

Recolonization of the Austrian Alps by otters: conflicts and management

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INTRODUCTION

Otters were once widespread in the Austrian Alps, but their distribution and decline were not documented properly. By the 1980s, otters were virtually extinct. It remains unclear if some of the otter signs recorded within the 1980s in the Alps originated from a relict population or were migrants from source populations in the north and east of Austria, both outside the Alps.

Regional and non-systematic surveys focusing on the existing populations in the north and east of Austria were carried out from the later 1970s until 2000 (Jahrl and Kraus, 1996; Kranz, 1995; Kranz, 2000a; Kraus, 1981; Kraus, 1886; Kraus, 1989; Sackl et. al., 1996). Afterwards, the basis of documented population expansion was based on systematic large-scale surveys covering entire provinces.

Otter conservation, and thus also monitoring, is within the legal responsibility of the nine provinces (Bundesländer) of Austria (Figure 1), where legal issues and thus the EU Habitat Directive are implemented either in the hunting law (Burgenland, Kärnten/Carinthia, Oberösterreich/Upper Austria, Salzburg), the nature conservation law (Niederösterreich/Lower Austria, Tirol/Tyrol) or in both laws (Steiermark/Styria, Vorarlberg, Wien/Vienna). As a side effect of these approaches, otter distribution surveys of the provinces were not coordinated and were not carried out at a given year.

Table 1 gives an overview when the entire provinces were monitored for otter presence. These maps are all based on bridge-crossing surveys, where bridges, suitable for monitoring, were checked for otter presence; usually four bridges were checked for each of the 10 × 10-km UTM squares. Therefore, Austrian-wide otter distribution maps are the summary of several separate surveys carried out within a couple of years.

In this paper we show the distribution of otters on an Austria-wide scale for different years. It is worth pointing out that the range expansion of otters in Austria is due to natural recolonization; there was no reintroduction carried out

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Figure 1 Administrative organisation of Austria with its nine provinces.

and there are no indications for illegal releases anywhere in Austria. The only location where otters originate from captivity is the city of Salzburg, where otters were discovered in autumn 1997 (Jahrl, 1998). They obviously escaped from the zoo of Salzburg, although the director of the zoo denied that in the first hand (Jahrl, 1998). These were very few animals and they did not expand their range beyond

Table 1 Systematic otter surveys covering entire provinces (years indicate the year of survey; in some cases, the publication of the report took place at a later point).

Provinces	Area	Survey I	Survey II	Survey III	Survey IV
Upper Austria	12,000 km ²	2001 ¹	2012 ²		
Styria	16,400 km ²	2003 ³	2006 ⁴	2012 ⁵	2018 ⁶
Carinthia	9,500 km ²	2004 ⁷	2009 ⁸	2014 ⁹	2017 ¹⁰
Lower Austria	19,200 km ²	2008 ¹¹	2018 ¹²		
Salzburg	7,100 km ²	2009 ¹³	2016 ¹⁴		
Tyrol	12,600 km ²	2010 ¹⁵			
Burgenland	4,000 km ²	2013 ¹⁶			
Vorarlberg	2,600 km ²	not existing			
Vienna	400 km ²	not existing			
	83,800 km ²				

¹ Kranz et al., 2003

⁷ Kranz et al., 2005

¹² Kofler et al., 2018

² Kranz and Poledník, 2013

⁸ Kranz and Poledník, 2009a

¹³ Kranz and Poledník, 2009c

³ Kranz et al., 2004

⁹ Kranz and Poledník, 2015

¹⁴ Kranz and Poledník, 2017

⁴ Kranz and Poledník, 2012

¹⁰ Schenekar and Weiss, 2018

¹⁵ Kranz and Poledník, 20010

⁵ Kranz and Poledník, 2012

¹¹ Kranz and Poledník, 2009b

¹⁶ Kranz and Poledník, 2014

⁶ Holzinger et al., 2018

the city of Salzburg as indicated by a much larger survey in 1998/1999 (Jahrl, 2000).

The increase of otters causes increasing conflicts with anglers in rivers and streams as well as with fish farmers. In the Alps, enterprises mainly specialize on producing salmonids. As a consequence, there are now subsidies available in several provinces in order to support otter-proof fencing of fishponds. In addition, killing of otters is carried out in several provinces. These conflicts and their approaches to alleviate them are also outlined below.

