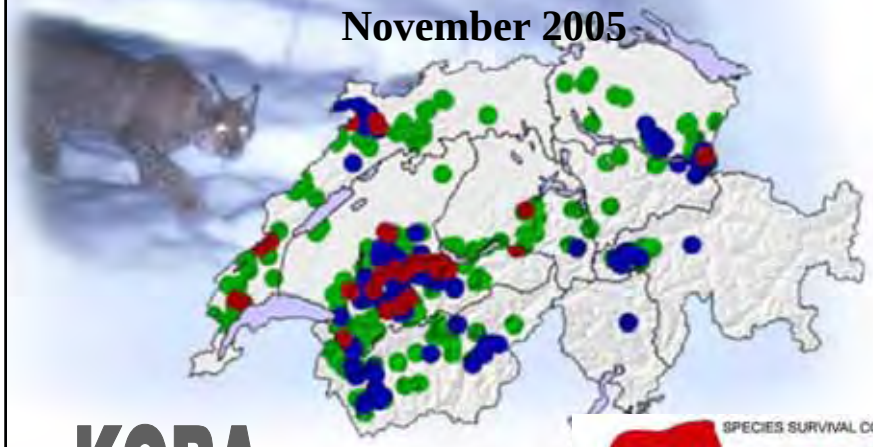
Monitoring methods

Workshop Mavrovo
November 2005



KORA

SPECIES SURVIVAL COMMISSION
CAT SPECIALIST GROUP

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Passive monitoring (PM): collecting second-hand information

Data that crop up „anyway“ are reported and compiled into a database attached to a GIS

Active monitoring (AM): periodic surveys and field procedures

Data are collected in a targeted and systematic way to assure that the sample is as homogenous as possible

KORA

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of chance observations:

- The observations are assessed and classified according to the SCALP criteria

- Category 1: hard facts
- Category 2: confirmed observations
- Category 3: unconfirmed observations

Status and Conservation of the Alpine Lynx Population
SCALP

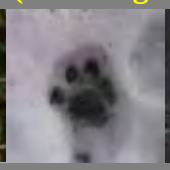
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into a passive monitoring system:

1) Dead lynx

2) Livestock or wildlife killed by lynx

3) Chance observations (direct sightings, tracks, kills)


Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into a passive monitoring system:

1) Dead lynx

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Methods:

- Lynx found dead must be collected in from the whole distribution area
- It is important to inform all institutions (e.g. wildlife and forest services, hunters, police, veterinarian) possibly involved on: how to collect a carcass or remaining parts; what data to record; where to send parts and forms

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

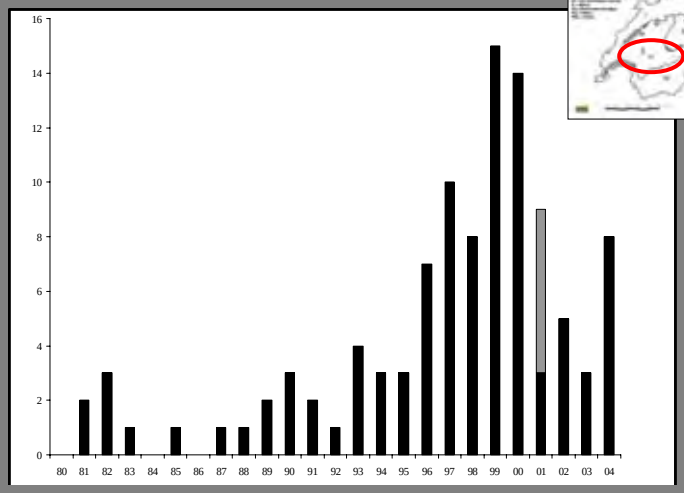
Registration of lynx mortality:

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of dead lynx:

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of dead lynx:



Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

- C1 data (SCALP criteria)
- Mortality data are tricky to interpret as high losses can indicate both an increasing or decreasing population
- The evolution of the losses represents trends only over a longer period and with a delay of a few years
- For an interpretation over short periods they need to be compared with other datasets
- Provide information on reproduction

Mortality factors as well as genetic and taxonomic status can furthermore be collected. This is especially important for the Balkan lynx.

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into a passive monitoring system:

1) Dead lynx
2) Livestock or wildlife killed by lynx

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Method:

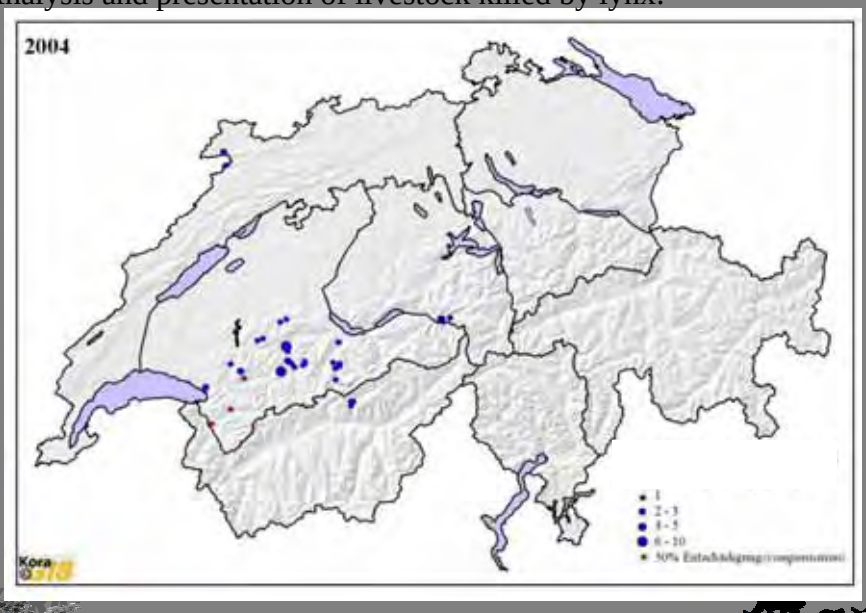
- In many European countries, livestock killed by lynx are compensated, if confirmed by trained staff (game wardens, foresters, etc.)
- Reporting is high because of the compensation
- Wild ungulates killed are even better indicator but not often found
- Identification of kills requires trained and motivated network of observers and high public awareness

