

HABITAT QUALITY ASSESSMENT FOR THE EURASIAN OTTER (*LUTRA LUTRA*) ON THE RIVER JAJROOD, IRAN

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ABSTRACT - There is little information about the status and ecology of the Eurasian otter (*Lutra lutra*) in Iran. We assessed the habitat suitability for otters of the River Jajrood, Tehran province, measuring, or visually estimating, 12 environmental parameters along 16 600 m long river stretches (sampling sites). The downstream stretches of the river were found to be more suitable for otters with respect to the upper part of its course. Although the assessments of habitat suitability for the otter may be affected by several limits, the current distribution of the species on the river agrees with the results of this study. The preservation of the otter in Tehran province should involve the restoration of the ecosystem of the River Jajrood in order to improve the length of suitable river stretches.

Keywords: distribution, Eurasian otter, habitat suitability, water quality, Tehran province

RIASSUNTO – *Stima dell' idoneità ambientale per la lontra (Lutra lutra) del fiume Jajrood, Iran.* Le informazioni relative alla lontra (*Lutra lutra*) in Iran sono scarse. L' idoneità ambientale per la specie del fiume Jajrood, provincia di Tehran, è stata valutata, misurando o stimando 12 parametri ambientali lungo 16 stazioni di campionamento, coincidenti con tratti di fiume della lunghezza di 600 m. I tratti più a valle sono risultati più idonei rispetto al corso superiore del fiume. Malgrado i numerosi limiti del metodo di stima dell' idoneità ambientale adottato, i risultati sono in accordo con l' attuale distribuzione della lontra lungo il fiume Jajrood. La conservazione della lontra nella provincia di Tehran dovrebbe prevedere miglioramenti ambientali volti a incrementare lo sviluppo lineare degli habitat idonei lungo il fiume Jajrood.

Parole chiave: distribuzione, lontra euroasiatica, idoneità ambientale, qualità delle acque, provincia di Tehran

INTRODUCTION

Two out of 13 species of otters are found in Iran: the smooth-coated otter (*Lutra perspicillata*) and the Eurasian otter (*Lutra lutra*). A review of avail-

able scientific reports and interviews with “otter-aware” people showed that Eurasian otters are widespread throughout most of Iranian aquatic ecosystems, including Gilan, Mazandaran, Azarbayejan, Tehran, Kordestan, Ker-

manshah, Markazi, Isfahan, Khorasan, Chaharmahal-Bakhtiari, Fars, Khozestan and Lorestan provinces (Kiabi, 1993; Karami *et al.*, 2006; Mirzaei, 2006).

Major threats to Iranian otter populations include habitat destruction, due to reclamation of wetlands for settlement and agriculture, reduction in prey biomass, water pollution and poaching (Karami *et al.*, 2006).

Although in recent years the Eurasian otter has become the focus of public interest (Foster-Turley *et al.*, 1990; Teubner *et al.*, 2003), knowledge about population density, spatial behaviour and reproductive biology remains largely limited (Erlinge, 1968; Reuther, 1993; Kruuk, 1995), except for its European range, where during the last 30 years numerous attempts have been made to identify, categorise, or classify typical or optimal otter habitats, by a wide variety of approaches, targets and methods (Reuther *et al.*, 2004).

Information about the environmental biology and behaviour of endangered species is essential for their conservation, as well as the assessment of habitat suitability. (DEFRA, 2001).

The aim of this study was to assess the habitat suitability for *L. lutra* of the River Jajrood (Tehran province), for which information about otter distribution and diet were still available (Mirzaei, 2006). We believe that the current study is instrumental in contributing to the knowledge on the habitat requirements of the Eurasian otter in Iran, which can, in turn, allow to prevent the loss of prime otter habitats and establish effective conservation strategies.

