Appendix I

Memorandum of Understanding for sourcing ex-situ lynx for reintroduction

1. Background

Since the early 1970s Eurasian lynx have been reintroduced into former ranges in Western and Central Europe through various translocation events. Most of the released animals were translocated from the Carpathian population, namely from Slovakia. In some cases, there are still ongoing releases of lynx originating from ex-situ breeding programs in zoos or game reserves. While releasing animals born ex situ is a common and important practice for species conservation, it is also controversial for large carnivores due to conflicting human interests or potential dangers posed to humans.

In principle, Eurasian lynx kept in enclosures can be reintroduced into the wild, as experience through planned reintroduction projects (i.e. from zoo lynx released to the Harz Mountains) or in the case of unintentional escapes from enclosures or wild lynx rehabilitated for release has shown. Anecdotal observations also demonstrate that not all animals sourced from captivity are suitable for living in the wild; some have preyed on livestock, while others were too habituated to humans.

The phylogenetic background and genetic suitability of ex-situ lynx is crucial: several distinct subspecies of the Eurasian lynx are recognized. However, insufficient attention was directed to managing subspecies as distinct breeding lines in the past. An ex situ source population for release must fulfill both phylogenetic (correct subspecies) and population genetic (sufficiently diverse genetic founder) requirements.

There has been a mounting demand for releasing Carpathian lynx (*Lynx lynx carpathicus*) in Western and Central Europe in the near future. Inbreeding problems stemming from original founding populations are on the rise and require adequate genetic rehabilitation through restocking. Although reintroductions are currently planned for colonizing suitable habitats and to reinforce existing populations, it will be difficult to meet the demand through translocations sourced from the wild Carpathian population alone. On the one hand, wild lynx from Slovakia and Romania are not available in unlimited quantities. On the other hand, relocating wild-caught lynx is difficult to plan and technically complex (limited capture time with unpredictable success, quarantine, genetic and veterinary clarifications, and transport risks and logistics).

Sourcing ex situ lynx for in situ projects is a welcomed alternative because it offers planning security and facilitates a more targeted selection of individuals suitable for release. A combination of translocating wild animals (including orphan lynx kept temporarily in enclosures) along with animals from the ex situ program would be the most effective route to establishing new populations or restocking existing ones. However, both the breeding program and the institutions with candidates for release must meet specific requirements. A reintroduction project must meet the conditions outlined by the International Union for the Conservation of Nature (IUCN)[1], on the other hand, the special conditions for the lynx and its conservation in Europe must be taken into account. In this Memorandum of Understanding, the signatory institutions outline the framework conditions for the use of ex situ born Carpathian lynx for in situ projects and commit to a cooperation that will allow the

[1] IUCN/SSC (2013). Guidelines for Reintroductions and other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission, viiii + 57 pp.

implementation of these framework conditions in the coming years.

2. Geographical concept for lynx conservation in continental Europe

Europe is home to three genetically well-defined subspecies of Eurasian lynx recognized by the IUCN SSC Cat Specialist Group, *L. l. lynx* in the north, *L. l. carpathicus* in the Carpathians and *L. l. balcanicus* in the south-western Balkans. Since the last ice age, these subspecies have established geographically distinct regions and have not merged despite marginal overlap in distributions. The subspecies should therefore continue to be maintained as distinct phylogenetic units. Although the phylogenetic assignment of the historical distribution lynx in the areas where the species became extinct is uncertain, based on current distribution and prior reintroductions in Central Europe, it was decided at the international lynx expert conference in Bonn in June 2019 to delineate reintroduction and conservation of the three subspecies among the following areas of continental Europe (Figure 1):

- Northern lynx *L. l. lynx*: northern and north-eastern Europe, Baltic States and lowlands of northern continental Europe
- Carpathian lynx *L. l. carpathicus*: Carpathians, continental European low mountain ranges, Alps and northern Dinarides
- Balkan lynx *L. l. balcanicus*: Southern Dinarides and mountain ranges of the Southern Balkan Peninsula.

This geographical division is not intended to limit natural mixing through migration. But the geographical division ensures that optimal starting conditions for a networked metapopulation are provided and possible outbreeding depression is prevented based.

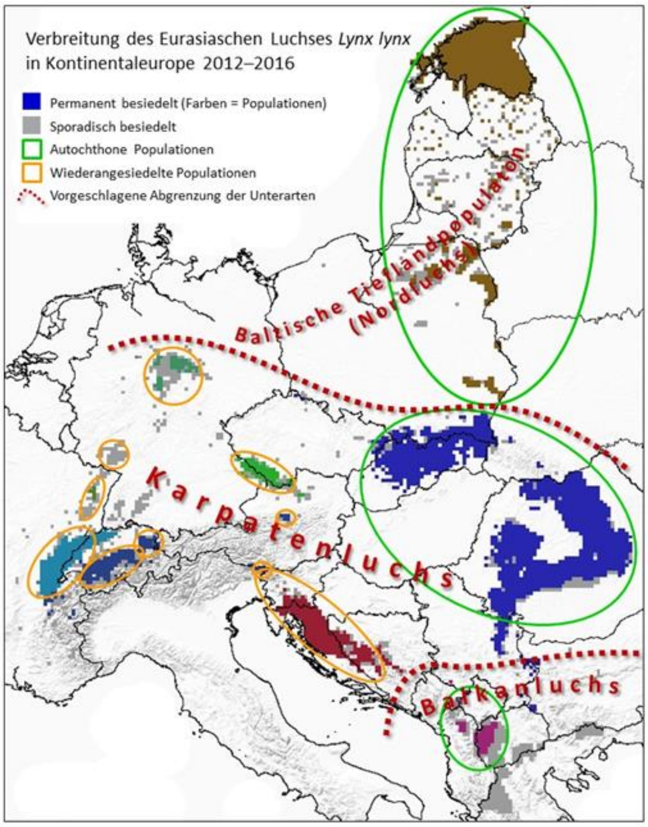

Figure 1: Proposed delineation across continental Europe for the conservation and reintroduction of the three Eurasian lynx subspecies.

