

The fish otter in Austria and beyond: population status, legal challenges and potential solutions

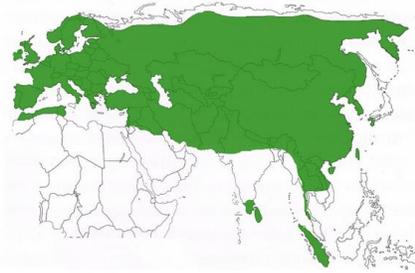
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Species Profile

(*Lutra lutra*)



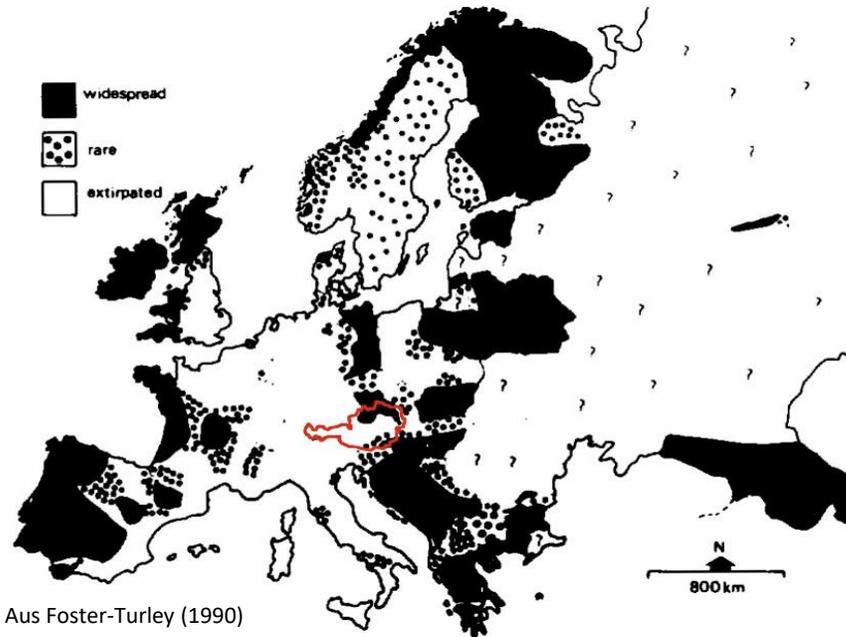
Int. Otter Survival Fund

- ▶ **Eurasian otter** - Native to Eurasia and North Africa - **very large distribution area.**
- ▶ **Flexibel diet** - includes insects, crustaceans, amphibians, birds, small mammals and of course fish.
- ▶ **Primarily nocturnal, solitary and highly territorial** - but can occur in groups, active in the day where large quantities of resources are available (such as aquacultural fish ponds).
- ▶ **Current IUCN Status** - **Near threatened** - authors justify this category (which is not an endangerment category) based on the fear of historical hunting pressure returning.

