

The state of conservation of the Otter, *Lutra lutra*, in the French alps. What does the future hold?

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ABSTRACT

The Otter in France almost disappeared in the middle of the 20th century, due to trapping, poisoning, pollution and destruction of wetlands. It survives only in the western part of the country and in the Massif Central. The species disappeared first from the Alps and from most of the Pyrenees, and secondly in the plains. Since its protection in 1981, and with the application of a national recovery plan in 2010, the Otter has slowly recovered in the west and south-west of the country and is currently recolonizing the mountainous areas. The Pyrenees are now almost completely reoccupied, but recovery in the Alps seems to be rather slow, although progressing. Here, we present the current distribution of the Otter in the Alps, together with an analysis of the potential for this part of the country. We consider also the future pressure the species is likely to encounter in this area.

INTRODUCTION

Up to the 1950s, the Otter, *Lutra lutra*, was present throughout metropolitan France, even at high altitudes in the mountains (Kuhn, 2011). There were reports of the species being observed above 2,000 metres. Trapping for its fur, conflict with fishing, poisoning, shooting, but also increased water pollution and the destruction of wetlands, drove the species to extinction in the north of France by the middle of the 20th century and from much of the mountains. Despite the legal protection of both species and habitat since 1981, abundance and distribution continued to reduce, such that, by the end of the 1980s, the Otter was absent from two-thirds of the country (Rosoux et al., 1995). Viable populations were still present in Brittany, in the Poitou-Charentes, part of the Aquitaine and in the western part of Massif central, le Limousin. Some individuals were observed in the western and central parts of the Pyrenees, but there were no official observations from the Alps. But finally, the end of trapping and poisoning, the management of rivers, the decrease in water pollution and the destruction of some dams have permitted the Otter to regain part of its original territory over the past 20 years. The Pyrenees are now completely recolonized, and there are records of the species up to the 2,200 m (Riffaud, 2016), and at the same time signs of presence were also observed in the south-east of France and in the Mediterranean region. The Otter is present in the north-west in the Alps, in the alpine foothills, and at a low level in Burgundy. Whereas, in the south-west, it can be seen in the Camargue and along the river Rhône. Finally, the first signs of recolonization of the Alps have been clearly evident over the past 4–5 years.

LEGAL STATUS OF THE OTTER IN FRANCE

Previously considered as ‘wild game’, with many means of destruction possible, in 1981, the Otter and its habitat gained official protection. This legal protection followed the prohibition of hunting (but not trapping) in 1972. Since 1981, in the event of non-preventable destruction of habitat by construction projects, some other parts of the Otter habitat must be restored to compensate for the loss.

In 1984, the IUCN status of the Otter, on a national scale, was ‘Endangered’ (De Beaufort, 1984). Following the partial recovery of the species, the conservation status has improved to ‘Least concern’ in 2009 (UICN et al., 2009) and 2017 (UICN et al., 2017). However, in relation to the situation of the species as a whole, the local conservation status could be different in some parts of France.

For the two administrative regions which include the French Alps, i.e. Provence-Alpes-Côte d’Azur in the south and Rhône-Alpes in the north, the IUCN status of the Otter is ‘Critically endangered’, based upon a very low level of local abundance, a scattered distribution and enduring pressure.

The reports from 2006 to 2018 (Table 1) (Arthur and Landry, 2015), made every six years to the European Habitat Directive, indicate no change to the state of conservation of the Otter in the three biogeographic regions which cover the

Table 1 Reports to the Habitat Directive on the state of conservation of the Otter for the three biogeographic regions in the French Alps, for the years 2006, 2012 and 2018.

Biogeographic region	2006*	2012	2018
Continental	Inadequate	Inadequate	Inadequate
Mediterranean	Bad	Bad	Bad
Alpine	Bad	Bad	Bad

* The first report indicated a favourable state of conservation, but it was later revised.

French Alps, and clearly the species is still considered to be in an unfavourable state of conservation in this region.

NATIONAL PLAN FOR THE RE-ESTABLISHMENT OF THE OTTER IN FRANCE

Since the Otter's status only evolved slowly in spite of the 1981 protection, the Department of the Environment decided in 2009 to introduce a National Plan for the re-establishment of the species. This plan, in progress for six years was written by the French Society for the Study and Protection of Mammals, and approved by the Department of the Environment in 2010 (Kuhn, 2009).

A second plan is now in progress for ten years (2019–2027). As for the first one, this plan focuses on four topics:

- Improving our knowledge of the Otter, its distribution, abundance and the possibilities for recolonization;
- Managing solutions for cohabitation between the Otter and humans;
- Improving the conservation status of the Otter by reducing mortality due to human activities and restoration of habitat;
- Increasing public and professional awareness of the species.