Source: KORA Foundation, 2021. *50 years of lynx in Switzerland*. KORA Report No. 99, 88 pp, adapted from: Bonn Expert Group. 2021. Re-commendations for the conservation of the Eurasian lynx *Lynx lynx* in Western and Central Europe. Results from the "Bonn Lynx Expert Group" workshop held in Bonn, Germany, 16-19 June. *Cat News* Special Issue 14, *in press*.

This Memorandum of Understanding focuses on a conservation strategy for the Carpathian Lynx. The aim is to sustain wild lynx as a viable, coherent population within the Carpathians and to expand its distribution to suitable and designated habitats across Western and Central Europe. Many forested mountain and hilly landscapes beyond the large massifs such as the Carpathians or the Alps today offer favorable conditions to support the return of the lynx. However, these habitats are too small to harbor viable populations in the long-term if they remain isolated. Therefore, a comprehensive, genetically variable and connected metapopulation of the Carpathian lynx should be established within the entire designated area. The long-term success of a reintroduction project depends largely on how quickly a robust group of animals can be released and establish as founders. With several projects taking place simultaneously in different countries, this means a considerable need for suitable lynx as well as skilled coordination between the respective projects and countries.

3. Partnership between ex situ and in situ projects

The creation and maintenance of a Carpathian lynx metapopulation in Western and Central Europe requires strategic international cooperation amongst authorities responsible for species and nature conservation, non-governmental organizations (NGOs) and scientific institutions dedicated to conservation. As the success of reintroduction and restocking is only predictable to a limited extent, an adaptive approach is required, which in turn implies a robust post-release monitoring of the demographic and genetic development of the population. As an increasing demand for suitable lynx for release is unlikely to be met by wild captures alone, the provision of selectively bred and well-suited animals from the ex situ program translocated to in situ projects is necessary. However, for the use of such lynx for release in the designated Carpathian Lynx regions, strict conditions have to be met:

1. Lynx must be clearly assigned to the subspecies *L. l. carpathicus*, on the basis of their pedigree and genetic test;
2. animals are bred in a way that avoids imprinting on humans;
3. lynx must be kept until release in suitable enclosures that allow species-appropriate socializations and feeding on wild prey (mainly deer) to prevent habituation to humans;
4. in a given reintroduction or restocking project, only ex situ lynx may be released that have been individually evaluated as suitable and meet the genetic (especially concerning the degree of relatedness to other animals of the population) and veterinary requirements;
5. post release, the fate of the individual released lynx as well as the development of the population must be closely monitored in order to ensure a continuous learning and inform adaptive management.

These prerequisites imply the identification or establishment of a suitable ex situ breeding group of Carpathian lynx, the provision of suitable infrastructure (e.g. rearing and intermediate enclosures) and guidelines for targeted husbandry and care and the post-monitoring requirements. The relevant protocols are partly already in place or can be derived from relevant experiences with other species that can be adapted for species-specific purposes.

4. Long-term cooperation and next steps

Reestablishing a large-scale metapopulation in western and central Europe is a long-term undertaking. The reintroductions to date have all been understood and organized as local or, at best, regional projects. In continental Europe’s fragmented landscape, a large-scale and coordinated approach to lynx reintroduction is not only a necessity from the point of view of species conservation, but also increases the chances of success and efficiency of individual projects through exchanging experience and the synergetic use of knowledge and infrastructure. The following steps are necessary to achieve this:

- Identification of purebred Carpathian lynxes in zoos and game reserves based on pedigrees and targeted genetic analyses, as well as the selection and gradual expansion of a suitable ex situ breeding group from which candidate animals can be made available for in situ projects;
- Establishment of an ex situ group of keepers who can provide the necessary enclosures and care capacity. Not only facilities for breeding are needed, but also enclosures for species-appropriate husbandry of subadult lynx (breeding animals or orphans) intended for release;
- Provision of protocols for breeding, keeping, preparing and evaluating lynx for release into the wild, as well as guidelines for genetic and veterinary clarifications, quarantine, transport, etc.;
- Clarifying demand (reintroduction and restocking projects) and potential supply (breeding lynx, wild-caught lynx, orphan lynx) and establishment of a coordination platform.

The signatory partners have begun the necessary clarifications and will now gradually develop the necessary guidelines and protocols that will allow this MoU to be implemented in a timely manner. Other institutions involved in the return and conservation of lynx in Western and Central Europe are invited to join this agreement. Authorities that have to decide on permits for the reintroduction of lynx and donors who finance such projects are called upon to support the project as outlined in this Memorandum of Understanding.

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Appendix II

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Genetic Certificate Eurasian Lynx (*Lynx lynx*)

Gelnhausen, 28.01.2022

Individual identification

ESB#	**DWV ID**	**GAN**	**Transponder**
3262		CHM16-00787	
Local ID	**Animal name**	**Sex**	**Genotype ID**
KA0284	Emily	female	Z_LL065w
Birth date (dd.mm.yyyy)	**Birth location**	**Sire (ESB#)**	**Dam (ESB#)**
17.05.2016	Karlsruhe (Zoologischer Stadtgarten), Germany	2911	2678

Samples

Genetic results received from 2 sample(s) collected by Karlsruhe (Zoologischer Stadtgarten), Germany.

Sample type(s): scat ☐ hair ☒ saliva ☐ blood ☒ tissue ☐

Genetic results

Utilised genetic marker system: SNP ☒ STR ☒ mtDNA ☒

Mitochondrial haplotype: 4 → characteristic for *L. lynx carpathicus*, occasionally in Baltic *L. lynx lynx*

Reference: Hellborg, L., Walker, C.W., Rueness, E. K., Stacy, J. E., Kojola, I., Valdmann, H., Vilà, C., Zimmermann, B., Jakobsen, K. J. & Ellegren, H. (2002). *Differentiation and levels of genetic variation in northern European lynx (Lynx lynx) populations revealed by microsatellites and mitochondrial DNA analysis.* Conservation Genetics, 3(2), 97-111; Rueness, E. K., Naidenko, S., Trosvik, P., & Stenseth, N. C. (2014). *Large-scale genetic structuring of a widely distributed carnivore-the Eurasian lynx (Lynx lynx).* PloS one, 9(4), e93675.

