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INFLUENCE OF SELECTION OF BANK SIDE ON THE STANDARD METHOD FOR OTTER SURVEYS

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Abstract: The effectiveness of the standard method used to survey otters can be affected by the choice of which stretch of bank is examined. The sensitivity of the standard method was evaluated in two regions with differing otter (*Lutra lutra*) population densities by surveying 300m stretches of bank from bridges on both upstream and downstream banks, in a region with a high population density, 64% of the 'positive' sites would be recorded as positive, regardless of which stretch of bank the surveyor chose. When using the standard survey method in a sparsely populated region, as few as 9% of 'positive' sites would be recorded if the choice of riverbank were not optimal. Examination of 100m of all four banks improved the success rate of the survey substantially in the sparsely populated region. The study suggests that the standard method is very sensitive to the selection of the stretch of bank in sparsely populated areas. The accuracy of the standard method can be increased with little extra effort, if survey guidelines are changed from "an optional search" of both banks under bridges to "an obligatory search".

INTRODUCTION

Systematic and comparable surveys are important for conservation and management of species. The survey method originally developed in the UK to monitor otter (*Lutra lutra*) distribution (CRAWFORD et al., 1979; GREEN and GREEN, 1980; LENTON et al., 1980) has now developed into a standard method for monitoring otter distribution in Europe. The standard method is recognised as an adequately accurate, objective and easily repeatable field method to monitor otter distribution over large areas, although some watercourses occupied by otters are not detected (REUTHER et al., 2000). At each survey site a maximum of 600m of riverbank is searched for signs of otters. For the national surveys of Denmark, two 300m stretches of bank on either side of bridges, and both banks under bridges, were examined (MADSEN and NIELSEN, 1986; MADSEN et al., 1992; HAMMERSHØJ et al., 1996). The selection of which stretches of bank to examine is a subjective choice made by the surveyor. At sites where the presence of otters is not evident on either the upstream or the downstream banks, the surveyor's choice affects the result of standard surveys. In an area with a very low population density, successive standard surveys have failed to detect otters (MADSEN and GAARDMAND, 2000).

Several studies have evaluated both the effectiveness and the limitations of the standard method (recently summarised in REUTHER et al., 2000), but no studies have specifically addressed the effects bank selection has on the survey method. In this paper we evaluate the effect bank selection has on the reliability of the standard method in two regions of Denmark with different otter population densities.