All these topics were applied wherever the Otter is present, with the goals of maintaining the existing populations, to improve recovery in all areas where it was once present, stressing safe cohabitation between Otter, fish farms and trappers.

On a national scale, following the standard protocol of the UICN Otter group, the distribution of the Otter increased during the first plan (2010–2016) (Figures 1a and 1b), with local populations along the Atlantic coast coming together, an increased density in areas were found previously, but with few changes on the margin of this past distribution.

During the first plan, almost 25 fish farms (from more than 550 registered) were inspected to improve protection against Otter damage and, except for two cases, it was seen that simple rules sufficed to suppress most of this. Few complaints with respect to river fish were noted.

Road kill, as otters often prefer to cross the road rather than swimming in rivers in flood, was observed as the main cause of mortality, despite some cases of losses

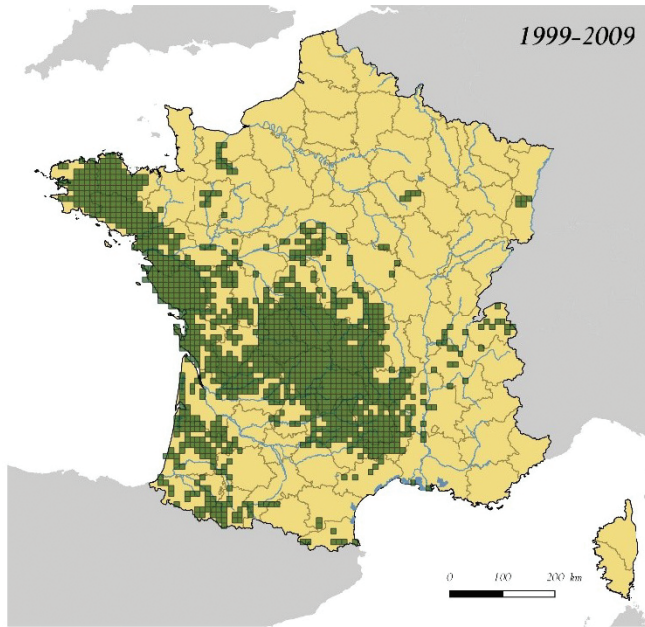


Figure 1a Distribution of the otter, *Lutra lutra*, in France during the period 1999–2009 (data collected using the IUCN Otter Group standard protocol) (green square indicates certified presence during these 10 years).

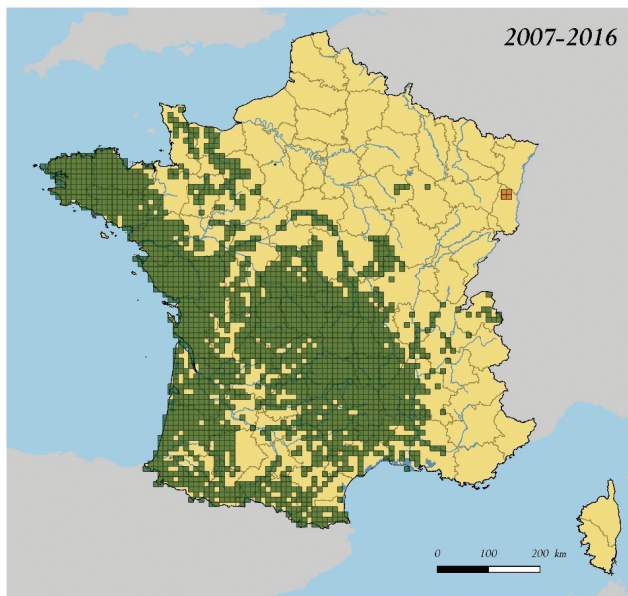


Figure 1b Distribution of the otter, *Lutra lutra*, in France during the period 2007–2016 (data collected using the IUCN Otter Group standard protocol) (green square indicates certified presence during these 10 years; orange square: indicates Otter was previously present, but no new data during this period).

by trapping being still present, mainly where campaigns against musk rats were applied.