96 SNPs (Single Nucleotide Polymorphisms) genotype (call rate: ?? % successfully genotyped):

Marker#																																
Genotype																																
Marker#																																
Genotype																																
Marker#																																
Genotype																																

References: Mueller, S. A., Prost, S., Anders, O., Breitenmoser-Würsten, C., Kleven, O., Klinga, P., Konec, M., Kopatz, A., Krojerová-Prokešová, J., Middelhoff, T. L., Obexer-Ruff, G., Reiners, T. R., Schmidt, K., Sindičić, M., Skrbinšek, T., Tám, B., Saveljev, A. P., Naranbaatar, G. & Nowak, C. (2022). *Genome-wide diversity loss in reintroduced Eurasian lynx populations urges immediate conservation management.* Biological Conservation, 266, 109442.

19 STRs (Short Tandem Repeats, microsatellites) genotype (call rate: ?? % successfully genotyped):

Marker#																			
Genotype																			

Reference: Mueller SA, Reiners TE, Middelhoff L, Anders O, Nowak C (2020) The rise of a large carnivore population in Central Europe: Genetic evaluation of lynx reintroduction in the Harz Mountains. Conservation Genetics 21, 577-587

Genetic assignment: *L. lynx carpathicus* (assignment probability: based on SNPs: 1.0; based on STRs: 1.0)

Population/lineage/subspecies assignments are estimates and dependent i. a. on the predefined reference group. Assignment test were done using the software ADMIXTURE with reference samples from Carpathian, Baltic, Scandinavian and Siberian lynx.

Reference: Alexander DH, Novembre J, Lange K(2009). Fast model-based estimation of ancestry in unrelated individuals. Genome Research, 19:1655-1664, 2009.

Sex determination: female Result based on: SNPs (3 markers) ☒ STR (2 markers) ☒

Additional Comments: ______________________________

Contact:

Senckenberg Research Institute
Center for Wildlife Genetics
Clamecystraße 12
63571 Gelnhausen
Germany

forschung.wildtiergenetik@senckenberg.de

Genetic analyses were conducted by the Center for Wildlife Genetics, Senckenberg Research Institute and Natural History Museum Frankfurt. The Center serves as German reference laboratory for genetic analyses of large carnivores. Samples are permanently stored at Senckenberg. These results were reported to the Eurasian Lynx ESB and DWV.

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Appendix III

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Information on sampling and preservation of sample material for genetic analyses of captive lynx

1. General information before sampling

Enclosed in this package you will find:

- ✓ Sealed and labelled plastic cups with 33 ml undenatured ethanol (96 %)
- ✓ Labelled ziplock bags with filter paper and desiccant
- ✓ Swabs (separat packaged)
- ✓ One-way tweezers (separately packaged)
- ✓ Nitrile gloves
- ✓ Scalpels
- ✓ Pencil (for labelling the samples)

The collection of samples from captive lynx and the professional and timely preservation of the collected material is of decisive importance for a successful genetic analysis. To avoid contamination with alien DNA, the sample collection should always be carried out with the highest care possible. Therefore, the following basic rules should be followed:

- Disposable gloves should be worn during all steps of sample collection to avoid contamination. Gloves should also be changed during sampling if potentially contaminated packaging, pens or other objects have been touched. Changing gloves between each sampling is strongly advised.
- Every sample container (cups/bags) and every sampling utensils (tweezers/swabs/scalpels) should only be used for ONE sample from A SINGLE individual.
- None of the substances in the sampling kit are hazardous to health.

2. Sampling

The following applies to all samples: Please completely fill out the labels attached to the sample containers (plastic cups/ziplock bags)! If possible, always give the **name of the animal** AND the **studbook number (ESB)** AND the **local ID**. If the husbandry conditions make it impossible to reliably assign a sample to an individual, please state all possible individuals from whom the sample could have originated (or, if possible, exclude individuals). This information is of great importance for genetic analyses.

In our many years of experience, conscientious observance of the instructions for handling samples leads to an increase in the success rates of the subsequent genetic analysis. After consultation, we will be happy to put together and send you further suitable sampling material. Please do not hesitate to contact us (even spontaneously by telephone) if you have any questions or are unclear about the sampling and treatment of sample material. You can find the contact on page 2.

Plastic cups with 33 ml undenatured ethanol (96 %)

Faeces is picked up with a glove or one-way tweezers and placed in the plastic cup filled with ethanol (see picture). The ethanol should completely cover the faecal sample. For larger amounts of faeces, a piece of 3-5 cm should be cut from one of the ends and placed in the cup. Often there is a shiny layer on the surface of the faeces shed by the intestinal mucous membrane, which is particularly suitable for DNA analyses. When separating large faecal pieces, those with a mucus layer, should preferably be sampled, if available. The plastic cubs should be labelled with a pencil. The yellow lid should be closed tightly.

If it is the case that **tissue samples** are available, these should also be placed in one of the plastic cups, also well covered by ethanol. To cut, please use one of the sterile scalpels provided.

Ziplock bag with filter paper and desiccant

The ziplock bags are primarily intended for **hair** and **saliva samples**. The sampling of which is particularly useful for veterinary examinations or translocations of the animals. The samples are placed in the folded filter paper. The desiccant should be left in the ziplock bag.