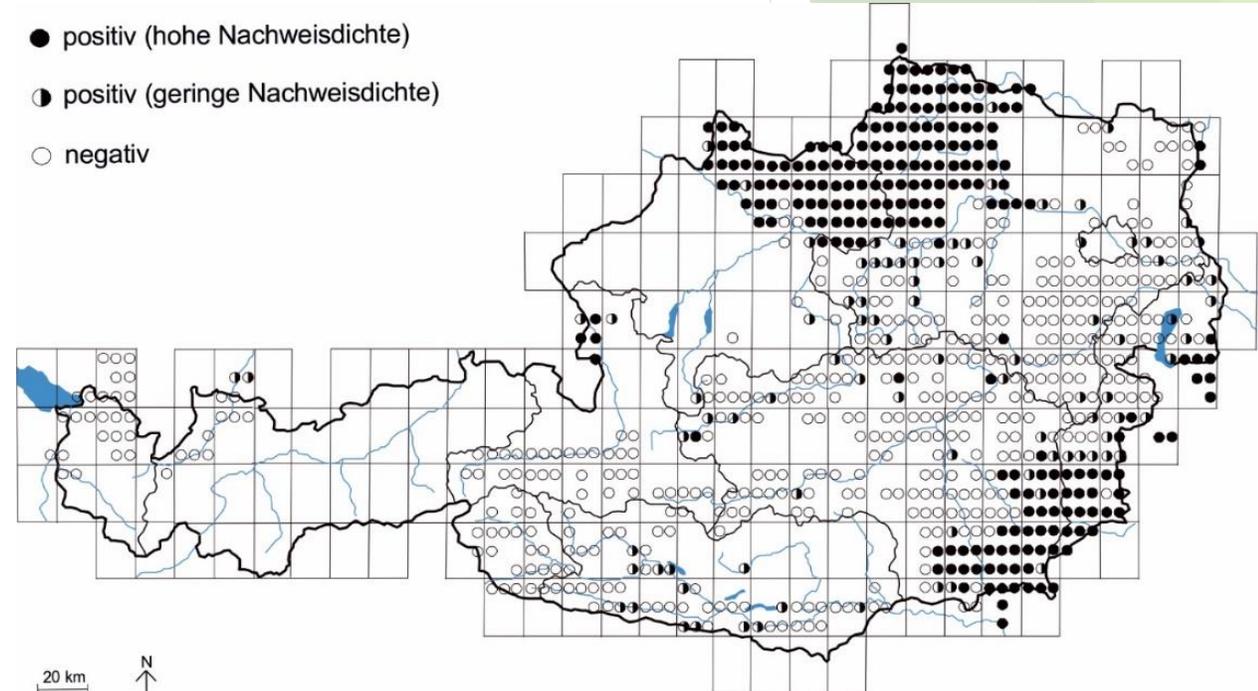


- ▶ **European Habitat Directive** - listed in Annexes II and IV.
- ▶ **Primary hypothesis concerning the species historical decline involves pollutants, such as PCBs and insecticides, but clearly, over-hunting played a significant role, especially in Central Europe.**

History of the otter in Western Europe



As of 1990 - still widespread in some countries, but extirpated from much of Central Europe.



Summary of otter occurrences 1990-1998 (from Jahlrl 1999)

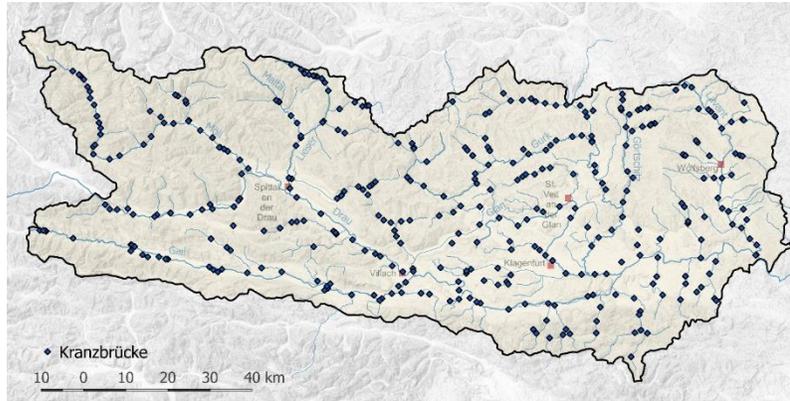
This and many other historical citations support that otters were never extirpated from Austria - two refugia are noted here (along the Czech and Slovenian borders). Single occurrences are repeatedly documented outside this area as well.

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, creating a modern, layered effect. The text is centered on the left side of the slide.

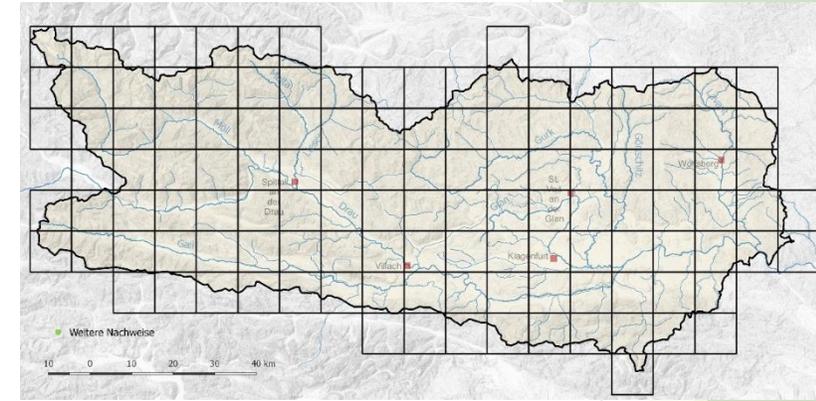
Current efforts to quantify population sizes and distribution area

Bridge-check approach to distribution data - example Carinthia

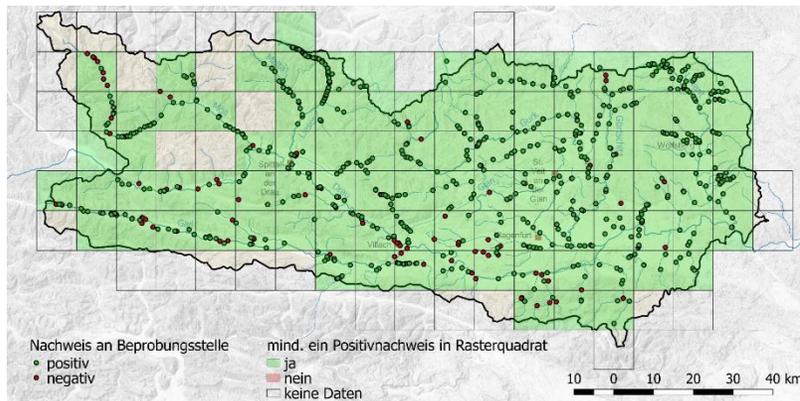
(adopted and simplified from the so-called standard or British method, see Schenekar et a. 2022)