STUDY AREAS AND METHODS

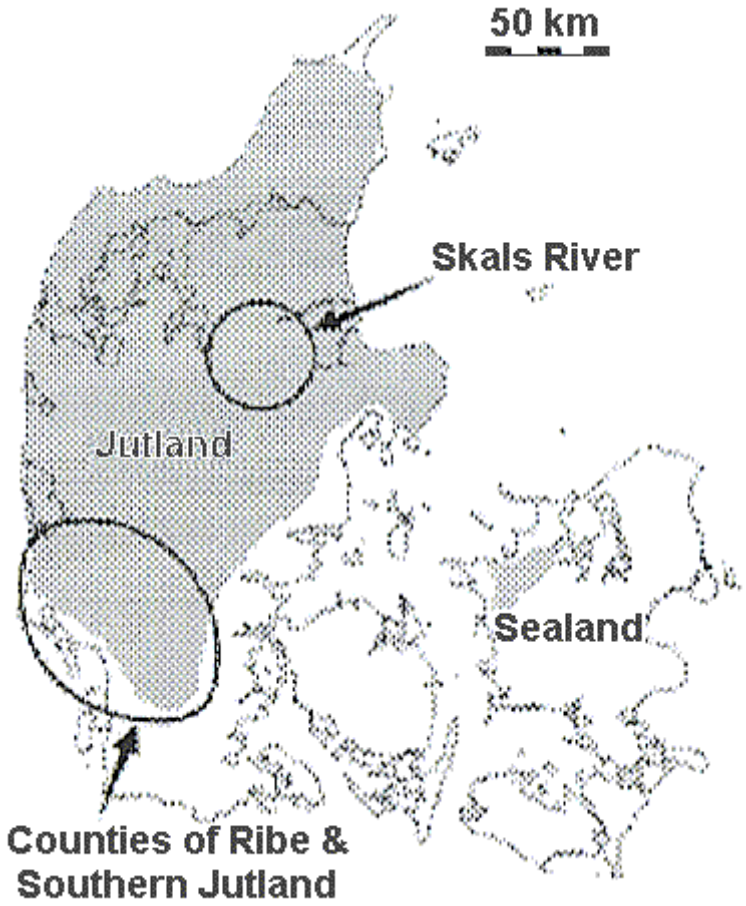

Figure 1: Distribution area of otter (*Lutra lutra*) in 2000 (grey shaded) and location of surveyed regions in Denmark (after PIHL et al., 2001; ELMEROS, 2000; BUSSENIUS, 2000).

Surveys were carried out in two regions of Denmark (Figure 1). One region was located in Mid-Jutland, in the Skals River catchment area, where all national surveys have recorded a widespread occurrence of otters (MADSEN and NIELSEN, 1986; MADSEN et al., 1992; HAMMERSHØJ et al., 1996). Forty-one sites were surveyed in November and December 1999 following the standard method. If possible the search covered the full distance. Numbers of spraints and the distance of the sprainting sites from the bridge were recorded. Imponderables as swamps, ditches and tributaries prevented full survey of all four stretches of bank at 30 sites. Eleven sites were surveyed 300m on both upstream and downstream banks. These sites were surveyed twice with a one-month interval. During the second survey only new spraints were recorded.

The second region was located in southern Jutland, covering the County of Ribe and parts of the County of Southern Jutland. Only one positive site had been recorded in the extreme north of the area during the national survey in 1996 (HAMMERSHØJ et al., 1996). Previous national surveys had failed to detect any presence of otters (MADSEN and CHRISTENSEN, 1986; MADSEN et al., 1992). Surveys were carried out in December 1998, in January 1999 and in late September 2000 and they showed a sparse presence of otters in the region (ELMEROS, 2000). In the course of these surveys, 160 sites were examined. Some sites were located by lakes and on stretches of waterways without bridges. On occasions, the survey distance was extended to 1000m. Density of spraints and the location of sprainting sites were recorded. When otters were recorded in watercourses, the density of survey sites was increased in order to collect more information on otters' use of the river system.

Watercourses in both regions have slow currents. They are lowland watercourses that meander through undisturbed meadows and agricultural lands. Land use, bank side vegetation, watercourse size and watercourse management was comparable in the two regions. The majority of the survey sites were situated in places where the waterway was 5-10 m wide.

RESULTS

Sixty-one percent of all 41 sites and all six 10x10 km UTM grids were positive in the region with a widespread otter population. In the sparsely populated region, 24 % of sites and 34 % of the 38 UTM grids surveyed were positive. As survey methods differed the overall percentages of positive sites and UTM grids in the two regions should be compared with caution. Site occupancies had differed more if the standard method been applied in both regions, e.g. all positive sites in one UTM grid in the sparsely populated region were negative when surveyed only 600m. The national survey in 1996 recorded otters at 59 % of 162 sites in a wider region around Skals River catchment (HAMMERSHØJ et al., 1996). The evaluation of the performance of the standard otter survey method and the comparison between regions is based only on positive sites where all four stretches of bank were surveyed up to a distance of 300m from each bridge.

The mean number of spraints registered on each positive 300m stretch of bank at each positive site was 3.8 in the region with a widespread otter population. In the sparsely populated region only 0.5 spraints were found per 300m stretch of bank at a positive site. Footprints were the only indication of the presence of otters at 19 % of positive sites in the sparsely populated region.

Most spraints were located within the first 100m surveyed in both the region with a widespread occurrence of otters (χ^2=6.59, d.f.=2, P>0.05) and in the sparsely populated region (χ^2=21.1, d.f.=2, .P>0.001). There was no difference in numbers of spraints on the right and left-hand banks of the waterways in the region with a widespread occurrence of otters (χ^2=0.07, d.f.=l, n.s.), nor in the sparsely populated region (χ^2=0.97, d.f.=l, n.s.).