To take a **hair sample**, you should ideally pull out around 30 hairs with your fingers (please wear gloves!). So that the hair follicles are preserved. Then place the hair in the folded filter paper within the bag. Please do not fix any hair on the adhesive surface, which will hinder the later analyses. Under certain circumstances, lynx can leave hair behind at their berths. Whenever possible, berths should be checked for hair left behind. Hair on rubbing areas or on walls in stables (if there are any) is also of interest.

Saliva (as an invasive oral swab sample) is preferably collected using the cotton swabs. To do this, please rub at least one swab vigorously back and forth on the oral mucosa and turn it around its own axis in order to absorb as much DNA-containing material as possible. After sampling, the swabs are placed in folded filter paper and stored in a ziplock bag with a desiccant.

Alternatives

If **blood samples** (e.g. EDTA blood samples in stock) are already available from previous or current treatments, these are also of interest for the analyses. We usually not advise collecting and sending blood samples - also in commercially available EDTA tubes - as it is difficult to send them in a cooled state and the DNA in the EDTA solution degrades very quickly. Otherwise, such samples should be sent in a well-cooled condition. Alternatively, cotton swab samples can be taken from such blood samples and preserved as described in the saliva sampling protocol above. Let the cotton swab fully soak up blood beforehand. If sedimented or clumped blood samples are available, please take up the cellular component (haematocrit).

3. After the sampling

After sampling, the samples should be preserved as quickly as possible, depending on the type of sample, by drying them or soaking them in 96% ethanol. Store all samples in or below room temperature and out of direct sunlight. Sample material should never be sent in an untreated condition. Alternative preservation methods should be discussed with us before use. All the waste generated can be disposed of as residual waste.

<u>The samples including completely filled out labels will be sent to the following address:</u>

Senckenberg Gesellschaft
Zentrum für Wildtiergenetik
Probenannahme
Clamecystraße 12
63571 Gelnhausen
GERMANY

Contact: Michelle Mueller
Phone: +49(0)6051-61954-3138
E-mail: forschung.wildtiergenetik@senckenberg.de

Appendix IV

Requirements for a coordination enclosure

and their

Area potential Evaluation

For the first time, the idea of a coordination center for the interim sheltering of genetically valuable lynx from ex situ breeding programs (consistently subspecies-oriented enclosure breeding from recognized zootechnical institutions) holds enormous advantages for goal-oriented population management within ex situ populations in the European wilderness. From here, the animals are transferred

a) to reintroduction projects or

b) to breeding groups of other zoological institutions.

The removal of adult lynx from the wild and reintroduction into another habitat is already an interference in an obviously well-functioning in-situ population. The exception is the removal and rearing of lynx orphans, which would have no chance of survival in the wild anyway.

The removal of lynx from selective ex- situ programs, as has been and is being successfully documented in the Harz, contributes enormously to the improvement of the enclosure quality of the lynx (offspring as part of the natural behavioral repertoire). This permits long-term behavioral and health monitoring in advance, on the one hand for the settlement of preferred animals, and as well for further animals that are returned to suitable enclosures as breeding potential. They continue to be considered as a genetic reserve for wild stocks.

Requirements of coordination enclosures

The recommendations for the keeping of wild animals in enclosures are based on the subject-specific content of the "Minimum requirements for the keeping of mammals" of the Federal Ministry of Food and Agriculture (2014), which distinguishes between intensive keeping in classical zoological institutions and extensive keeping in spacious wildlife parks. The expertise "Guidelines for keeping wild animals in enclosures in a welfare friendly manner" (BML 1995) are of particular importance under the above-mentioned aspects.

These requirements are outlined in the following:

Basic expertise	Notes	Total minimum area [m^2]	Enclosure	Height [cm]	Stables, shelters [type of construction]
Expertise on Minimum requirements for the keeping of mammals (2014)	Predominantly overgrown floor, elevated lying areas, opportunities for evasion and hiding, sand areas, climbing opportunities, vertical use of the enclosure, litter boxes, barriers, minimum stable height 2.50 m.	Intensive: x50/1 (verb. EG) Separation enclosure: ($10m^2/1$) extensive: x150/1 (verb. EG) Separation enclosure: ($30m^2/1$)	Open or closed constructions are possible	250	Unheated individual cages/boxes in sufficient number and size (animal must be able to lie down, stand up, turn around). Special warm house is not necessary
Guidelines for the conservation of wild animals in enclosures (1995)	Open area, natural ground, near-natural design, separation enclosure required	1200 m^2/ pair		n.d.	

In any case, sufficient separation enclosures are necessary, which should also be enclosed like an aviary-like, especially in the case of a forest enclosure, in order to secure the animals during storms. Two variants for the maintenance of such an enclosure are possible:

Option I - Minimum Equipment

The coordination enclosure consists of three individual enclosures that are connected to each other via sliders. Each individual enclosure is at least 600 m² in size. As the facility serves the purpose of reintroduction and is intended to promote near-natural behavior, the requirements are higher than for the expert opinions cited above. Two enclosures have a capture system, which can be reached via a keeper's corridor. (see plan "1 - version with minimum dimensions)

Cameras are used to monitor the animal population, especially outside the presence times of the animal keepers.
In order to involve the public in the lynx reintroduction project and to make the background of the project transparent, it is also possible to provide insights into the enclosures via cameras and webcams, always without revealing the location of the coordination enclosures.

Option II – Best Practice

Ideally, the coordination facility consists of three spacious individual enclosures that are connected to each other via sliders. The floor areas are 1,500 m², 800 m² and 600 m². Two separation enclosures (30 and 40 m²) allow the separation and capture of animals. Within the two enclosures, the animals have access to a covered area of approx. 20m². This is equipped with four lounging boards (each 1.10 x 0.50m). The separate keepers' area is directly connected to the separation enclosures and is equipped with a treatment table, freezer and all necessary equipment for the daily care and monitoring of the animals.