THE OTTER IN THE FRENCH ALPS

History of presence and abundance

In 1984, the Otter was scarce in the Alps, with fragmented populations, mainly in the piedmont in the Alpes-Maritimes and the Hautes-Alpes. The only existing viable population was situated around Lake Geneva and the cities of Annecy and Chambéry, with a connection up to Grenoble (Fayard, 1984). A new atlas made by FRAPNA at the end of the 1990s (Grillo, 1997) showed that the species was absent from almost every part of the northern French Alps. Nevertheless, the possibility was suggested of the survival of a few individuals at the junction of the rivers Rhône and Ain, between Annecy and Chambéry, up to the north-east of the city of Lyon, and maybe near Grenoble (Michelot and Bendele, 1995). The small populations observed in the south of the Alps, in 1984 along the Durance, in the Vaucluse and Hautes-Alpes, and also in the Alpes-Maritimes and Alpes de Haute-Provence, were considered extinct in 1995 (Rosoux et al., 1995). In 2007 and in 2012, the presence of the Otter along the basins of the Affre and Giffre in Haute-Savoie and around the village of Chamonix was noted (Jacquet, 2007; Gilliéron, 2012). Nevertheless, both authors could not conclude if this presence was due to original populations which had been overlooked, or due to some recent new arrivals. In the south of the Alps, Rigaux (2016) indicated the presence of the species in the piedmont, at lower altitudes along the Durance because of dispersal from the Camargue (Héron et al., 2012), but an absence from the mountainous parts of the Alps. More recently, a summary of Otter distribution in the Alps was prepared in the course of a national census in 2012, which was repeated in 2018. In the south of the Alps, the Otter was first observed in 2013 on the river Durance at low altitudes, but, year after year, the species has steadily recolonized the higher parts of the region and, in 2015, the first signs of presence were found up to the great Serre-Ponçon dam (1,200 m high), in the Alpes de Haute-Provence, previously considered as an insuperable barrier. In the north, since 2010, signs of presence and some direct observations have been made up to 2018, around Geneva and in the Maurienne valley, where a local population has been known for some time, and more surprisingly in the valley of the Romanche, close to Grenoble on the border of the Ecrins National Park. During the years 2016–2018, the Otter has reached the upper part of the Durance, coming close to the city of Gap (Figure 2).

From where do the otters in the French Alps originate?

Unfortunately, few samples of otters from the French Alps have been collected and analysed, and these only recently. The genetic studies conducted by Jacob (2012) and Pigneur et al. (2018) revealed, in the north of the Alps, the presence of a common locus with the populations of the eastern part of the Massif Central (that

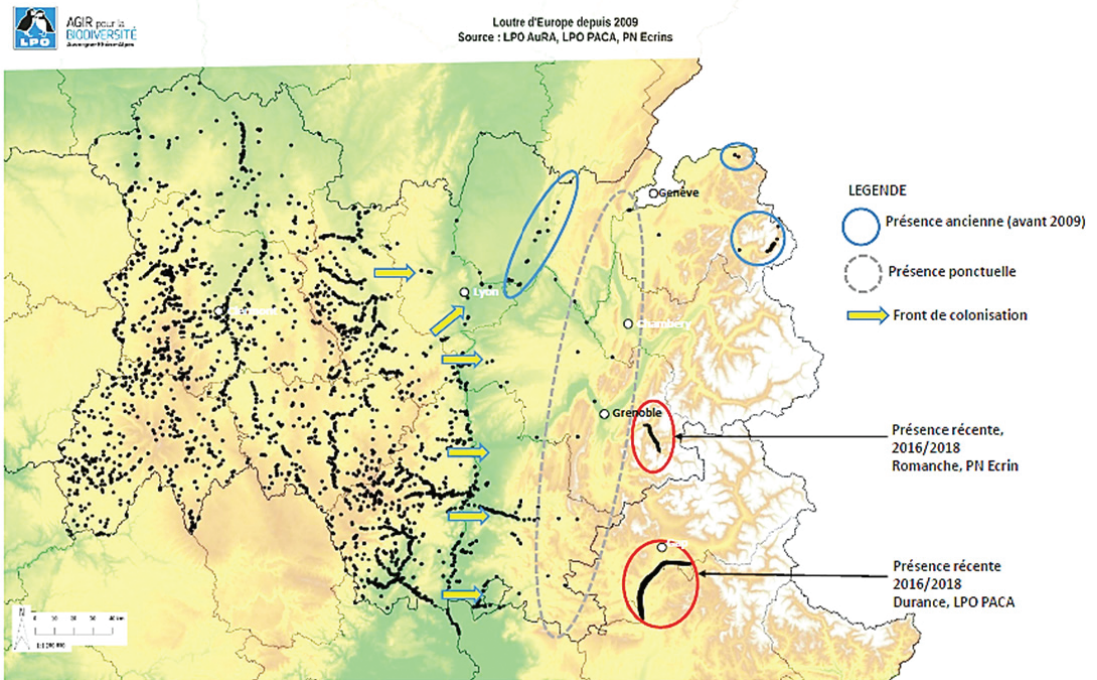


Figure 2 Summary of recent distribution data for the Otter in the French Alps and near the border (dotted black or solid black line: presence certified) (from LPO Rhône-Alpes and PACA, 2018).

is the western border of the French Alps), but also the presence of one specific locus, previously found from a captive breeding strain in a European zoo (Mucci et al., 2010), in the population of the Haute-Savoie (Maurienne valley). Last but not least, two samples collected on the river Arve, in this department, have revealed some specific alleles not found elsewhere in the Alps or in Europe either (but the low number of samples doesn't permit a conclusion; Pigneur, pers. com.).

