pass the threshold of economically inadmissable damage. Agricultural damage consists of eating various cultivated crops, especially cereals and sugarbeets. We cannot speak of inadmissable damage until vulnerable crops are involved, grown on a small scale,

such as certain vegetables. This, however seldom occurs. The falling down of the banks of the main ditches, thus hindering mechanical cultivation of agricultural land, may also be a form of agricultural damage. Commercial inland water fisheries in the Netherlands is no longer a factor of economic importance, but it often happens that muskrats swim into eel traps and then destroy them while trying to escape.

As for nature-protection, it has been observed that damage has been done to the reed-bordered reclaimed zones of a swamp and water ecosystem in Germany (Akkermann, 1975); these observations indicate that the muskrat can cause damage to areas of natural importance. In this respect it should be remembered that natural areas in Western Europe are much smaller than those in North America and therefore much more vulnerable.

The damage done to the status of water by burrowing is, after all, the most important type of damage under our conditions. The holes made by muskrats in drainage ditches interfere with drainage. Intensive burrowing may damage the dams so that repair work will be necessary. The dams may even be damaged to such an extent that they will lose their retaining function, with all its consequences. In this respect we are not concerned with the heavy river and sea dikes, for these are of such a structure and dimension that they are relatively invulnerable to muskrat damage. The often century-old smaller polder dikes, where smaller damage may have already lead to landslides or bursts, are much more vulnerable. These older polder areas are found most in the densest populated areas of the Netherlands, and large residential areas, airports, and other important centres may be innundated by such bursts.

Most attention is therefore given to burrowing by muskrats. One animal can replace about one cubic meter of soil in one year. Repair work on banks, where up to 5 cubic meters of new material must be supplied is not an exception. That's why necessary attention is paid to muskrat control.

This control has been organized since 1945. Since Government in the Netherlands still objects to the use of rodenticides in the aquatic environment where muskrats live, control is still carried out in the old way by means of traps and nets, though specially adapted to some extent. Because these kinds of catching methods are used, we prefer to have it done by persons who are trained to do this work as their daily task in Government Service. Personnel in the service of the Government of the provinces and the water drainage boards have been entrusted with this control work. A great many other persons are also working at this on the basis of regulated premium (bounties), although this obsolete method has not been too effective.

The Ministry of Transport is responsible for the muskrat control policy and the Ministry of Agriculture and Fisheries, especially the Wildlife Division, for an optimal execution. Both bodies have united in the Musk-Rat Control Commission. The object of this Commission is to prevent inadmissable damage by means of a method of control which treats the environment as kindly as possible. The muskrat is, in fact, accepted as a new wildlife element, provided a population level is maintained below the threshold of inadmissible damage. That, in spite of all efforts, the muskrat population is still developing does not mean that the way in which the muskrat is controlled is inadequate.

Positive effects of control are the following: the spread of the muskrat has greatly slowed down; the average survival value has decreased and, in general, only 25% of the animals reach their first reproduction period; and there is continuous inspection of the places where muskrats occur, which make it possible to take rapid action when damage occurs or is impending. The latter is manifested by the decline in cases of damage when control becomes more intensive.

It is possible to prove that the local population remains at the same level or declines in number, when, during the first few months of the reproduction period (March to May inclusive), 50% or more of the adult animals are caught, and if the work can be continued with the same intensity during the rest of the year. From the trend in catches during these three months, the number of animals in every working area can be estimated and how many of them are caught will be known. This method has been described elaborately by Doude van Troostwijk (1977). So, when, in spring, these catches are > 50%, it is possible to predict a decline of the local population. After one year, with hindsight, this prediction can be tested. Though it takes a lot of time, the density estimations done in the field can first of all indicate whether, as compared with the previous year, the population has really decreased. But, based on the trend of the catches, a new estimate can be made of the size of the population. Finally the trend of the catches throughout the year indicates whether, as compared with last year, the population has decreased or increased.

From a technical point of view, it is not difficult to treat the muskrat problem. But it is all the more difficult from the point of view of management. To build up an adequate preventive protection against the harmful consequences of the animal, a very large number of full-time workers are needed, involving high costs. Hitherto, the costs of control have been higher than those for the repair of the damage. The question arises whether, from a profit and loss ratio, the control-campaign is justified. First of all we must say that control is a certain form of insurance premium. For, without control, there might be even more damage. A real aspect in the management of muskrat control is measuring the risk of damage.

Another factor influencing the future policy is the resistance of part of the human population to campaigns against animals living wild. This "anti-hunting" movement is getting an even greater influence. Here, too, a profit and loss analysis, together with the use of ecological views and "clean" techniques will have to provide an answer to this. Especially because of its manageability, the present procedure is, in the long run, extremely suitable as a form of management rather than as control.

Much attention must, in future, be paid to a continuation of such a policy with regard to other harmful animals, while we must try to achieve a state of balance between the interests of man on the one hand, and those of the animal species on the other. This will not only be of importance for this part of the western world, but just as much for the existing nature-protection problems and those certainly to be expected in the developing countries, hence it will therefore also influence the living conditions all over the world.

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