Cameras also allow continuous monitoring of the animal population in the enclosures, especially outside the presence of the animal keepers. The technical supply is provided via a directly adjoining technical room. (see plan "2 - Best Practice Option with minimum dimensions)

Area potential assessment

An evaluation matrix was developed for a more objective assessment of the areas that could be considered for the construction of coordination facilities. This covers 28 factors in 15 categories, which are rated on a scale of 1 to 5 when assessing each potential site. In order to match the complex considerations behind the selection of suitable areas, all 28 factors have also been weighted (between 1 and 5). Depending on the requirements and objectives, the weighting can be varied.

The calculation is done by multiplying the assessment factors and their respective locally determined weights. The sum of these results is then divided by the sum of the factor weights.

$$Evaluation = \frac{Sum(Evaluation\ factor) * Site\ assessement}{Sum(Evaluation\ factor)}$$

This results in a score for each site between 1 and 5, which takes into account all the requirements of the coordination facilities. In case evaluation factors do not have to be applied for regional reasons, the decision for a location can still be made objectively.

Disturbance factors that can lead to negative conditioning (adaptation to urban habitats, road and rail traffic, etc.) of the animals to be released cannot be defined in a measurable way according to current state of knowledge.

Therefore, social aspects should also be taken into account in the selection of locations:

1. The reintroduction of lynx (especially translocation) is an intervention in nature whose success cannot be 100% guaranteed. Similar to an animal experiment proposal, problems can be named and, if necessary, solutions can be pointed out. The prerequisite is the selection of animals that are purely subspecies and, if possible, not related to each other.

2. Individuals from ex-situ breedings cannot be released in an uncontrolled manner due to legal regulations and relevant controls (timely identification and reporting of offspring). Thus, the selection of individual animals from the coordination enclosures will always be a case-by-case decision.

   Generally, only locally limited reintroductions of individuals are carried out, which are under constant control (monitoring). Participating in these programs is also a potential burden for breeders, as they also have to bear long-term responsibilities for animals that are not suitable for release into the wild.

3. Due to the location loyalty of the female cats, we need many breeding enclosures in order to obtain offspring from different parents. Relocating female cats that are already breeding is not in accordance with animal welfare.

4. Parameters of the coordination enclosures

   The avoidance of human influence during the stay of the lynx in the coordination enclosures is indisputable. It is difficult to define which external parameters should be taken into account.

   4.1. Acoustic disturbance factors

   It should be taken into account that the hearing ability of the lynx is extraordinarily pronounced and thus a high sensitivity is to be expected.

   Here, traffic on roads and railways as well as anthropogenic concentrations in urban centres play an essential role. It is less a question of disturbance than of habituation of the animals to it, which should be avoided as far as possible.

   One solution would be to select at least three sites for a coordination enclosure and to choose the least disturbed area.

   4.2. Visual disturbance factors

   Visual abilities of lynxes are also remarkable. Geographical orientation is achieved, among other things, by landmark recognition (source?). Concealing visitor pathways prevents the lynx from gaining a sufficient overview despite acoustic perception.

   We recommend a solution like the one described in 4.1.

   4.3. Olfactory disturbance factors

   No disturbance to be expected.

   4.4 Topography

   The enclosure topography appears to have an extraordinarily high influence on the behaviour and well-being of lynx.

   Enclosures with a significant variation in altitude are preferable to flat areas. This can also lead to positive conditioning and thus to the selection of sites preferred later in the wild (e.g. birth dens).

5. Conclusion

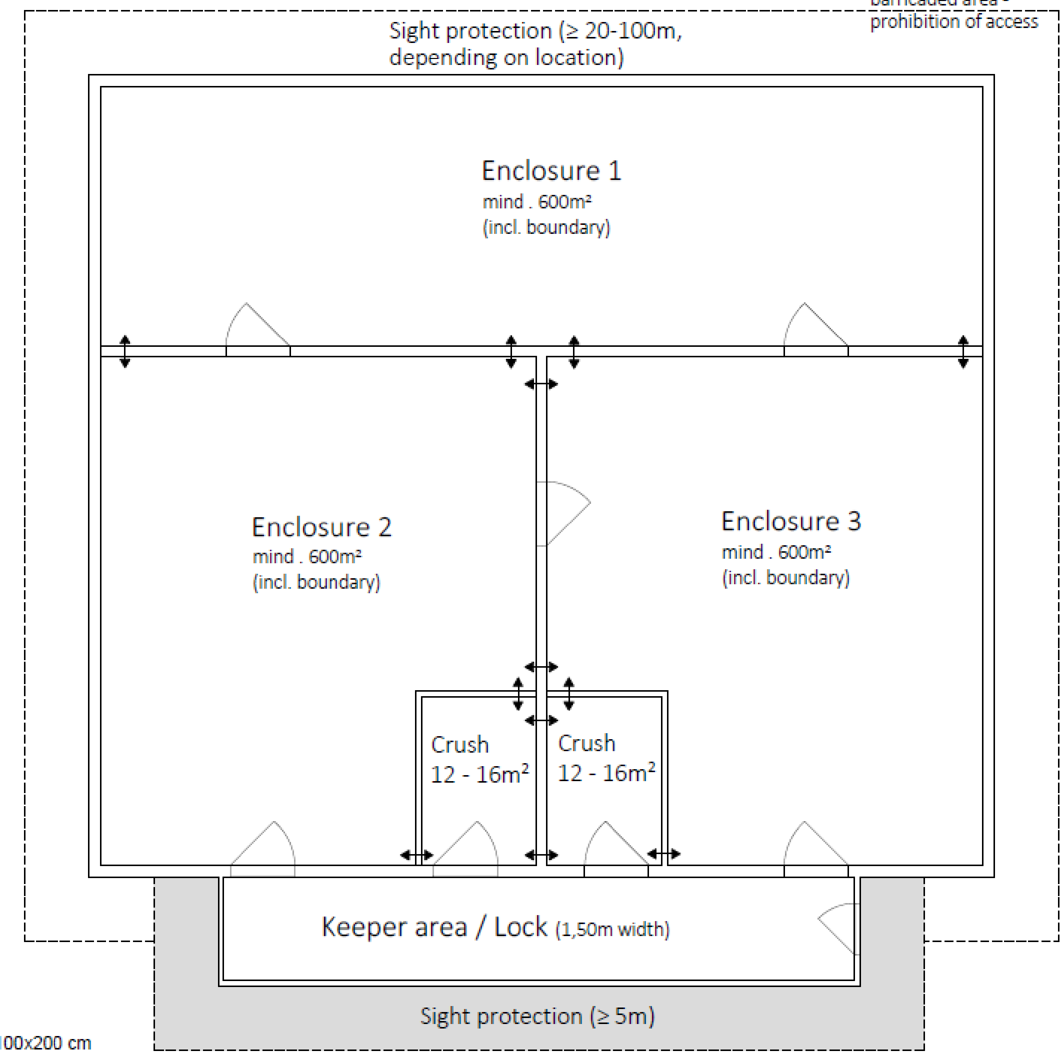
Considering these aspects, rural areas are preferable for coordination enclosures. Areas with appropriate altitude differences have priority over plains.