RECOLONIZATION

In the mid-1980s, otters were absent in the Austrian Alps. Just along the River Salza in northern Styria, some signs could be found in two $10 \times 10\text{-km}$ squares (Figure 2). In that time, otters were restricted in Austria to two areas outside the Alps: (a) in the north of the River Danube in Wald- and Mühlviertel (Lower and Upper Austria respectively); and (b) in south-eastern Styria and southern Burgenland in the catchments of the River Mur and the River Raab on the border with Slovenia and Hungary. In total, the northern population covered about $1,400\text{ km}^2$, the south-eastern population covered an area of approximately $1,000\text{ km}^2$ (Figure 2). In those days, both these populations had a backup of otters from (a) Czechoslovakia and (b) Hungary and Slovenia. Hence, they were part of bigger populations in the neighbouring states.

From about 1990 onwards, there were clear signs of recovery of the remnant otter populations. By the year 1999, these populations had significantly increased their range, but were not yet connected (Figure 3). It is remarkable that the

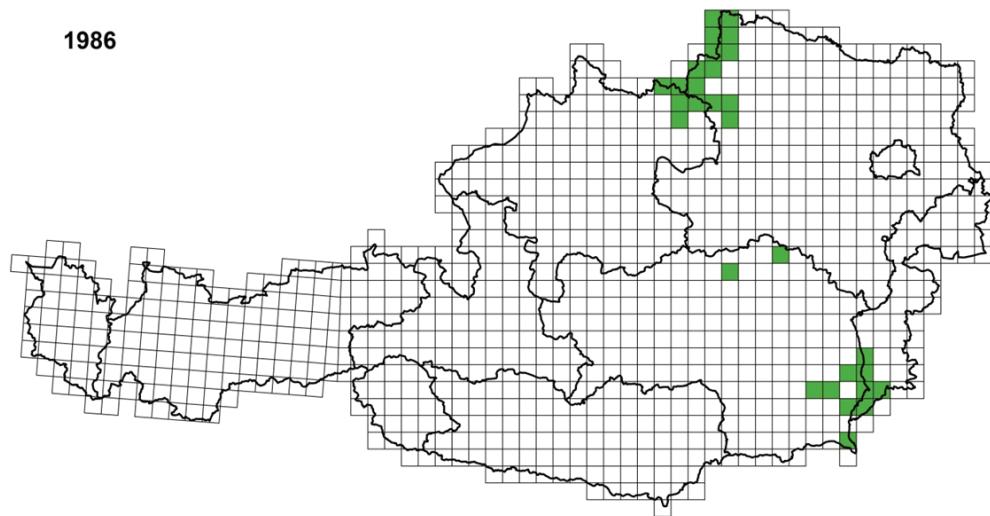


Figure 2 Distribution of otters in Austria in 1986.

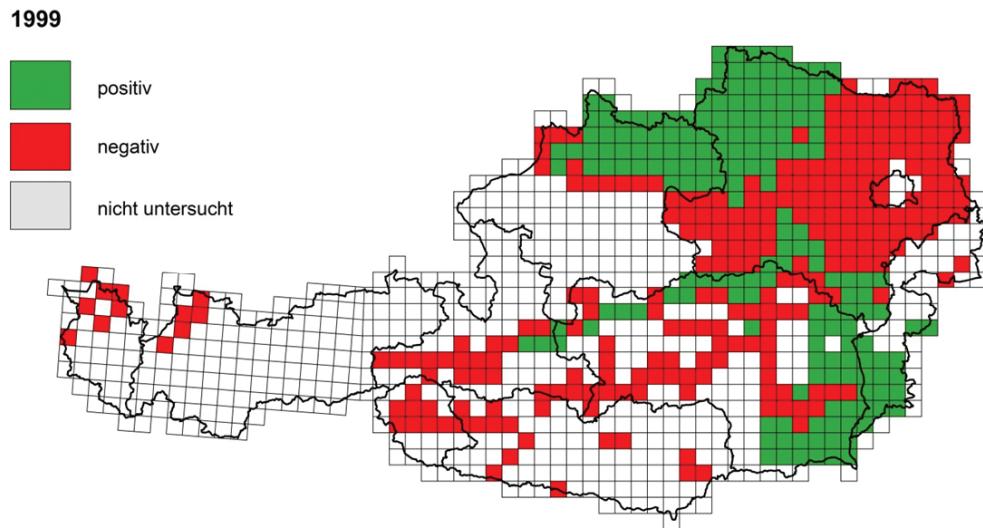


Figure 3 Distribution of otters in Austria in 1999.