From the samples collected in 2011 and 2012, and analysed by G. Jacob (Teyssier, 2012), in the Savoie and Haute-Savoie departments, only males, with a minimal number of seven individuals spread over four rivers and a maximum of three individuals on one river, were identified.

In the south of the French Alps, the genotypes observed for the individuals living in the lower parts of the river Durance are closely related to those found in the Camargue (Pigneur et al., 2018). But, recently, following the presence of otters on the river Argens (Haut Verdon) since 2010, an inquiry revealed that, in 2006, the French ministry of the environment came to make a film and for this used three 'domestic' otters. At this place, from 2006 to 2010, no observations were made and, between 2011 and 2018, the species was difficult to spot (Rombaut, pers. com.).

In fact, putting them all together, these facts lead to diverse possibilities, each one not exclusive from the others:

- There is a possibility of relict populations, especially around the city of Geneva, in the valleys of the Gresivaudan, the Maurienne and along the river Isère, between Grenoble and Lyon. The fact that these populations were not detected, during the 1980s and up to 1999, is not really surprising; surveys were not so intense during this period and we know that, at low density, Otter populations can be difficult to ascertain;
- There has been a recent recolonization of the French Alps, mainly from Burgundy, but also from the eastern borders of the Massif Central (Ardèche) where populations are abundant. A southern recolonization is also occurring, with animals migrating from the Camargue along the river Durance, but more slowly due to the rough nature of the area. A third process of recolonization may occur in the Haute-Savoie, in relation to the installation and development of an Otter population in Switzerland, around the city of Geneva (Angst, 2018). In all parts of the Alps, this dispersion is apparently mainly due to males;
- There may have been a possible release of captive individuals in the valley of the Maurienne, Haute-Savoie and in the Verdon valley, Alpes de Haute-Provence, in 2006.

How appropriate is the habitat for the Otter in the French Alps?

The question about habitat quality for the Otter in these mountainous regions arises frequently when one questions the possibility of viable populations. In most of the studies modelling habitat quality for the Otter, the premise is that mountain ranges are less suitable habitats for otters (Müller et al., 1976). However, Robitaille and Laurence (2002) showed, on a European scale, that altitude seemed a poor indicator of Otter occurrence.

During the implementation of the national plan for the conservation of the Otter in France 2010–2015, potential habitat suitability for the Otter in geographical sectors of metropolitan France was reviewed (Savouré-Soubelet et al., 2015). Water connectivity, fish biomass, levels of pollution, road fragmentation, quality of river banks, landscape characteristics and potential for disturbance were included in the model (Figure 3).

The French Alps, although not having poor quality habitat, have generally a low level of potential, due mainly to the low food resource biomass, principally in the south, but also due to a developed road network and human presence in the north, especially in the valleys with ski stations. The valleys of the Maurienne and the Tarentaise, in the north of the Alps, also have high rates of pollution as industry and mining have been present for a long time. Jacquet (2009) indicated that, in the department of the Savoie and the Haute-Savoie, almost one river in two has a sub-favourable habitat, and locally the combination of limited food resources, high human population, risk of mortality from vehicles, as these valleys are intensively populated, counterbalance the good quality of habitat for shelters and the availability of water.