Two enclosure boundaries facing away from each other and free from acoustic and visual disturbance are in any case more advantageous than enclosure concealment by means of artificial or natural visual barriers. A variant study of at least three sites allows for an objective selection of the most suitable enclosure area for the region.

	Enclosure definition: Coordination enclosure	*The coordination enclosure serves as a collection centre for genetically valuable lynx, primarily from enclosures intended either directly for release into targeted habitats or as potential breeding animals for future husbandry. The length of time an individual is kept in a coordination enclosure should not exceed 2 years. The enclosure has different interconnectable compartments, all of which can be used in the best possible way for scientific monitoring. For the use of the enclosures as breeding facilities, further requirements and details should be clarified separately....*						
		Information	**Quality**	**Location A**	**Location B**	**Location C**	**Location D**	**Note / remark**
1	Land and soil	Conservation status (potential enclosure) (particularly worth protecting = 1, Stock not worth protecting = 5)	3					Valuation of costs takes place under pos. 12
		Ownership, purchase necessary (all own-owned = 5, all third-party owned =1)	1					
		Forest conversion permit required (yes=1, no=5)	3					
		Other requirements (e.g. FNP, B-Plan)	2					
2	Base area enclosure	The larger the enclosure area, the more successfully animals can be prepared for life in the wild: < 800 m² = 1; 1; 800 - 1.000 m² = 3; ≥ 1.500 m² = 5	3					
3	Structure of the enclosure	A park-like forest structure reflects the habitat of the lynx and at the same time provides the necessary observation opportunities for the staff.	2					
4	Number of enclosures ???	Division into connectable individual enclosures: Main enclosure + separation = 2 2 main enclosures + separation = 3 2 main enclosures + 2 separations = 4 ≥ 3 main enclosures + 2 separations = 5	3					Recommendation: per main enclosure in sizes like pos. 2; Separation: ≥ 30 m² Separation enclosure with infrastructure (water, sewage, electricity, etc.)
		Separation enclosures with special hygienic requirements	1					
5	Social structure	Lynx can be very compatible with each other in family groups. Nevertheless, it must be possible to avoid problems. The short-term separation of individuals must be guaranteed (quality of sliding elements, operability).	2					Connectable single units Sufficient number of gate sliders and rope pulls
6	Breeding behaviour	Restrictions in the breeding behaviour of enclosure lynxes in neighbourhood to unrelated lynxes	1					Coordination enclosures should be at least ≥ 200 m away from breeding facilities
7	Transfer conditions	According to the enclosure definition, there will be comparably frequent fluctuations in the animal population: - "covert" observation possible (decision for transfer) - Access possibilities - Capture possibilities (anaesthesia, trap, net???)	3					

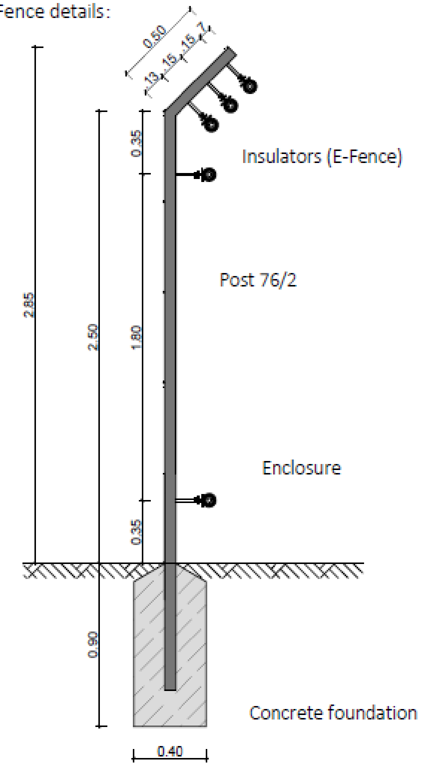
8	Localisation of the coordination facility	Within a show enclosure = 1 Location connected to local recreation area = 2 Distance to public paths with double fencing and visual protection ≥ 100 m = 3 Facility inaccessible (visually, acoustically, olfactorily) = 5	5					within a show enclosure = KO
9	Technical fencing	Anforderung an die Errichtung eines 2. Außenzaunes auf Potentialfläche: komplett (=1), teilweise (=3), nicht notwendig (=5)	1					The quality of the fencing depends on the environment and visitor frequency: highly stability, safety requirements and expected maintenance and care = 1 rather extensive system = 5
		Impact of the tree population on the outer fence route (necessary clearing, special tree protection against climbing over/leaping over).	2					
		Effort for the distance to public paths (distance, visual protection, vegetation?)	2					
10	Infrastructure	Water, Broadband????/Video/Webcam	3					
11	Investment costs	Total costs (very high = 1, very low = 5)	1					may also be dropped if confirmed by the MLR.
		Possibility of regional promotion (few possibilities = 1, many possibilities = 5)	1					
		Possibility of national promotion	1					
		Possibility of international funding	1					
12	Maintenance intensity	Animal care expertise	3					Quantity and qualification
		Veterinary and zoological inspection	3					Quantity and qualification
		Distance to the operating institution	2					Evaluation by distance indication of the sites in comparison
13	Location analysis	Promotional concept for increased acceptance by visitors of the operating institution	3					meaning: long-term care is provided by the institution; construction is provided by funding/donations, etc. Institution contributes significantly to promoting acceptance of the lynx in the wild Acceptance as an opportunity for cooperation Involvement of hunters
		Possibility of a central national advertising management	3					
14	Running costs	Management by operating institution proportionate and secured in the long term	3					an operation run independently by an institution is the most expensive option and could be a knock-out criterion
		Institution must be organised independently	3					
15	Timeframe	Estimated planning and implementation phase	5					
			Total evaluation	**0,00**	**0,00**	**0,00**	**0,00**	