STUDY AREA AND METHODS

The River Jajrood flows for about 140 km from Mount Kharsang to Waramin Plain, in the north-east of Tehran Province (Fig. 1). The climate is semi-arid. The average annual temperature is 15°C, while precipitation averages 280 mm. The altitude of the study area varies from 1200 to 1370 m a.s.l. Riparian vegetation consists mainly of *Salix* spp., often associated to *Elaeagnus angustifolia* and *Populus nigra*. Eleven species of fish, 15 mammals, 80 birds, two snakes and three species of amphibians have been so far recorded in the study area. The river is a major recreational attraction, visitor pressure increasing in spring and summer. The lower stretch of the river lies in the Khojir National Park (Mirzaei, 2006).

This study was conducted between August 2005 and July 2006. Sixteen sites, each 600 m long and some five kilometres apart were randomly selected along the river (Fig. 1). Each site was surveyed once per season. According to the available information about the ecological preferences of Eurasian otters and threats to their survival in Iran and abroad, the following 6 life requirements and 6 potential threats were selected and measured or visually estimated for each site:

a) Life requirements

- i) Per cent cover, visually estimated for a 100 m wide belt on each shore);
- ii) Availability of refuges (resting sites);
- iii) Distance to cover from the centre of the sampling stretch (m);
- iv) Retreat possibilities: eight aspects were considered - N, S, E, W, NE, NW, SE, SW - the ideal situation is when otters can escape in all directions;
- v) Number of pools adjacent to the river and slow stretches of water;

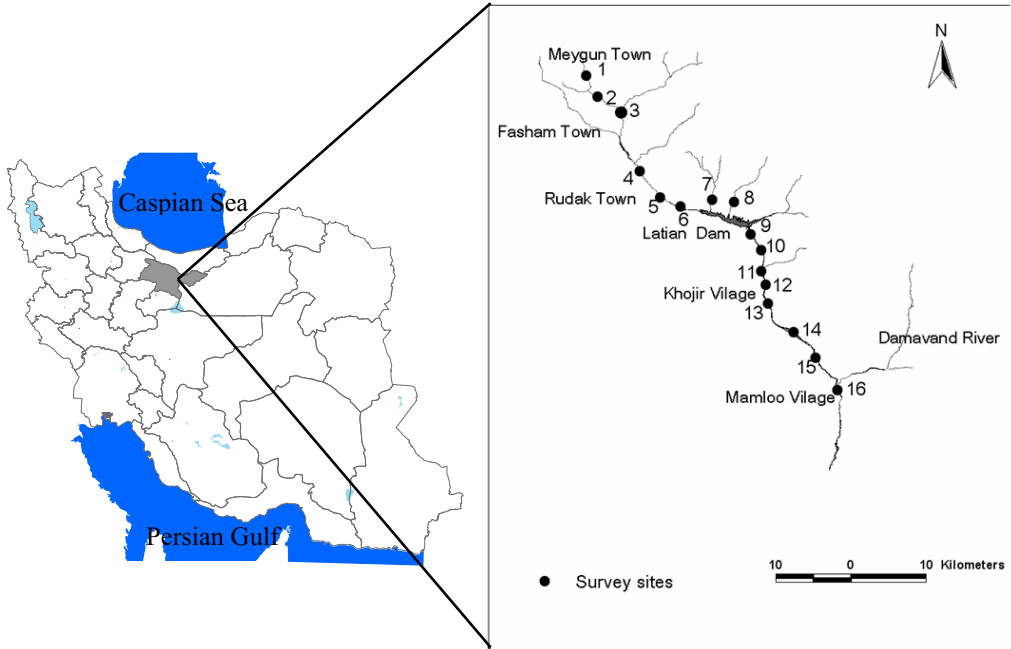


Figure 1 - Distribution of sampling sites in the study area

vi) Altitude (m a.s.l.): altitude was considered an index of food availability according to the OHNE project classification (Reuther, 2002); we assumed that this classification was effective also for Iran, for which no information is currently available.

b) Potential threats

- i) Distance to roads from the centre of the sampling stretch (m);
- ii) Distance to settlement areas from the centre of the sampling stretch (m);
- iii) River canalisation: per cent length of canalised river banks;
- iv) Density of livestock: assessed either by direct observations or based on the presence of signs;
- v) Tourism and recreation activities;
- vi. Water quality (BOD, COD, DO, pH): data from previous research (Iran Department of Environment, 2005), using the Department of Environment classification; although this classification was designed

for water use by humans, these data were assumed to be adequate for assessing water quality for otters.