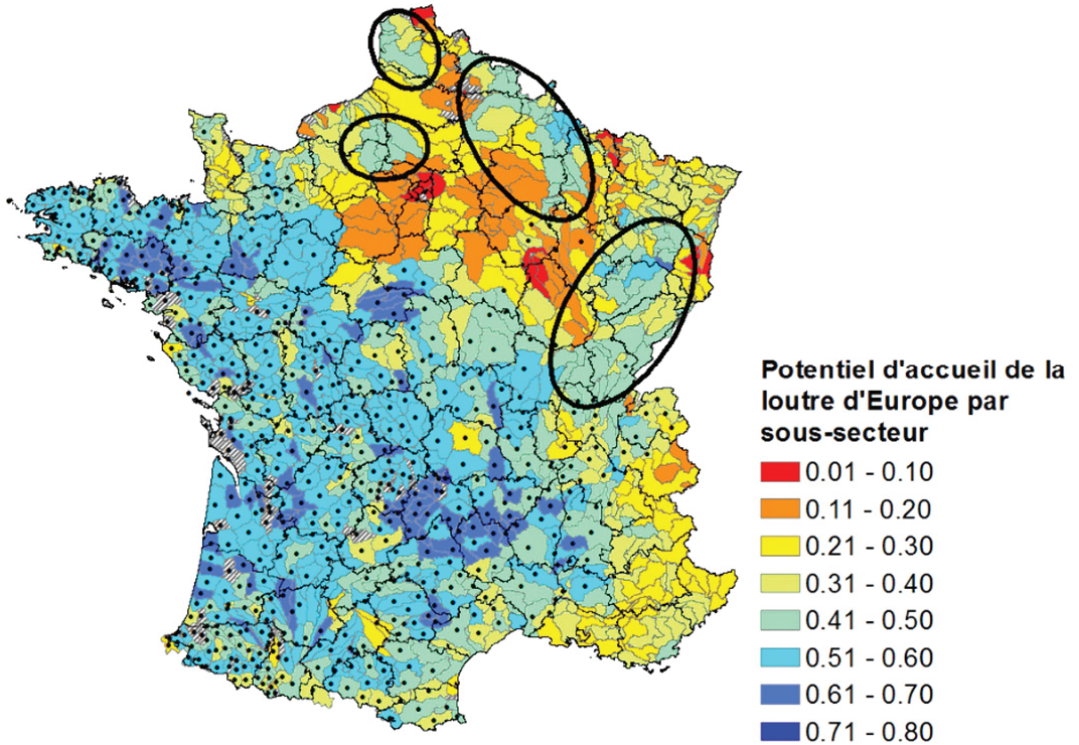


Figure 3 Potential habitat suitability for the otter in France (Savouré-Soubelet et al., 2015) (blue: high suitability; green and yellow: low suitability; red: no suitability).

In the south of the French Alps, high seasonal variations in water levels in relation to the Mediterranean climate and the widely dispersed water courses are the main limiting factors for habitat quality. More recently, Cavillon (2011) showed that, in the French Alps but mainly in the south, three main factors may influence the recolonization by the Otter: the fragmentation of the hydrographic network; the presence of anthropogenic pressures (as indicated by the presence of villages and roads); and, more surprisingly, the clearing of river banks to limit flooding (Figure 4). This clearing could influence the amount of food resources other than fish, but also the potential for shelters and nurseries, and decrease facilities for displacement.

Human pressures

The widespread use of water as an hydroelectric resource in the French Alps and the desire to limit flooding have important consequences for the management of rivers and streams throughout the Alps. A lot of dams and sills have been constructed on all rivers during the second half of the 20th century, some of them being major works and representing a barrier for the displacement of semi-aquatic

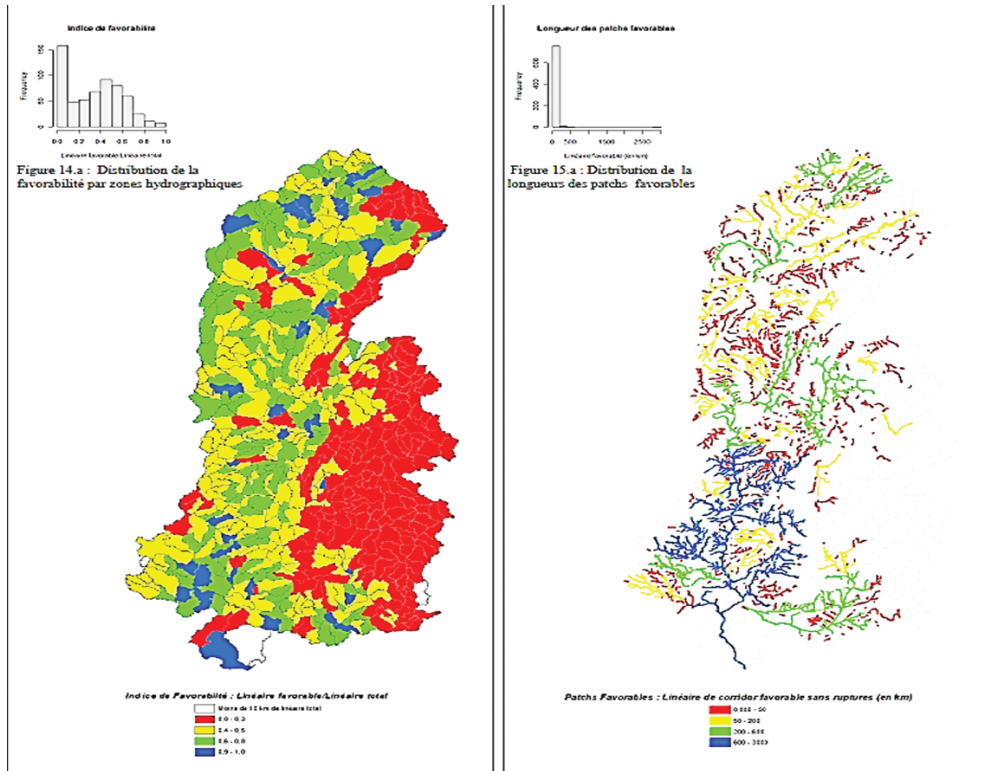


Figure 4 Favourability of river banks and the degree of river fragmentation in the Rhône basin for the Beaver and the Otter (Cavillon, 2011).

animals, such as the Otter. A map of all these obstacles was made in 2014 by the LPO Rhône-Alpes and PACA (Figures 5a and 5b). Even if the Otter demonstrated its ability to overcome many obstacles, as it did when crossing the Serre-Ponçon dam, a dam with a wall more than 40 metres high!, the sheer number of obstacles may constitute a clear limitation to the recolonization of the French Alps.