population in the Northern Lime Stone Alps of Lower Austria and Styria also significantly increased (Kranz, 2000a). Prior to the signs for increase and with growing interest in the species, many areas were checked, where rumours (e.g. F. Hafner, pers. com.) indicated some potential of otter presence. In Carinthia (Wieser, 1993) as well as Salzburg (Jahrl, 1995 and 2000), Lower Austria, Styria and Carinthia (Kranz, 2000a), Tyrol (Knollseisen, 1997; Schipke et al., 1997) and Vorarlberg (Kraus, 1997) no otters were detected indicating that the absence of otters in most of Austria was in fact a result of there being no otters present and not a lack of knowledge.

By 2018, otters had covered almost all habitats from the province of Salzburg eastwards (Figure 4). That status of distribution was reached quite some years before 2018, for instance in Styria all the province was recolonized in 2012 (Kranz and Poledník, 2012), the latter survey in 2017/2018 (Holzinger et al., 2018) confirmed that; the same is true for Carinthia, the 2017 survey (Schenekar and Weiss, 2018) did not show any increase since the survey of 2014 (Kranz and Poledník, 2012). The 2018 map does not reflect the otter distribution in Tyrol, where the last survey was carried out in 2010. Meanwhile, otters are more widespread along the catchment of the River Inn in North Tyrol as indicated by road-kills, camera trap evidences (Carsten Löb, pers. com.) and accidental findings of spraints (C. Löb, and own unpublished data).

Repeated surveys along main rivers such as the Drava, Mur, Enns, Salzach and Traun suggest that otters do not colonize the catchments by a continuous range expansion from downstream to the headwaters, but by a disjunctive colonization pattern: otters coming from downstream first colonize the headwater, and then colonize the middle part of the river both from upstream and from downstream.

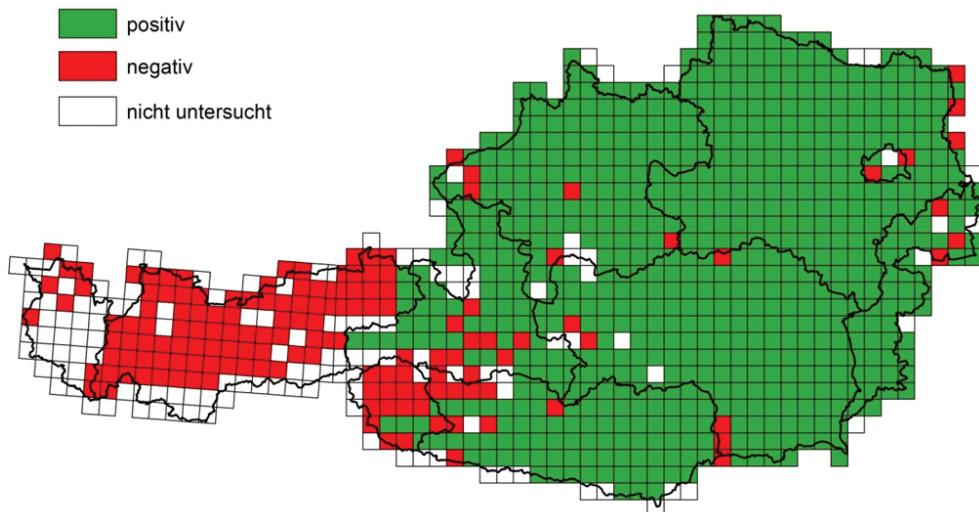


Figure 4 Distribution of otters in Austria in 2018; however, as far as Tyrol is concerned, the map is not up to date, the last survey dates back to 2010 and meanwhile otters are far more widespread in Tyrol.

This might be due to more favourable habitat in upstream parts than in middle parts where rivers are rather big and heavily modified because of flood prevention and hydropower dams.

Otters in Austria constitute a source population for otter populations in the Italian Alps. The first otters in the Italian Alps were recorded in 2008 (Kranz, 2008) in the very upstream part of the River Drava and came from East Tyrol in Austria. Another recolonization point of otters from Austria to Italy is the Drava tributary, the Gailitz near Villach, from which otters are recolonizing the catchment of the River Tagliamento (Lapini et al., 2019 this volume).