Schematic layout



Keeper gate: 100x200 cm
Sliding doors: 400 x 700 mm

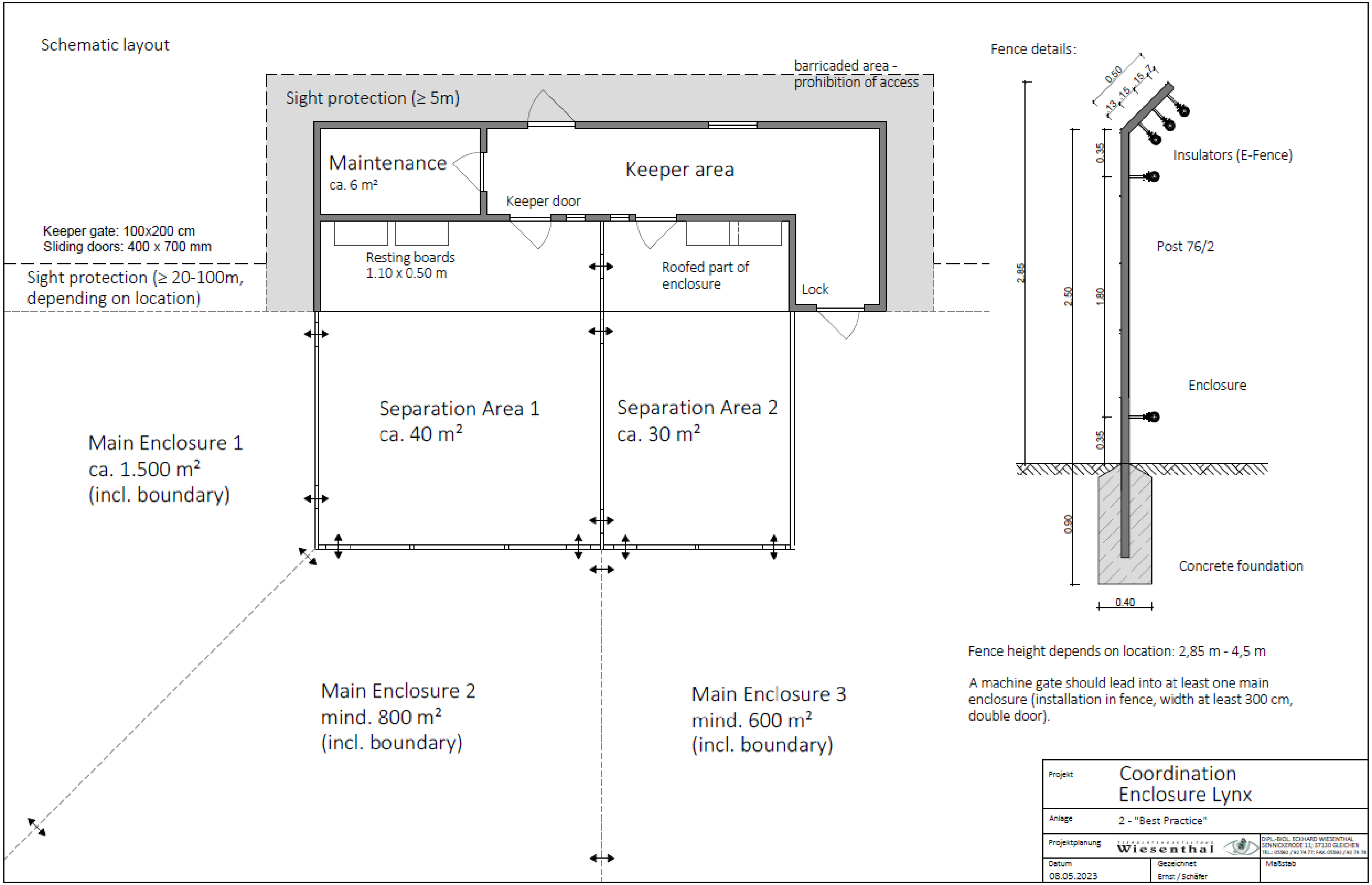
Fence details:



Fence height depends on location: 2,85 m - 4,5 m

A machine gate should lead into at least one main enclosure (installation in fence, width at least 300 cm, double door).