Only 14 fish farms, mainly for trout, are present in the French Alps, 28 if we include the piedmont (Raimond, 2012). So, if the possibility of Otter damage to fish farms is low, as their number is low, complaints as a result of Otter damage to wild trout populations will arise concurrently with the return of the species to the Alps, as seen in the Pyrenees.

Last but not least, the development of road networks in alpine valleys, in relation to the increase of ski resorts over the past 30 years, most of these roads closely following the rivers (often less than 10 metres away), may increase the risk of road kill. Few cases were reported in the Alps these past 10 years, but their number will increase with the return of the Otter, as we have observed in the western Pyrenees, where, during the past 10 years, more than 20 animals were killed (4 of them being females with cubs)

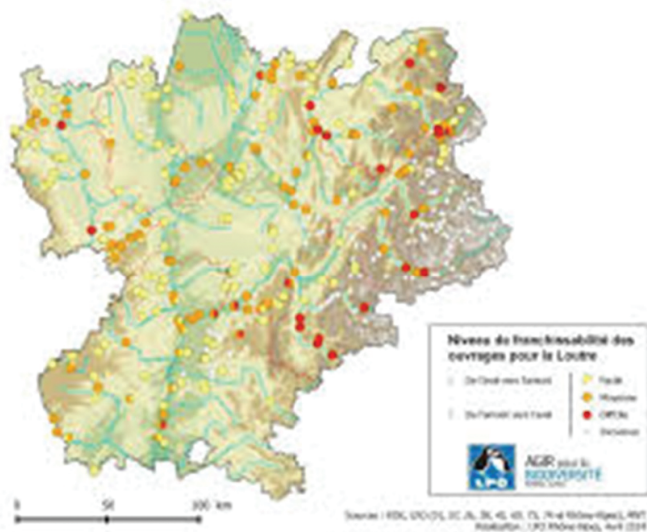


Figure 5a Presence and possibility of an Otter being able to pass for the dams in the northern French Alps (LPO Rhône-Alpes, 2018) (yellow: easy to cross; orange: crossing possible but not easy; red: crossing considered as not possible).

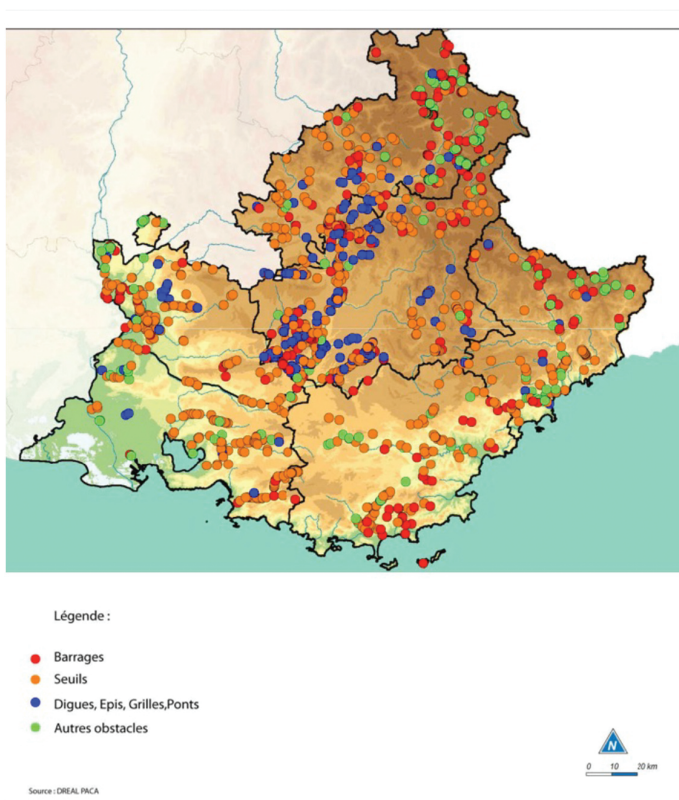


Figure 5b Presence of dams (red dot), sills (orange dot) and other obstacles (green and blue dots) on rivers in the southern French Alps (LPO PACA, 2016).