CONFLICTS AND MANAGEMENT

Otters compete with man for fish, both in fishponds and in rivers and streams. This raises serious conflicts in Central Europe (Kranz, 2000b; Kranz and Toman, 2000; Kranz et al., 2002; Klenke et al., 2013).

In several provinces, such as Lower Austria, Upper Austria, Styria and Burgenland, the administration provides financial support for building-proof fences (e.g. Kranz, 2017; Kranz, 2018), and in some provinces, such as Carinthia, Lower Austria and Salzburg, compensations are paid for damages to ponds. In Burgenland, ex-ante damage payments exist in order to increase the tolerance of fish farmers towards otters in those cases where otter-proof fences are not applicable (Kranz, 2015; Kranz, 2019).

In any of the Austrian provinces, compensation or support is provided for fish eaten by otters in streams and rivers. The underlying legal principle is that fish in

the river as terrestrial game species do not belong to anybody as long as they are not captured by fishermen or hunted by hunters. However, in smaller rivers up to 12 m wide, otter predation may decrease fish populations to such an extent that recreational angling is not attractive any more (Kranz and Ratschan, 2017).

Since 2017, some permissions were granted to kill otters in the Alpine Region in order to reduce the conflict occurring in rivers. Such permissions were provided in Lower Austria in 2017 for a 14-month period for 20 otters in the Northern Lime Stone Alps in the south of the Danube. However not a single otter was killed within that licence.

In Upper Austria killing of otters was permitted along two 15-km stretches of rivers in the Northern Lime Stone Alps. The permission was given for three years from 2018 onwards and is not limited by the number of otters (no quota). Several otters were killed within the first year.

In Carinthia in May 2018, another permission was granted for three years. The annual quota is 43 individuals, but road kills are taken into account as well. In the first year the quota was fulfilled, and about 20 otters were intentionally killed.

In addition to these permits for appeasing the conflict in rivers in the Alps, two licences were given to kill otters outside the Alps: one concerns traditional fishponds in Northern Lower Austria (Waldviertel) along traditional fishponds in 2017; the quota of 20 was fulfilled within 14 months. The other concerns two trout rivers in Northern Upper Austria (Mühlviertel).

In Lower Austria, Upper Austria and Carinthia, the permissions were provided for the Alpine Region of the Fauna Flora Habitat Directive, and by the time the permissions were given, the conservation status according to Article 17 of the Habitat Directive was defined as ‘unfavourable–inadequate’ for Austria in 2013. The reassessment for 2019 is in progress, but it seems that the status will not be changed to ‘favourable’ for the Alpine Region in Austria; in contrast, in the Continental Region the status was already ‘favourable’ in 2013 and will continue to be so in 2019.

It is under debate if the killing of otters, as carried out in recent years and is expected to continue at least to the same extent in the coming years, has an influence on the recolonization of the Alps, both within Austria and in particular in Italy. The debate will presumably never come to an operational conclusion, since there is no, or very poor, monitoring of the effect on otters and fish populations in particular. It is also open whether that kind of otter reduction had any positive effect on the fish populations on the small scale in the concerned river stretches.

However, it is for sure that the killing of otters is a major issue in the context of animal welfare. All licences provided to date offer(ed) the possibility of killing females during the winter months. In that period, females may be pregnant; in most cases they have dependent cubs (Figure 5). Therefore, such killings may cause starvation and death of the cubs.

In none of the permits is there proper monitoring of the otters killed (post-mortem analysis) carried out, hence it will never be evident how many lactating or pregnant females were killed within such licences; in single cases, we have already evidence that it happened. That is not surprising since females give birth in Austria at least from March until end of October, and cubs depend on their mother for



Figure 5 Female with prominent signs of lactation, the killing of such individuals as provided in the three licences of killing otters in Austria will cause starvation and subsequent death of the cubs which is unacceptable from an animal welfare point of view.

almost a year, well beyond the duration of lactation. Hence, in order to carry out otter killing, only live trapping and a subsequent checking for the status of females appears in line with animal welfare standards of Austria. It is, however, quite difficult to properly check the status of females in a box trap.