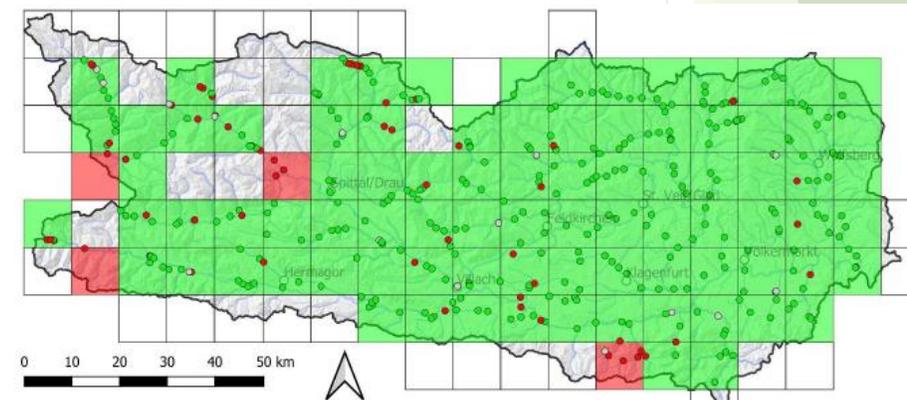
378 predefined bridges



10 x 10 km grid - at least 4 bridges per grid



Positive bridges, as well as positive grid cells reported



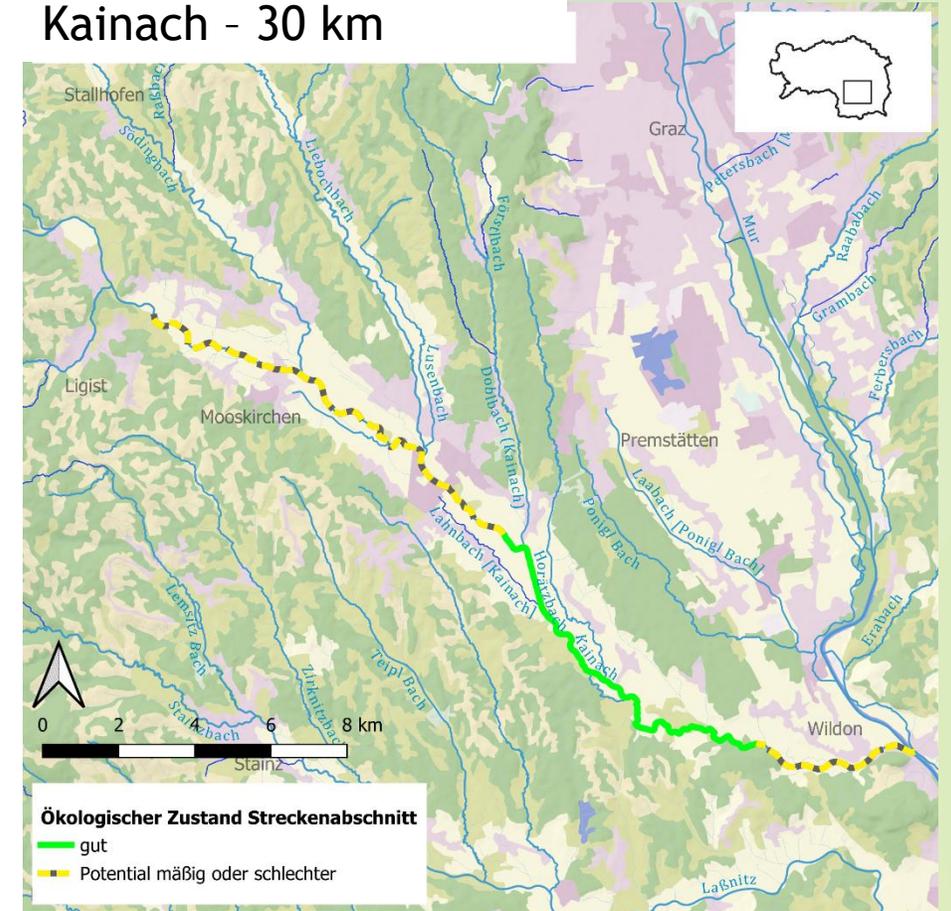
In 2024 - 82% of controlled bridges, and 95% of grid cells were positive for fish otter presence - this is also typical for other provinces in Austria.

Methods - Population estimation - Genetic Analysis



Fish otter scats collected in a stabilizing buffer, frozen on dry ice, GPS coordinates taken and transported to the lab.