Spraints and footprints of otters were not found on all four 300m stretches of bank at positive sites (Table 1). In the widespread otter population, tracks from otters were found on 72% of the surveyed 300m bank stretches. In the sparsely populated region, spraints or footprints were recorded at 36 % of the surveyed banks at positive sites. The majority of positive sites had only one positive stretch of bank.

Table 1. Percentages of positive banks and sites with 1, 2, 3, or 4 positive banks in regions with widespread and sparse occurrence of otters. Only positive sites included where 300m were surveyed at all four banks

Occurrence of Otters	n	% Positive Banks	% Positive Banks			
			1 bank	2 banks	3 banks	4 banks
Widespread	2 x 11	72	5	32	36	27
Sparse	32	36	66	25	9	0

At positive sites where only one or two banks were examined, the results using a standard survey depended on which banks were surveyed (Table 2). If a surveyor, by accident, examined negative banks whenever possible, 63 % of the actual positive sites were recorded as positive in the region with a widespread population. The worst possible result from a standard survey of the region with a sparse population recorded only 9 % of the actual positive sites and 25% of the actual positive UTM grids correctly.

Table 2. Dependence of numbers and length of surveyed banks on

percentage of positive sites recorded correctly in regions with widespread and sparse occurrence of otters. Only positive sites included where 300m were surveyed at all four banks

Occurrence of Otters	n	% Positive Sites			
		4 x 300m	2 x 300m	4 x 200m	4 x 100m
Widespread	2 x 11	100	63 - 100	86	68
Sparse	32	100	9 - 100	91	81

Examination of all four stretches of bank, upstream and downstream from bridges, improved the reliability of surveys. Efficiency decreased as survey distances were reduced. Reducing survey distances to 100m on four bank stretches resulted in a marginally better percentage of positive sites occupation than the minimum number of positive sites recorded by the standard method in the region with widespread occurrence of otters. The majority of positive sites that became negative sites, if surveyed either for only a 4 x 100m stretch or as spot checks at bridges exclusively, were located on small streams.

In the region with a sparse occurrence of otters the majority of sites had only one positive bank and, therefore, the reliability of surveys increased noticeably if four stretches of bank were searched. If all four banks were searched for a distance of a 100m from the bridge, the presence of otters was detected at 81% of all positive sites in the region with a sparse occurrence of otter. If surveyed as spot checks at bridges only 53% of positive sites were recorded correctly.

DISCUSSION

Seasonal variations in the sprainting activity of otters (REUTHER et al., 2000) and survey conditions may also hamper comparison of the two surveys as an evaluation of the standard method. However, meteorological conditions during the surveys in Mid-Jutland and the winter survey of southern Jutland were similar (STATISTICAL YEARBOOK, 1999, 2000), but lower sprainting activity and denser vegetation may have affected the results from the autumn survey in the sparsely populated region. Excluding the positive recordings from the autumn survey from the evaluation, the percentage of correctly recorded sites dropped to 76% if all four bank stretches were searched for 100m. Changes in other figures were negligible, possibly because the autumn survey took place during a period with low water levels, which offered optimal tracking conditions with sand and mud banks under bridges.

Surveying otter distribution by the standard method is affected by the choice of which bank to survey. Table 2 indicates minimum achievable occupation percentages with the standard method. However, the efficiencies of the standard method improved if banks were chosen randomly and should increase even further if an experienced surveyor with knowledge of otters' sprainting behaviour performed the survey and selected bank sides that offered the best preconditions for finding otter tracks. A standard survey conducted by an experienced surveyor would probably be at least as accurate as surveys of all four banks 100m from bridges in the region with a widespread distributed population of otters. The validity of the standard method becomes more questionable in low-density otter population. Although the accuracy should improve considerably compared to the minimum values stated in Table 2 with an experienced surveyor, it is uncertain if the standard method would be more efficient than a survey of 100m of all four bank stretches in areas with few signs of otters.