CONSERVATION NEEDS

As the example in Austria shows, otters are able to expand their range and to cope with heavily modified habitats. Any natural recolonization of the Italian Alps depends upon the connectivity between Austrian rivers and those of Slovenia and Italy. However, most of the Italian border line does not provide access for otters to enter Italy, because of high, steep mountains. There are actually very few potential corridors. Starting from the east, the following locations are considered as actual or potential otter corridors:

Slizza/Gailitz (AT)–Tagliamento (IT) in the area of Arnoldstein/Tarvisio connecting the river catchments of the Drava and Tagliamento; this corridor may also receive otters migrating from the Sava in Slovenia by crossing the watershed next to Rateče. The corridor in Tarvisio is already in use by otters.

Drava (AT)–Rienza (IT) in the area of Sillian/Innichen–San Candido connecting most of the upper River Drava with the catchment of Adige.

According to regular surveys from 2008 until 2017, the watershed was not crossed by otters (D. Righetti, pers. com. in 2019).

Stiller Bach (AT)–Adige (IT) in the area of Reschenpass connecting Inn with the uppermost catchment of Adige. Otters are present in the River Inn, where the Stiller Bach joins (own observations, June 2019), but it is unknown if and to what extent otters are already present along the tributary of the Stiller Bach.

Inn (CH)–Mera in the area of Malojapass connecting the catchments of Inn and Adda. Otters are present in the uppermost Inn up to St Moritz (1,800 m a. s.) since autumn 2017 (Baumann, 2019).

In order to support the natural recolonization of the otters in the Italian Alps, special attention should be paid to the habitats of the corridors mentioned above. That implies (a) prevention of habitat destruction or reinforcement of barrier effects due to landscape planning, and (b) habitat improvement as it has recently been carried out within an EU-founded LIFE-project in the area of Tarvisio (P. Molinari, pers. com. in 2019).

In addition, in Austria any actions such as intentional killing of otters should be avoided, which reduces population pressure in Austria and therefore may reduce the migration of otters into the river catchments in Italy.

Since the otter will cause conflicts in most of the newly recolonized areas (Kruuk, 1995; Kranz and Ratschan, 2017), a significant effort should be spent in the reconciliation of upcoming conflicts, in particular with anglers in streams.

Last but not least, communication and exchange on new developments in any of the countries involved should be intensified. People working on otters in any of the countries holding part of the Alpine arch should meet at least on a bi-annual basis in order to allow such an exchange.

REFERENCES

- Baumann, A. (2019) *Forschungsbedarf Fischotter am Inn*. Vortrag bei der Nationale Begleitgruppe Fischotter. Amt für Jagd und Fischerei Graubünden, 20, March.
- Holzinger, W., Zimmermann, P., Weiss, S. and Schenekar T. (2018) *Fischotter Verbreitung und Bestand 2017/2018 in der Steiermark*. Ökoteam-Institut für Tierökologie und Naturraumplanung und Universität Graz, Institut für Biologie; Projektbericht im Auftrag des Amts der Stmk. Landesregierung, 151 pp.
- Jahrl, J. (1995) *Historische und aktuelle Situation des Fischotters (Lutra lutra) und seines Lebensraumes in der Nationalparkregion Hohe Tauern*. Studie im Auftrag des Vereins der Freunde des Nationalparks Hohe Tauern, Salzburg, 94 pp.
- Jahrl, J. and Kraus, E. (1996) *Kartierung des Fischotters (Lutra lutra) in Süd- und Mittelburgenland 1996*. Bericht im Auftrag der Burgenländischen Landesregierung, 37 pp.
- Jahrl, J. (1998) *Kartierung des Fischotters (Lutra lutra) in der Landeshauptstadt Salzburg und ihrer Umgebung 1997/1998*. Eutin: Wasser Otter Mensch e.V., 57 pp.
- Jahrl, J. (2000) *Kartierung des Fischotters (Lutra lutra) im Flach- und Tennengau 1998/99*. Bericht im Auftrag des Österreichischen Naturschutzbundes–Landesgruppe Salzburg und der Salzburger Jägerschaft, 60 pp.