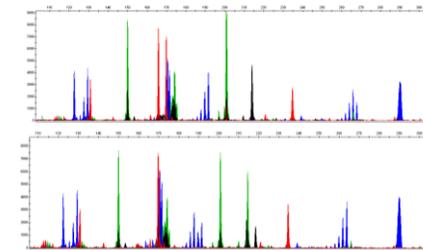
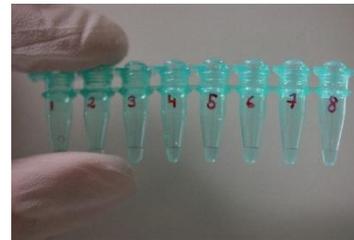
Kainach - 30 km



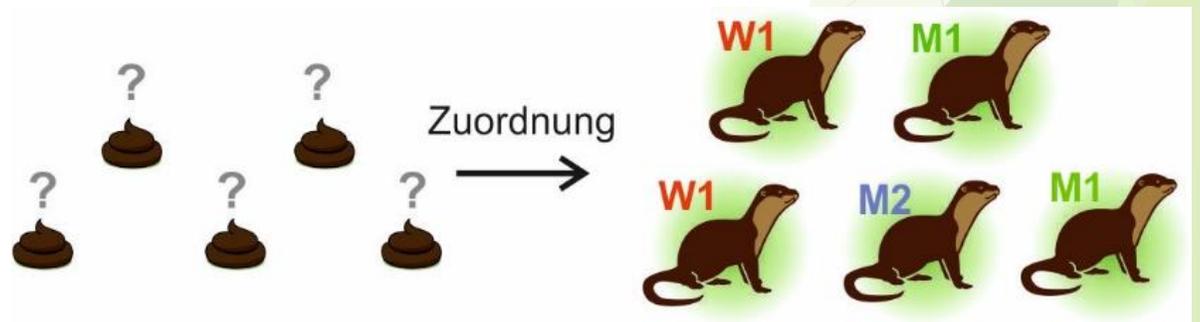
30 km-long reference stretches are chosen, and both banks are surveyed for scats

Methods - Population estimation - Genetic Analysis

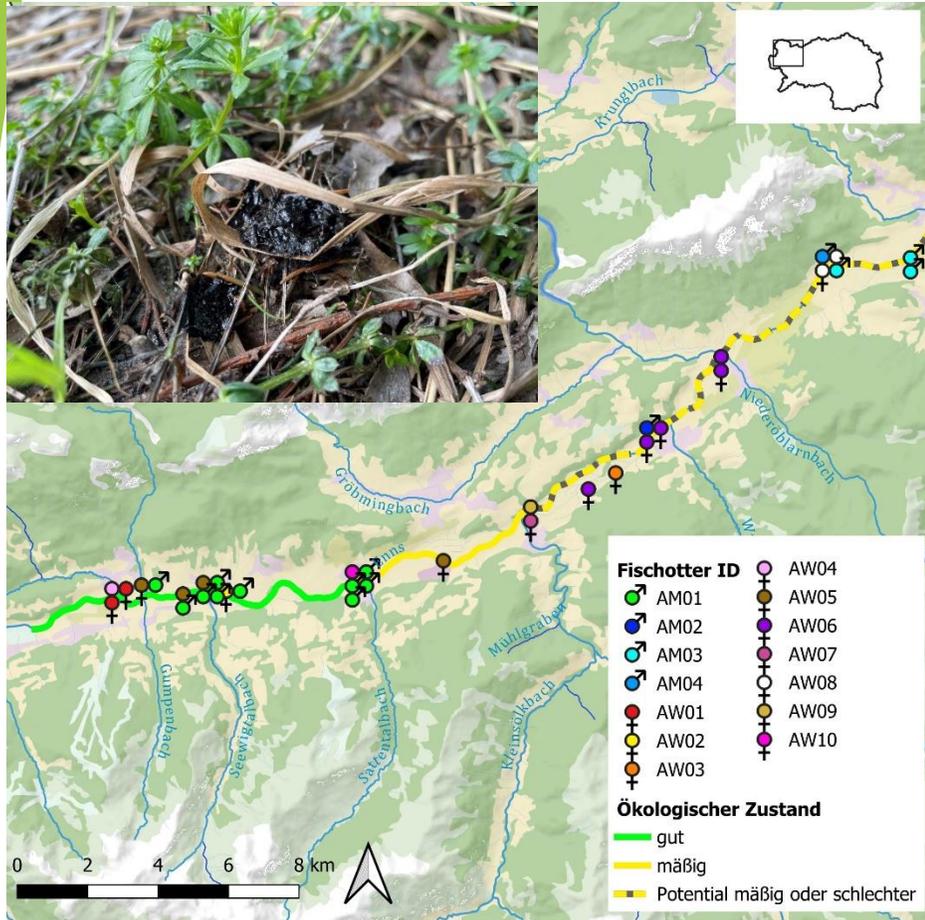
1. DNA Extraction from scat samples
2. PCR (Mikrosatellites)
3. Analysis of results, multiple replications (due to degraded DNA) and development of a consensus genotype for each sample
4. Sex determination with two independent markers
5. Assignment of genotypes to individuals, from each scat sample