CONCLUSION

In the past, the Otter inhabited almost all of the French Alps, reaching some high altitudes and being able to exploit mountain lakes in summer at altitudes up to 2,000–2,500 m (Fatio, 1869). However, even if data about the level of population are absent, the assumption of lower abundance in these places may be retained. Cavillon (2011) indicates currently, as potential favourable habitat for the Otter in the Alps, 14,192 kilometres of river. If we retain the abundance in mountains indicated by Kruuk (2006) and Garcia-Diaz (2008), between 0.07 and 0.14 individuals per kilometre of river, with the hypothesis of at least the same minimum extent of favourable habitat as in the past, the Otter population in the alpine region could be estimated between 993 and 1,987 animals. Even if these numbers are estimations and must be used with care, the local populations in the past were small, and the French Alps couldn't be considered as an optimal habitat for the species.

Nevertheless, the species is actually recolonizing this region, where there are low levels of pollution, sufficient quiet places for nurseries, even if the scarcity of trophic resources may be a problem in many parts, thus driving the species to move further and exposing it to a higher rate of road kill. The goal of the national action plan, begun in 2010 and renewed in 2019, is to improve and help the species to return to its traditional habitat. Friendly dams, clearing river banks in mosaic, managing roadside verges, especially around bridges, together with an information campaign for fishermen, are the main actions we have to take for helping the species to return to the Alps. All of these actions must be applied quickly, as the return of the Otter seems to be progressing rapidly.

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REFERENCES

- Angst, C. (2018) Status of Eurasian Otter in Switzerland. Communication at the symposium: 'The Eurasian otter in the Alps: towards a common strategy across boundaries'. 10–11 October 2018, Aosta: Gran Paradiso National Park, 29 p.
- Arthur, C.P. and Landry, P. (2015) Mammifères terrestres. In: F. Bensettiti and R. Puisseauve, *Résultats de l'état de conservation des habitats et des espèces dans le cadre de la directive Habitats-Faune-Flore en France. Rapportage 'article 17'. Période 2007–2012*. Paris: MNHN-SPN, MEDDE, pp. 79–89.
- Cavillon, C. (2011) *Qualité et fragmentation du réseau d'habitats du corridor rivulaire des bassins versants de la Loire et du Rhône. La Loutre d'Europe (Lutra lutra) et le Castor d'Europe (Castor fiber galliae), espèces focales potentielles pour une évaluation du corridor alluvial?* Montpellier: Master 2 IEGB, Faculté des sciences, Montpellier II, 77 pp.

- de Beaufort, F. (ed.) (1984) *Livre Rouge des espèces menacées en France. Tome 1: Vertébrés*. Paris: Muséum National d'Histoire Naturelle, 233 pp.
- Fatio, V. (1869) *Faune des vertébrés de la Suisse (Volume I: Mammifères)*. Genève and Bâle: Georg, 410 pp.
- Fayard, A. (ed.) (1984) *Atlas des Mammifères sauvages de France*. Paris: SFPEM, pp. 118–119.
- Garcia-Diaz, P. (2008) Abundance of the Eurasian Otter *Lutra lutra* (Linnaeus, 1758) in two areas from central Spain (Province of Salamanca, River Tomes). *UICN Otter Species Group Bulletin*, 26(1): 50–59.
- Gillieron, J. (2012) *Les mammifères de l'arc alpin*. Nyon: Glénat, pp. 311–313.
- Heron, J.-N., Blanc, G. and Tatin, D. (2012) Premiers indices de recolonisation de la Loutre d'Europe *Lutra lutra* (Linnaeus, 1758) en Provence. *Nature de Provence, Revue du CEN PACA*, 1: 85–93.
- Grillo, X. (ed.) (1997) *Atlas des mammifères sauvages de Rhône-Alpes*. Lyon: FRAPNA, pp. 122–125.
- Jacob, G. (2012) *Etude génétique de la population de Loutre en région Rhône-Alpes*. Lyon: LPO Rhône-Alpes, 10 pp.
- Jacquet, F. (2007) *Etude de faisabilité du retour de la Loutre d'Europe (Lutra lutra) en Haute-Savoie. Thèse de doctorat vétérinaire*. Maisons-Alfort: Ecole Nationale Vétérinaire d'Alfort, 188 pp.
- Jacquet, F. (2009) The return of Otter (*Lutra lutra*) in Haute-Savoie (France): development of a new method of habitat analysis. *Revue d'Ecologie (Terre et Vie)*, 64: 359–368.
- Kruuk, H. (2006) *Otter: Ecology, Behaviour and Conservation*. New York: Oxford University Press, 265 pp.
- Kuhn, R. (2009) *Plan national d'actions pour la Loutre d'Europe (Lutra lutra), 2010–2015*. Paris: Société Française pour l'Etude et la Protection des Mammifères/Ministère de l'Ecologie, de l'Energie, du Développement durable et de la Mer, 109 pp.
- Kuhn, R. (2011) *La Loutre d'Europe Lutra lutra (Linnaeus, 1758). Encyclopédie des Carnivores de France. Fascicule 8*. Bourges: Société Française pour l'Etude et la Protection des Mammifères, 73 pp.
- Kuhn R., Simonnet F., Arthur C. & Barthélemy V. (2019) Plan national d'actions en faveur de la Loutre d'Europe (*Lutra lutra*) 2019–2028. SFPEM & DREAL Nouvelle-Aquitaine, Poitiers, 89 pp.
- LPO PACA (2016) *Plan National d'Actions en faveur de la Loutre d'Europe, Lutra lutra, 2010–2015. Déclinaison en région Provence-Alpes-Côte d'Azur, bilan 2010–2015*. LPO PACA, 56 pp.
- LPO Rhône-Alpes (S. Teyssier and C Bouchardy, eds) (2018) *Synthèse de la déclinaison 2011–2016 du Plan national d'actions pour la loutre d'Europe dans les ex-régions Auvergne et Rhône-Alpes*. LPO Rhône-Alpes and Catiche Productions, 27 pp.
- Michelot, J.-L. and Bendele, R. (1995) Statut de la loutre dans le bassin du Rhône et le département de l'Ardeche. *Cahiers d'éthologie*, 1(2/3/4): 223–232.
- Mucci, N., Arrendal, J. Ansorge, H., Bailey, M., Bodner, M., Delibes, M., Fernando, A., Fournier, P., Fournier, C., Godoy, J., Hajkova, P., Hauer, S., Heggberger, T., Heideke, D., Kirjavainen, H., Krueger, H.H., Kvalovy, K., Lafontaine, L., Lanszki, J., Lemarchand, C., Liukko, U.M., Loecscheke, V., Ludwig, G., Madsen, A., Mercier, L., Ozolins, J., Paunovic, M., Pertoldi, C. Piriz, A., Prigioni, C., Santos-Reis, M., Luis, S.T., Stjenberg, T., Schmmid, H., Suchentruk, F., Teubner, J., Tomberg, R., Zinke, O. and Randi, E. (2010) Genetic diversity and landscape genetic structure of otter (*Lutra lutra*) populations in Europe. *Conservation Genetics*, 11: 583–599.