- Klenke, R., Ring, I., Kranz, A., Jepsen, N., Rauschmayer, F. and Henle, K. (2013) *Human–Wildlife Conflicts in Europe. Fisheries and Fish-eating Vertebrates as a Model Case*. Berlin/Heidelberg: Springer, 347 pp.
- Knollseisen, M. (1997) *Fischotterkartierung am Tiroler Lech*. Unpublished Final Report, 8 pp.
- Kofler, H., Lampa, S. and Kirchzarten T.L. (2018) *Fischotterverbreitung und Populationsgrößen in Niederösterreich 2018*. Final Report on behalf of Amtes der Niederösterreichischen Landesregierung, Abteilung Naturschutz, 117 pp.
- Kranz, A. (1995) Verbreitung der bayerisch-böhmischi-österreichischen Otterpopulation (*Lutra lutra*) 1994 in Österreich. *BOKU-Berichte zur Wildtierforschung und Wildbewirtschaftung*, 9, 25 pp.
- Kranz, A. (2000a) Zur Situation des Fischotters in Österreich: Verbreitung–Lebensraum–Schutz. *Umweltbundesamt, Bericht*, 177.
- Kranz, A. (2000b) Otters (*Lutra lutra*) increasing in Central Europe: from the threat of extinction to locally perceived overpopulation? *Mammalia*, 64(4): 357–368.
- Kranz, A. and Toman, A. (2000) Otter recovering in man-made habitats of central Europe. In: Huw I. Griffiths (ed.) (1999) *Mustelids in a Modern World. Management and Conservation Aspects of Small Carnivore: Human Interactions*. Leiden, The Netherlands: Backhuys Publishers, pp. 163–183.
- Kranz, A., Toman, A., Knollseisen, M. and Prašek, V. (2002) Fish ponds in Central Europe – a rich but risky habitat for otters. In: R. Dulfer, J. Nel, A.C. Gutleb and A. Toman (eds), *Proceedings of VIIth International Otter Colloquium*, T ebo , pp. 181–186.
- Kranz, A., Poledník, L. and Poledníková, K. (2003) Fischotter im Mühlviertel. Ökologie und Management Optionen im Zusammenhang mit Reduktionsanträgen. Appraisals on behalf of the Oberöster-reichischen Landesjagdverbandes, 73 pp.
- Kranz, A., Poledník, L. and Poledníková, K. (2004) Die Rückkehr des Fischotters. Des einen Freud, des anderen Leid. *Der Anblick*, Special Issue 2: 1–8.
- Kranz, A., Poledník, L. and Toman, A. (2005) *Aktuelle Verbreitung des Fischotters (Lutra lutra) in Kärnten und Osttirol. Carinthia II*, 195./115. Archive, pp. 317–344.
- Kranz, A. (2008) Südtirol: Fischotter im Oktober 2008 nachgewiesen. In: *Wild und Jagd in Europa*. Anblick 11.
- Kranz, A. and Poledník, L. (2009a) *Fischotter–Verbreitung und Erhaltungszustand 2009 in Kärnten*. Final Report on behalf of Abteilung 20 des Amtes der Kärntner Landesregierung, 39 pp.
- Kranz, A. and Poledník, L. (2009b) *Fischotter–Verbreitung und Erhaltungszustand 2008 in Niederösterreich*. Final Report on behalf of Abteilung Naturschutz des Amtes der Niederösterreichischen Landesregierung, 47 pp.
- Kranz, A. and Poledník, L. (2009c) *Fischotter–Verbreitung und Erhaltungszustand 2009 im Bundesland Salzburg*. Final Report on behalf of Abteilung 4 des Amtes der Salzburger Landesregierung, 37 pp.
- Kranz, A. and Poledník, L. (2010) *Fischotter–Verbreitung und Erhaltungszustand 2010 im Bundesland Tirol*. Final Report on behalf of Abteilung Umweltschutz des Amtes der Tiroler Landesregierung, 33 pp.
- Kranz, A. and Poledník, L. (2012) *Fischotter–Verbreitung und Erhaltungszustand 2011 im Bundesland Steiermark*. Final Report on behalf of Fachabteilungen 10A und 13C des Amtes der Steiermärkischen Landesregierung, 77 pp.
- Kranz, A. and Poledník, L. (2013) *Fischotter–Verbreitung und Erhaltungszustand 2012 in Oberösterreich*. Final Report on behalf of Abteilungen Naturschutz und Land- und Forstwirtschaft der Oberösterreichischen Landesregierung, 79 pp.