Kotprobe	PCR #	Lut435 Allele	Lut435 Allele	Lut457 Allele	Lut457 Allele	Lut615 Allele	Lu615 Allele 2	Lut701 Allele	Lut701 Allele	Lut717 Allele	Lut717 Allele	Lut833 Allele	Lut833 Allele 2
Llu167	A	129	129	188	192	0	0	214	214	197	201	170	170
Llu167	B	129	129	188	188	268	268	214	222	197	201	0	0
Llu167	C	129	129	188	192	268	268	0	0	197	201	170	170
Llu167	D	129	129	188	194	268	270	214	218	197	201	170	170
Llu167	E	0	0	0	0	268	268	214	218	197	197	170	170
Llu167	F	0	0	188	192	270	270	214	218	197	201	0	0
Llu167	G	129	129	188	192	0	0	214	218	197	201	170	170
Llu167	H	129	129	192	192	268	270	214	218	197	201	170	170
Llu167	I	129	129	188	192	0	0	214	218	197	197	170	170
Llu167		129	129	188	192	268	270	214	218	197	201	170	170



Methods - Population estimation - Extrapolation



Individuals are identified and mapped onto each 30 km-long reach of river. Here on the Enns River, we identified 14 individual otters.

The mean otter density per km is along 30-km-long river stretches is calculated across multiple rivers, and this mean is extrapolated across the river network (river order 4 or higher). The variance between the individual rivers is used to calculate a 95% confidence interval for our estimates.

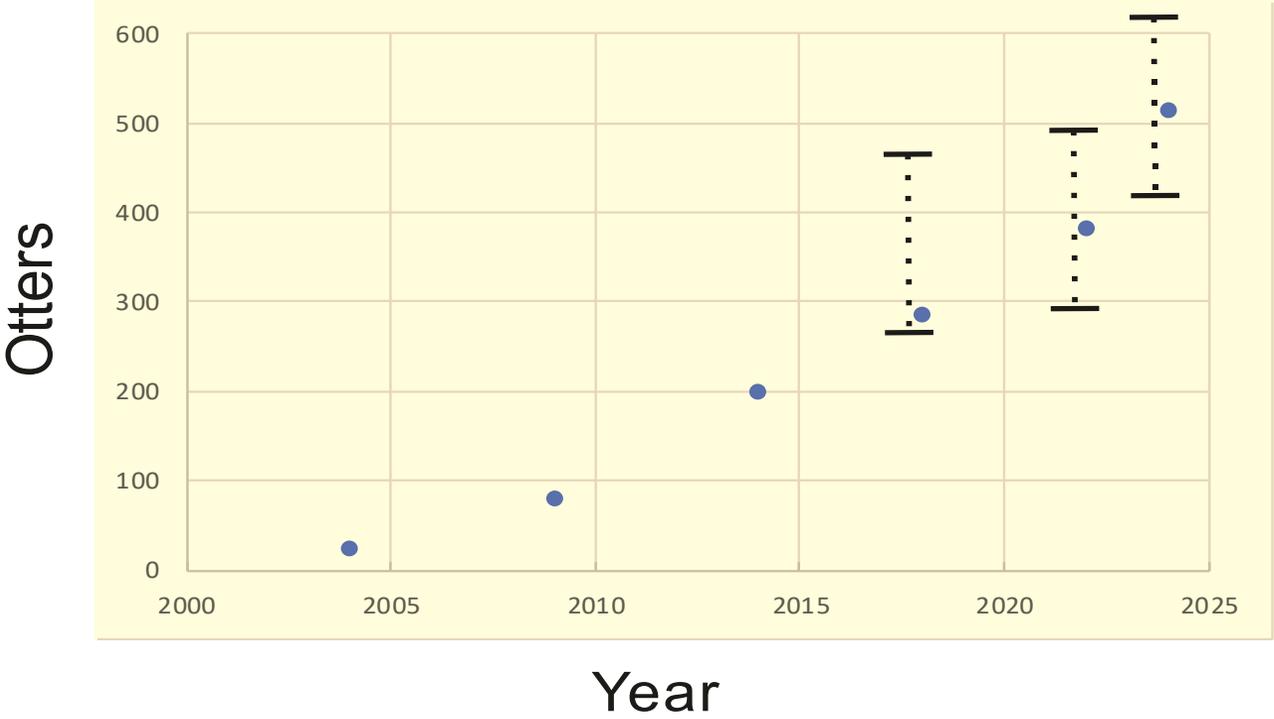
(see Schenekar et al. 2023 for description and verification of the approach).