- Müller, H.-U., Martin, C. and Diethelm, P. (1976) *La Loutre: sa présence, ses conditions d'existence, sa conservation en Suisse*. Ethologie und Wildforschung, Zoological Institute, University of Zürich, 88 pp.
- Pigneur, L.-M., Michaux, J., Caublot, G., Fournier, P., Marc, D., Simonnet, F. and Jacob, G. (2018) Apport de la génétique pour l'étude de la dynamique des populations de Loutre d'Europe *Lutra lutra* (Linnaeus, 1758) en France. *Naturae*, 6: 63–71.
- Raimond, S. (2012) *Sites piscicoles en France et risques potentiels de prédation par la Loutre d'Europe. Plan National d'Actions en faveur de la Loutre d'Europe*. Bourges: SFEPM, 52 pp.
- Riffaud, A. (2016) Loutre des cimes. *Mammifères sauvages*, 71: 11.
- Rigaux, P. (2016) La Loutre d'Europe (*Lutra lutra*). In: LPO PACA, GECEM and GCP, *Les mammifères de Provence-Alpes-Côte d'Azur*. Mèze: Biotope, pp. 198–199.
- Robitaille, J.-F. and Laurence, S. (2002) Otter, *Lutra lutra*, occurrence in Europe and in France in relation to landscape characteristics. *Animal Conservation*, 5: 337–344.
- Rosoux, R., Tournebize, T., Maurin, H. and Bouchardy, C. (1995) Etude de la répartition de la loutre d'Europe (*Lutra lutra* L.) en France. Actualisation 1993. *Cahiers d'éthologie*, 15(2/3/4): 195–206.
- Savoure-Soubelet, A., Witte, I., Flamme, L., Grech, G. and Haffner, P. (2015) Détermination du potentiel d'accueil de la Loutre d'Europe (*Lutra lutra*) par secteur géographique en France métropolitaine. *Revue d'Ecologie (Terre et Vie)*, 70(4): 293–313.
- Teyssier, S. (2012) Du côté de la science. *Info Loutre Rhône-Alpes*, Bulletin décembre(1): 5–7.
- UICN Comité français, MNHN, SFEPM and ONCFS (2009) *La Liste rouge des espèces menacées en France. Mammifères de France métropolitaine*. Paris: UICN France, 12 pp.
- UICN Comité français, MNHN, SFEPM and ONCFS (2017) *La Liste rouge des espèces menacées en France. Mammifères de France métropolitaine*. Paris: UICN France, 17 pp.