Each parameter was classified into five categories, ranging from “very bad” (score = 1) to “excellent” (score = 5) (Table 1). The relative suitability of each site was estimated by summing the twelve partial scores.

RESULTS AND DISCUSSION

Sites 12, 14, 15 and 16 were the most suitable for the Eurasian otter, whilst sites 1, 3, 4, 5 and 11 were the most unsuitable (Fig. 2). In general, the sites situated downstream the Latian Dam were more suitable than those upstream (Fig. 2 and Appendix), offering more vegetation cover and food resources, higher water quality and less embankments. Moreover, the downstream sites are included in Khojir National Park,

Table 1 - Environmental parameters measured or visually estimated for each sampling site. Scores range from 1 (very bad) to 5 (excellent).

Score					Parameters	
very bad	bad	moderate	good	excellent		
1	2	3	4	5		
<20%	20-40%	40.1-60%	60.1-70%	>70%	Per cent cover	Life requisites
0	1-3	4-5	6-7	>7	Refuges	
>20	10.1-20	5.1-10	2-5	<2	Distance to cover (m)	
<2	2-3	4	5	6-8	Retreat possibilities	
0	1	2-3	4-5	>5	Number of pools	
>1600	800.1-1600	400.1-800	200.1-400	<200	Altitude (m a.s.l.)	
<50	50-100	100-150	150-200	>200	Distance to roads (m)	Threats
<200	200-400	400-700	700-1000	>1000	Distance to settlement areas (m)	
>70%	50-70%	30-50%	10-30%	<10%	River canalisation (%)	
Very high	high	mid	low	absent	Density of livestock	
Very high	high	mid	low	absent	Tourism and recreation activities	
Very bad	bad	mid	good	excellent	Water quality	

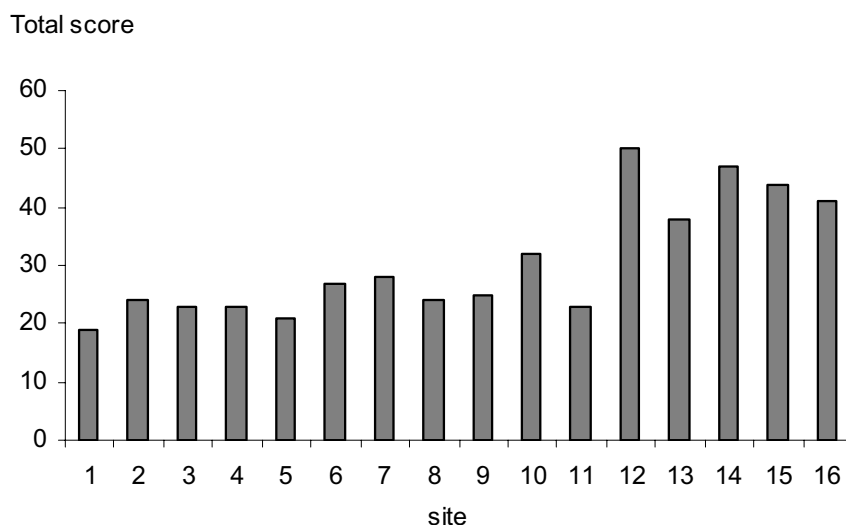


Figure 2 - Total score for each sampling site on the River Jajrood.

resulting in more conservation measures and lower disturbance by tourists, the access to this area being limited by military services. On the whole, only 25-30% of the investigated river stretch presented fairly good/good conditions for otters.