Recent fishotter surveys in the region (river network only)

State	Year	Otters/river km	Pop estimate	Density/100 sq. Km	Dist Coverage
Styria	- 2018, 2024	0.468	1148(972-1325) 25% +	7.00	100%
Carinthia	- 2017,2020,2024	0.357	513(406-627) 34% +	5.38	100%
Upper Austria	- 2021	0.364	646 (536-749)	5.39	100%
Salzburg	- 2021	0.240	261 (196-320)	3.65	100%
Burgenland	- 2023	0.448	216 (166-260)	5.45	100%
Lower Austria	- 2018, 2023		1085(823-1348) 13% +	5.66	100%
Bavaria	- 2023	0.11 - 0.49	1495 (1281-1734)	4.34 (3.8 - 6.9)	49%

Population growth over time

Carinthian Population Growth

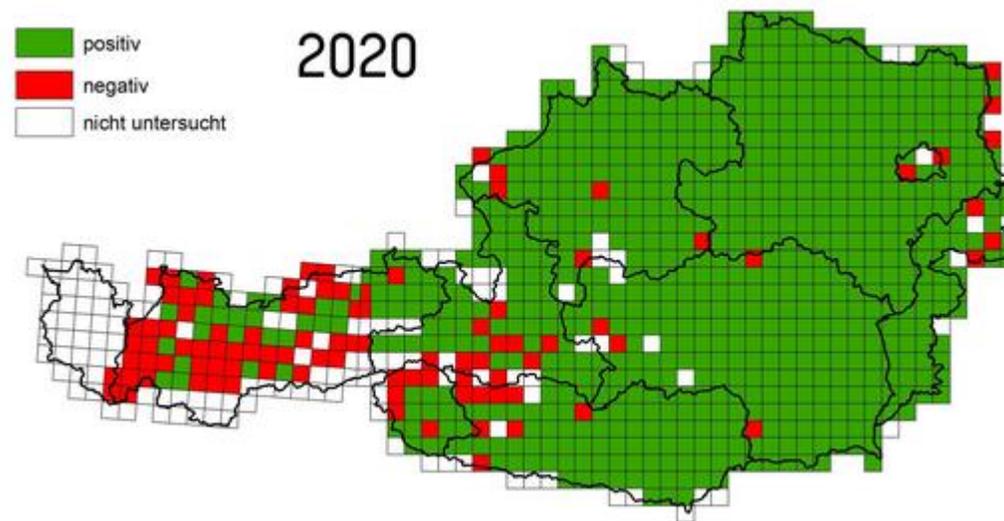
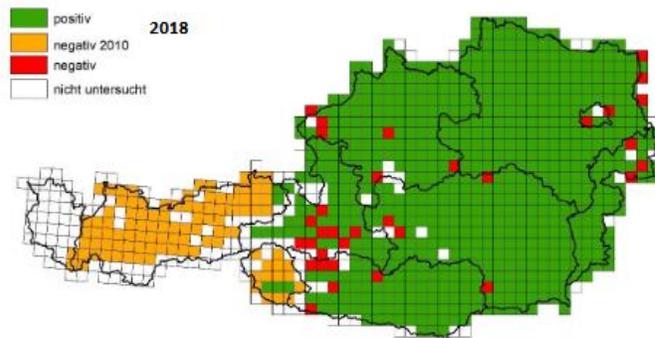
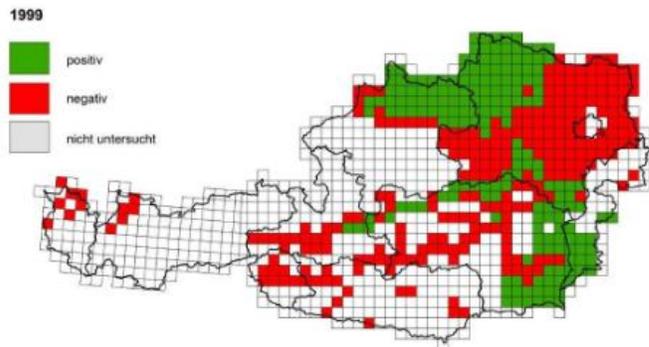
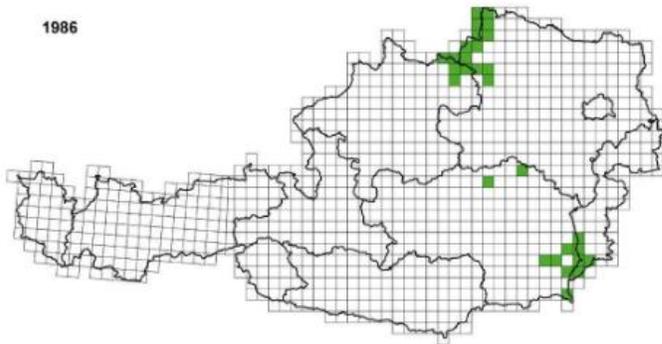