- Kranz, A. and Poledník, L. (2014) *Fischotter im Burgenland: Verbreitung und Bestand 2013*. Final Report on behalf of Naturschutzbundes Burgenland, incuding 4 attachments, 95 pp.
- Kranz, A. (2015) *Förderung naturnaher Teiche im Burgenland. Überprüfung, Evaluierung und Vorschläge für ein zukünftiges Förderprogramm*. Report on behalf of Naturschutzbundes Burgenland, 17 pp.
- Kranz, A. and Poledník, L. (2015) Fischotter in Kärnten: Verbreitung und Bestand 2014. Endbericht im Auftrag des Amtes der Kärntner Landesregierung; 32 pp., including 4 attachments.
- Kranz, A. (2017) *Fischottermanagement im Burgenland*. Final Report of Fischotterombudsmannes for years 2016/2017. On behalf of ÖNB Burgenland, 21 pp.
- Kranz, A. and Poledník, L. (2017) Fischotter in Salzburg: Verbreitung und Bestand 2016. Finall Report on behalf of Amtes der Salzburger Landesregierung; 27 pp., inclusive of 2 attachments.
- Kranz, A. and Ratschan, C. (2017) *Zu Auswirkungen des Fischotters auf Fischbestände in Fließgewässern Oberösterreichs. Analysen und gutachterliche Einschätzungen sowie Managementvorschläge. Bericht im Rahmen des ELER Projektes 'Basisdaten Fischotter Oberösterreich'*. On behalf of Amtes der Oö. Landesregierung, Direktion für Landesplanung, wirtschaftliche und ländliche Entwicklung, Abteilung Land- und Forstwirtschaft, 21 pp.
- Kranz, A. (2018) *Fischotterberater in der Steiermark*. Report for the years 2016–2017. On behalf of Naturschutzbund Steiermark, 23 pp.
- Kranz, A. (2019) Fischottermanagement im Burgenland. Jahresbericht zur Naturteichförderung und Zaunberatung des Jahres 2018. On behalf of ÖNB Burgenland on behalf of Burgenländischen Landesregierung, Abt. 4; 7 pp.
- Kraus, E. (1981) *Untersuchungen an Vorkommen, Lebensraumanspruch und Schutz des Fischotters (Lutra lutra) in Niederösterreich*. Dissertation der Universität Wien.
- Kraus, E., Kirchberger, R. Pichler, R and Wendl, F. (1986) *Steirische Fischotterkartierung 1986*. Unpublished Report, 23 pp.
- Kraus, E. (1989): Der Fischotter (*Lutra lutra*) im Mühlviertel, Oberösterreich. *Stapfia* 20: 153–154.
- Kraus, E. (1997) Fischotter-Kartierung Vorarlberg 1995. *Vorarlberger Naturschau*, 3: 9–46.
- Kruuk, H. (1995) *Wild Otters. Predation and Populations*, Oxford: Oxford University Press, 290 pp.
- Lapini, L., Pontarini, R., Molinari, P., Cantarutti, G., Dorigo, L., Pecorella, S., Cesco, N., Commessatti, G., Comuzzo, C., Da Pieve, J., de Belli, E., Leandro Dreon, A., Giacomuzzi, D., Luca, M., Mareschi, A., Picco, G. and Rossi, A. (2020) The return of the Eurasian otter in north-eastern Italy. New challenges for biological conservation from Friuli Venezia Giulia Region. *Journal of Mountain Ecology*, 20: XX–XX.
- Sackl, P., Ilzer, W. and Kolmanitsch, E. (1996) Historische und aktuelle Verbreitung des Fischotters (*Lutra lutra*) in der Steiermark. *Forschungsbericht Fischotter 3*, Forschungsinstitut WWF Österreich, Heft 14, pp. 4–25.
- Schenekar, T and Weiss, S. (2018) *Genetische Untersuchungen der Populationsgröße des Eurasischen Fischotters in den Kärntner Fließgewässern*. Final Report on behalf of Amts der Kärntner Landesregierung, 53 pp.
- Schipke, R., Tamke, J and Lentner, R. (1997) *Fischotter im Lechtal*. Preliminary Final Report.
- Wieser, A. (1993) *Fischottervorkommen in Kärnten zwischen 1880 und 1992*. Doctoral Thesis, Universität Graz, 106 pp.