Projekt	Coordination Enclosure Lynx	
Anlage	1 - Minimum requirements	
Projektplanung	Wiesenthal	DIPL.-BIOL. ECKHARD WIESENTHAL SENNICKERODE 11; 37130 GLEICHEN TEL.: 05592 / 92 74 77; FAX 05592 / 92 74 78
Datum 08.05.2023	Gezeichnet Ernst / Schäfer	Maßstab


Schematic layout
Sight protection (≥ 5m)
barricaded area - prohibition of access
Maintenance
ca. 6 m²
Keeper area
Keeper door
Keeper gate: 100x200 cm
Sliding doors: 400 x 700 mm
Resting boards
1.10 x 0.50 m
Roofed part of enclosure
Lock
Sight protection (≥ 20-100m, depending on location)
Separation Area 1
ca. 40 m²
Separation Area 2
ca. 30 m²
Main Enclosure 1
ca. 1.500 m²
(incl. boundary)
Main Enclosure 2
mind. 800 m²
(incl. boundary)
Main Enclosure 3
mind. 600 m²
(incl. boundary)
Fence details:
Insulators (E-Fence)
Post 76/2
Enclosure
Concrete foundation
0.50
2.85
2.50
1.80
0.35
0.90
0.40
Fence height depends on location: 2,85 m - 4,5 m
A machine gate should lead into at least one main enclosure (installation in fence, width at least 300 cm, double door).
Projekt
Coordination Enclosure Lynx
Anlage
2 - "Best Practice"
Projektplanung
Wiesenthal
Datum
08.05.2023
Gezeichnet
Ernst / Schäfer
Maßstab

Appendix V – Liste Protokolle Gehegeluchse

No.	*Titel*	*File Name*	*Institution*	*Remarks*
1.	Monitoring protocol for the Romanian source of Eurasian lynx population	Gazzola et al 2018 Monitoring protocol for Romanian source of Eurasian lynx	Life Lynx project	Monitoring
2.	Guidelines for reintroductions and other conservation translocations	IUCN 2013 Guidelines or reintroduction and translocation	IUCN	Reintroduction, reinforcement
3.	IUCN Species Survival Commission Guidelines on the Use of Ex situ management for Species Conservation	IUCN 2014 guidelines on the use of ex situ management	IUCN	Husbandry, ex-situ management
4.	Husbandry Guidelines Eurasian lynx (*Lynx lynx* ssp.)	Krelekamp 2004 Husbandry_guidelines_Eurasian_lynx	EAZA	Husbandry
5.	Monitoring protocol for the Eurasian lynx (*Lynx lynx*) population in the Slovak Carpathian Mountains	Life Lynx 2018 Monitoring protocol for Eurasian lynx population	Life Lynx project	Monitoring
6.	Protocol for Eurasian lynx (*Lynx lynx*) capture, narcosis, transport, and quarantine in the Slovak Carpathians	Life Lynx 2018 Protocol for Eurasian lynx capture narcosis transport and quarantine	Life Lynx project	Capture, narcosis, transport
7.	Protocol for capture, transport and quarantine in the Romanian Carpathians	Life Lynx Protocol for capture transport and quarantine in Romanian Carpathians	Life Lynx project	Capture, narcosis, transport
8.	O.T2.2 Health, Husbandry and Management of Eurasian lynx (*Lynx lynx*)	Walzer 2020 Health husbandry and management of Eurasian lynx	Interreg, vetmed Uni Vienna	Health, husbandry
9.	Lessons learned from past reintroduction and translocation efforts with an emphasis on carnivores	Wilson 2018 Lessons learn from past reintroduction and translocation efforts	Life Lynx project	Reintroduction
10.	Population level reinforcement plan	Wilson 2019 Population level reinforcement plan	Life Lynx project	Reinforcement
11.	Translocation of lynx from Switzerland and Slovakia to the Palatinate Forest MoU	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Reintroduction, capture, transport, quarantine
12.	Fangmethoden und Vorgehen	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Capture
13.	Narkose und veterinärmedizinische Überwachung	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Immobilisation, veterinary survey
14.	Transport von Lebenden Luchsen	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Transport

No.	Titel	File Name	Institution	Remarks
15.	Anforderungen Quarantänestation	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Quarantine
16.	Selection of lynx for translocation	KORA_Bericht_100_Umsiedlung_DE_2021	KORA/FIWI	Translocation decisions
17.	Dokumentation Fang, Narkose und Markierung von Raubtieren[2]	Dokumentation Fang, Narkose & Markierung von Raubtieren 2020.docx	KORA/FIWI	Specific protocols (in German) to: - Capture and methods (including field forms) - Immobilisation (incl. field forms) - Tagging (telemetry) - Transport of live animals
18.	Genetic and demographic management of conservation breeding programmes oriented towards reintroduction	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Leus & Lacy 2009	Iberian lynx, captive breeding programme design
19.	Genetic issues in the implementation of the Iberian lynx Ex situ Conservation Programme	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Godoy et al. 2009	Genetic design of ex situ programme
20.	Studbook management of captive Eurasian lynx	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Versteege 2009	EEP Eurasian lynx
21.	Hand-rearing of Iberian lynx cubs	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Rivas et al. 2009	IbLx husbandry
22.	Behaviour problem of wild felids in captivity	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Manteca 2009	Husbandry, enrichment
23.	Breeding European wildcats in species-specific enclosures for reintroduction in Germany	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Hartmann-Furter 2009	Husbandry, enrichment
24.	Breeding Far-eastern leopards for reintroduction: the zoo programme perspective	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Christie 2009	Husbandry, enrichment
25.	Planning of veterinary supervision for translocation programmes of wild felids	Chapter in "Iberian Lynx Ex situ Conservation: An Interdisciplinary Approach"	Ryser-Degiorgis 2009	Health survey and veterinary procedures
26.	Health surveillance in wild felid conservation: experiences with Eurasian lynx in Switzerland	Chapter 20 in "Bonn Proceedings"	Ryer-Defiorgis et al. 2021	Health survey and veterinary procedures
27.	EAZA breeding programmes as source for lynx	Chapter 21 in "Bonn Proceedings"	Lengger et al.	Ex situ programme

[2] The not yet implemented plan is to produce an English version of the Documentation and publish it as a KORA Bericht. Documents No 12–16 are based on the 2014 version of the Documentation.

No.	Titel	File Name	Institution	Remarks
	reintroduction		2021	
28.	Recommendations for the conservation of the Eurasian lynx in Western and Central Europe	Chapter 22 in “Bonn Proceedings”	Bonn Lynx Expert Group	Metapopulation conservation, genetic management, etc.