Accordingly, although the absence of spraints does not conclusively mean the absence of otters (Conroy and French, 1987), no signs of otters have been reported for the upper part of the Jajrood River, while downstream the Latian Dam, evidence of the species' presence has been found at 6 sites (Site No. 10, 11, 12, 14, 15, and 16; Mirzaei *et al.*, 2009). Currently, at site 16 a dam is being built, resulting in no cover and disturbance. Although habitat cover is known to be an important environmental parameter for this species (Mason, 1995), otters may be attracted by the high fish availability offered by the water pool at the mouth of the dam, as supported by the high otter marking activity throughout the year (Mirzaei *et al.*, 2009).

The assessments of habitat suitability for the otter may be affected by several limits, summarized by Reuther *et al.* (2000) as follows:

- many factors are difficult to define in a quantitative way (e.g. pollution);
- the effects of a number of factors on the otter are not clear or are still disputed (e.g. disturbance);
- many factors cannot be accurately estimated by a simple survey (e.g. food supply and water use);
- many judgements are subjective (e.g. vegetation cover);
- many factors influence each other in an unknown way and extent (e.g. disturbance and cover).

Some surveyors (Teubner *et al.*, 1999) tried to compensate for these problems by ranking the sites in classes. However, the comparability of these data remains low as the whole method is highly subjective.

Nonetheless, overall the species distribution in the study area agreed with the assessed habitat suitability, three out of four most suitable sites (12, 14 and 16) showing the highest otter marking intensity (Mirzaei *et al.*, 2009). Moreover, in agreement with our results, Strachan and Jefferies (1996) stated that otter choice is lowland first and upland last.

The poorer habitat quality found at the upper sites is probably due to human development and disturbance. Although the species is known to have broad habitat tolerances, allowing them to survive in a wide variety of habitats (Kruuk, 1995), habitat destruction is the most important threat that exerts constraints on otter distribution on the upper course of the River Jajrood.

Habitat alteration and pollution are considered the main causes of otter decline in central and western Europe. As a consequence of recent economic development, rapid industrialization and urbanization, the situation of the otter in Iran does not represent an exception to this rule, especially in the surrounding area of Tehran. A nationwide strategy for the conservation of otters is therefore needed, including the survey of its many wetlands, which may play a main role in otter conservation.

The preservation of the otter in Tehran province should involve the restoration of the ecosystem of the River Jajrood in order to improve the length of suitable river stretches. More generally, information on the relative influence of

various environmental factors on otter distribution is needed for improving the effectiveness of otter management in the country. Finally, our results need to be confirmed for a wider variety of locations and habitats.

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Appendix - Single, partial and total scores for each sampling site; %C = per cent cover, R = refuges, Dc = distance to cover in m, Rp = retreat possibilities, Np = number of pools, A = altitude in m, Ps = partial score, Dr = distance to roads in m, Ds = distance to settlement areas in m, %R = river canalization in %, Dl = density of livestock, Tr = tourism and recreation activities, Wq = water quality.

Site	%C	R	Dc	Rp	Np	A	Ps	Dr	Ds	%R	Dl	Tr	Wq	Ps
1	2	1	1	1	1	1	7	1	1	1	5	2	2	12
2	2	1	2	1	1	1	8	1	1	4	5	2	3	16
3	2	1	1	1	2	1	8	1	1	4	5	1	3	15
4	1	1	1	1	1	1	6	1	5	2	5	2	2	17
5	1	1	1	1	1	1	6	1	1	4	5	1	3	15
6	1	2	1	5	1	1	11	1	1	5	5	1	3	16
7	2	1	1	1	3	1	9	1	1	5	5	3	4	19
8	1	1	1	1	1	1	6	1	1	4	5	3	4	18
9	1	1	1	1	3	2	9	1	1	5	3	2	4	16
10	1	1	1	1	3	2	9	5	1	5	5	3	4	23
11	2	1	1	1	2	2	9	1	1	5	5	1	1	14
12	3	4	4	5	5	2	23	5	5	5	5	3	4	27
13	3	1	4	5	4	2	19	3	1	5	4	3	3	19
14	3	5	5	5	4	2	24	5	5	5	3	2	3	23
15	3	2	5	5	5	2	22	4	5	5	3	1	4	22
16	1	1	1	5	5	2	15	5	5	5	3	4	4	26