Otter expansion in Austria over the last 40 years

Kranz & Polednik

Fischartverbreitung & Bestand 2020 in Tirol

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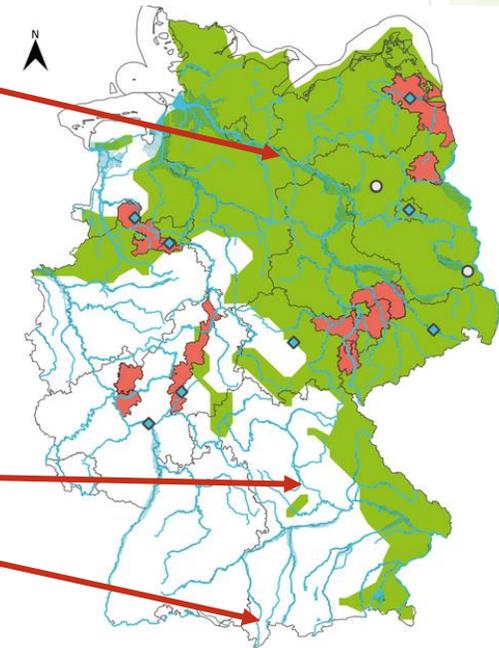
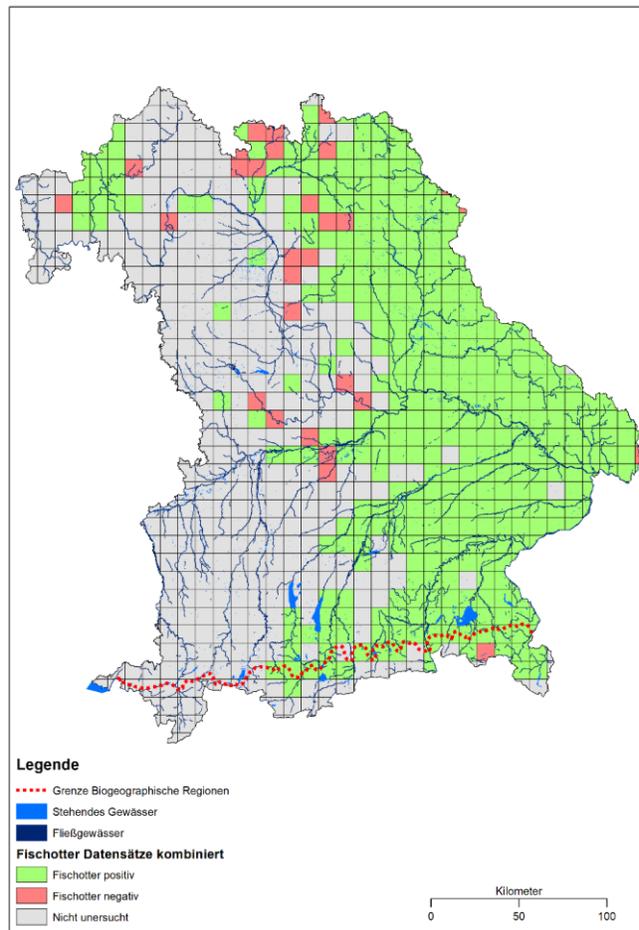
No 2024 map available - will be published with the Article 17 reporting for 2019-2024 period

Distribution expansion (East to West in Bavaria)

Similar to Austrian states, the fish otter in Bavaria has expanded from East to West – while otters also increased their density in fish pond areas of the Czech republic, as well as along the Bavarian-Czech border.

Our population genetic data supports that presence of the fish otter in northwest Bavaria may have a different origin than elsewhere in Bavaria – likely stemming from expansion Hesse and/or Thuringia.

Otters are well-distributed throughout northern Germany, and have never been extirpated from there.



Here, the distribution in Bavaria
is out of date

European Habitats Directive

As stated, the European fish otter is listed under **Annex II (species of community interest)**, and **Annex IV (strict protection)**.

Appendix II dictates that member states are obliged to seek and maintain a **favourable conservation status** for the species, AND, to designate **Natura 2000 areas** to promote the sustainability of listed species (along with designated habitats).

Appendix IV dictates protection of each individual animal.

Article 17 reporting - at six-year intervals, member states are obliged to report on the *conservation status* of all EHD listed species. The status is based on 4 parameters; Population, Range, Habitat, Future Prospects. A sub-favourable rating of any one parameter leads to a less than favourable conservation status. The status categories are **FV-Favourable**; **U1** - Unfavourable-Inadequate; **U2** - Unfavourable-Bad; **XX** - Unknown.

The reporting period for 2019-2024 is still being worked on - final results usually are delayed by a year or so. **It is expected that the conservation status of the fish otter in Austria will be designated as favourable for the first time since the law was established in 1992.**

European Habitats Directive

Why have some countries, for example Germany, but also Austria up until this current reporting period, not upgraded their conservation status of the otter?

Favourable Reference Values (FRV) - ?

FRVs are target goals for the range expansion or population size of a species, which, if fulfilled, would allow member states to report a favourable conservation status.

There is great misunderstanding surrounding this concept, in many countries. In the absence of such target values, countries such as Austria and Germany have used the historical distribution area (meaning the entire country, or bioregion) as the goal, and thus until this range is reached, no favourable status is given. This is further complicated in countries (such as Germany and Austria), where the administration of Nature Conservation laws occurs at the state or provincial level. However, this is not what the law intended to do - historical range or population sizes was never the intention of the law. The European Commission, through contracted reports, states that **FRVs are not supposed to correspond to the historical distribution area**. Rather, they should orient on long-term sustainability of the species.

Despite repeated urging of the European Commission, most member states do not set FRVs for the European Habitat Directive listed species.