Signs of otters are often recorded within the first few metres from bridges (MASON and MACDONALD, 1987; O'SULLIVAN, 1993) and bridges might be the only place to find signs of otters in some areas (LENTON et al., 1980; ROMANOWSKI et al, 1996). These findings suggest that the survey technique could be modified to surveys at bridges only, thus making it possible to monitor larger areas with less time and effort and without compromising the accuracy of the survey (REUTHER et al., 2000). However, many bridges in our study areas had no suitable sprainting places at normal water levels due to the type of bridge construction, intensive dredging, and stream management. The reliability of monitoring otters by surveying bridges exclusively is therefore more vulnerable than longer surveys of riverbanks, due to fluctuating water levels and the availability of

'spraintable' bridges. The impact of these factors, and the reliability of surveying otters by spot checks at bridges, may vary between the various habitat types occupied by Eurasian otters (JAHRL, 1995; ROMANOWSKI et al., 1996).

RUIZ-OLMO et al. (2001) found that presence of otters would be detected in catchments with very low density after surveying 2-3 sites or after relatively few repeated surveys at each site following the standard method. Average distance to find the first evidence of otters varied between 88m and 349m. A pragmatic procedure to improve the accuracy of the standard method would be to increase efforts to detect the presence of otters at each site, or to increase the number of survey sites in areas with a low density of otter occupancy.

The objectives of the standard method are to monitor otter distribution and population trends over large areas. Intensive survey efforts in smaller areas will inevitably record otters more efficiently than standard surveys. It is questionable if any survey methods designed to monitor distribution over large areas can record presence of individual residents or transient otters on every stretch of river.

National surveys should use a standard method to achieve comparability between studies. Present guidelines for the standard method states that the examination of both banks under bridges is optional (REUTHER et al., 2000). To improve the accuracy of the standard method with little effort, guidelines should state that the examination of both banks under bridges is obligatory. To optimise accuracy for more detailed regional surveys, the survey technique could include a search of minimum 100m of both upstream and downstream banks from bridges and include more sites pr. km waterway.

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RÉSUMÉ: INCIDENCE DE LA SÉLECTION DES BERGES SUR [LE RENDEMENT DE] LA "MÉTHODE STANDARD" DES INVENTAIRES LOUTRE

La pertinence de la "méthode standard" utilisée durant les inventaires loutre peut être affectée par le choix de la berge prospectée. Le rendement de la "méthode standard" a été evalué dans deux regions où les densités de populations de loutres (*Lutra lutra*) diffèrent, en prospectant à partir d'un pont les deux berges sur 300m, vers 1'amont et vers 1'aval. Quand les densités de populations sont elevées, 64% des sites positifs seraient notés comme tels, selon la berge choisie. En basse densité seulement 9% des sites positifs seraient identifiés comme tels en utilisant la "méthode standard" et si le choix de berge n'est pas idéal. La prospection de 100m supplémentaires des quatre berges améliore significativement le rendement de 1'inventaire là où 1'espéce est sporadiquement présente. Cette étude suggère que la "méthode standard" est très dépendante du choix des berges dans les zones où 1'espèce est présente de façon sporadique. Le rendement de la "méthode standard" peut ainsi augmenter sans un effort trop important, si le protocole consiste à ce que la prospection des deux berges, de facultative, devienne obligatoire.

RESUMEN: INFLUENCIA DEL BANCO ELEGIDO EN EL METODO ESTANDARIZADO DE RELEVAMIENTO DE NUTRIAS

La efectividad del método estandarizado de relevamiento de nutrias puede verse influida por la elección de que sector del banco es examinado. Se evaluó la sensibilidad del método estandarizado en dos regiones con diferentes densidades poblacionales de nutrias (*Lutra lutra*) relevando tramos de 300 m aguas arribas y abajo de puentes. En una región con alta densidad poblacional 64% de los sitios "positives" serán registrados como positivos independientemente de cual sector sea elegido por el investigador. En una región poco poblada solo 9% de los sitios "positivos" van a ser registrados usando el método estandarizado de relevamiento si la elección del banco no es optima. En la región poco poblada relevar 100 m de las cuatro orillas mejoró sustancialmente la tasa de éxito del relevamiento. El estudio sugiere que en áreas poco pobladas el método estandarizado de relevamiento es muy sensible a la elección del tramo. La exactitud del método estandarizado de relevamiento puede mejorarse con un poco de esfuerzo adicional si los lineamientos para los relevamientos se cambian de "una búsqueda opcional" en ambos bancos bajo puentes a "una búsqueda obligatoria"