European Habitats Directive

Not considering the newest reporting period - how does the conservation status of the fish otter look elsewhere in Europe?

A total of 15 countries report a favourable conservation status in one or more biogeographic regions, as of 2018, and a total of 28 Bioregions (of 46, not including Croatia) report a favourable conservation status. Range in many of these regions reaches 100%, and population sizes are in the 10s, or even several 100 thousand individuals. Below I list the countries and Biogeographic regions with favourable status (FV). CON = continental; ALP = Alpine; MED = Mediterranean; PAN = Pannonian; ATL = Atlantic; BOR = Boreal

Austria (FV-CON, U1+ for ALP); Bulgaria (FV - 3 regions, BLS, ALP, CON); Spain (FV - 3 regions, ALP, MED, ATL); Finland (FV - 3 regions, ALP, BOR); France (FV for 2 of 4 regions, ATL, CON, U1+ for ALP, U2+ for MED); Poland (FV - 2 regions, ALP, CON); Hungary (FV for PAN); Romania (FV - 4 regions, PAN, CON, BLS, ALP); Denmark (FV - ATL, U1 for CON); Estonia (FV - BOR); Lithuania (FV - BOR); Latvia (FV - BOR); Czechia (FV - 2 regions, CON, PAN); Italy (FV 1 of 3 regions, MED, U2+ ALP, N/A CON); Portugal (FV - 2 regions, MED, ATL); Greece (FV - 1 region).

At least one more bioregion (in Austria) will be favourable in the upcoming report. Countries where it is unlikely for the status to be favourable near future are Belgium and the Netherlands, but populations are nonetheless expanding. In several other countries, namely Slovenia and Slovakia, a poor status is reported, but this is not based on reliable modern data. Elsewhere, such as northern Sweden, a poor status in their boreal region appears to be based on very old data. Large populations of otter exist in northern and eastern areas of Germany, but only a poor status is reported, for now.

European Habitats Directive

Despite a common European law, there is great discrepancy among member states, concerning the interpretation, and application.

FRVs - according to EU documentation (see Bijlsma RJ, et al. (2019), should be larger than scientifically established minimum population sizes, and larger than the population or range values when the laws was inactment in 1992 (or when a new member state joined the Union), but will usually be considerably less than historical values.

Recently, I argued, for example, my estimated population size of 1500 otters in Bavaria was sufficient for long-term sustainability, especially considering that 1) this population is genetically the same (meaning there is gene flow) with otters north of the Alps in Austria, and 2), this population is connected to yet larger populations in the Czech Rep, and Poland (10s of thousands).

But the otter will remain in an unfavourable status in Bavaria, because not all of Bavaria is colonized (the range is expanding).

What legal efforts could be advanced?

Short-term - **urge governments to set favourable reference values** for species, such as the otter. (this is not only compatible with the law, it is encouraged by the EU commission).

Long-term strategy - **jointly petition the European Commission** (or the appropriate body), **to remove the Annex IV status of the otter.**

The Annex II status should remain!

Without Annex IV, member states would still be obliged to maintain favourable conservation status, but management would be easier, from a legal standpoint. (it is still possible now with various exemption clauses, monitoring, and economic conflict justification)

The European Habitats Directive should be a living document, where the listing of various species would be removed (or added!) according to changing circumstances.

This would be identical to how Endangered Species Legislation is administered in Canada, US, Australia, etc. There is still a political process to listing species, but science and current circumstances make the list more dynamic, with respect to which species are protected (i.e., added or removed).

Summary

The fish otter has recovered throughout much of its European range, after a low point in the 1970s and 1980s

There is more room for management, concurrent with EU law, then many countries accept

Member states can help establish more flexibility with management, by setting favourable reference values (for population size and range) - essentially conservation targets. This is strongly encouraged by the European commission.

Long-term, one might consider a lobbying effort to open up the European Habitats Directive to list changes, based on science and changing circumstances. For instance, one could consider removing the otter from Appendix IV (strict protection), but maintaining Appendix II (obligation to achieve or maintain favourable status).

Considering reaching out to NGOs for such an effort, with the notion that new species could be added to the appendices, if they have become much more endangered over time.

References

Schenekar T, Clark A, Holzinger W.E., Weiss S. (2022). Presence of spraint at bridges as an effective tool to assess current Eurasian fish otter distribution in Austria. *European Journal of Wildlife Research* 68:53
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Schenekar T, Weiss A, Weiss S. (2023). Applying molecular genetic data at different scales to support conservation Assessment of European Habitats Directive listed species: A case study of Eurasian otter in Austria. *Evolutionary Applications* 16:1735-1752.
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Bijlsma RJ, et al. (2019). Defining applying the concept of Favourable Reference Values for species and habitats under the EU Birds and Habitats Directives. European Commission Technical Report No. 07.0202/2015/15107/SER/ENV.B.3 (file:///C:/Users/UserAD/Downloads/TechnicalReportFRVs%20February2018.pdf).