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Kill form:

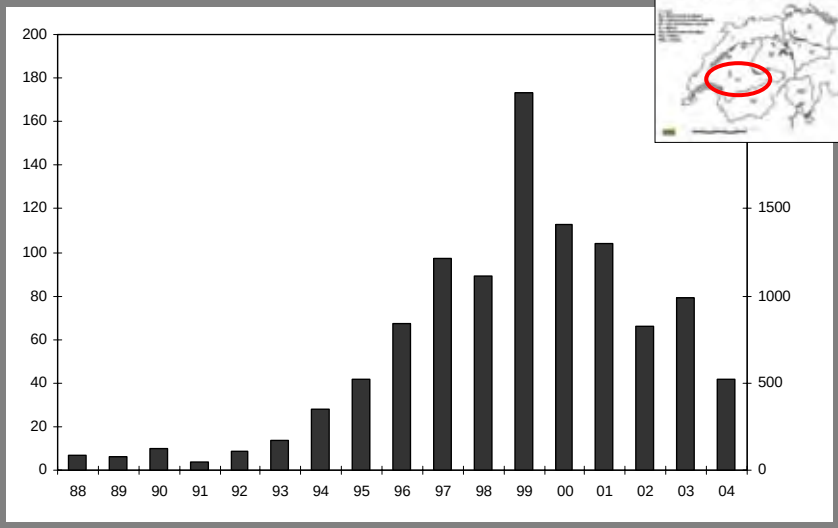
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of livestock killed by lynx:



Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of livestock killed by lynx:



Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

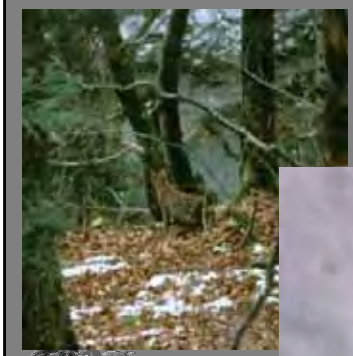
Interpretation of the data:

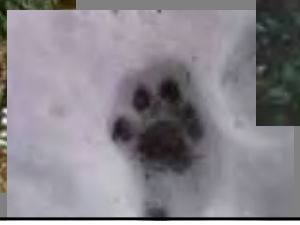
- If the examination and reporting is done by a network of trained people, the amount of kills found per time unit in a certain area is the best category 2 dataset (C2, SCALP criteria).
- The quality of the dataset depends on the probability of finding kills
- If the network is well established, kill frequency allow a relative comparison bewteen different areas and years
- The locality of wild ungulates kill sites gives good indication on the lynx distribution and habitat use
- Livestock depredation is biased towards areas where small ruminants (sheep & goats) are available
- Up to date, no case in Europe was reported where lynx were living manly from livestock

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into a passive monitoring system:

1) Livestock or wildlife killed by lynx
2) Dead lynx
3) Chance observations (direct sightings, tracks, kills)





Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Method:

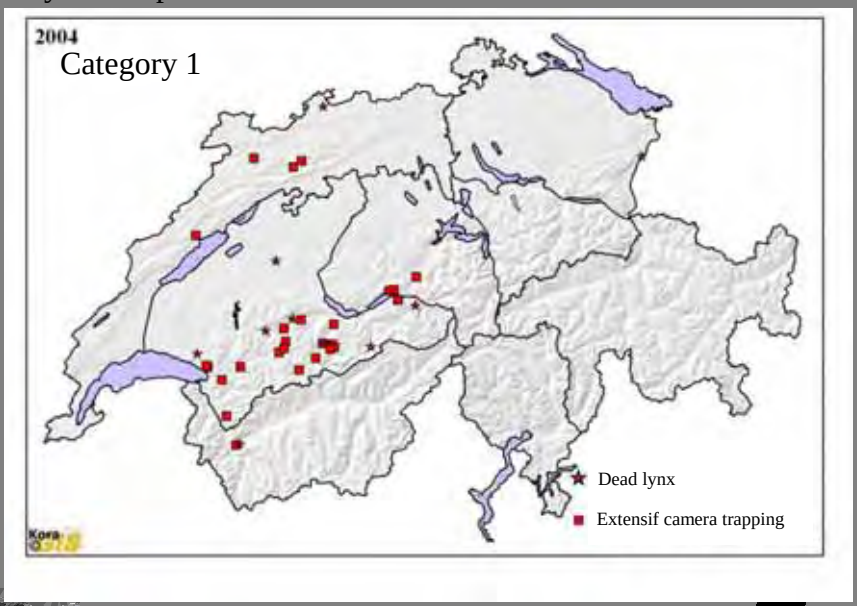
- Chance observations should be collected in a systematic way
- The variation within the dataset should not be the consequence of an inconsistent data collection
- Chance observations are collected over a large area (e.g. country) and should be gathered over a larger area as the presumed distribution area
- Potential observers (e.g. hunters, farmers,...) must be instructed about the importance of reporting occasional lynx observation
- The amount of data collected will depend on the propaganda made

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Lynx observation form:

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Analysis and presentation of chance observations:



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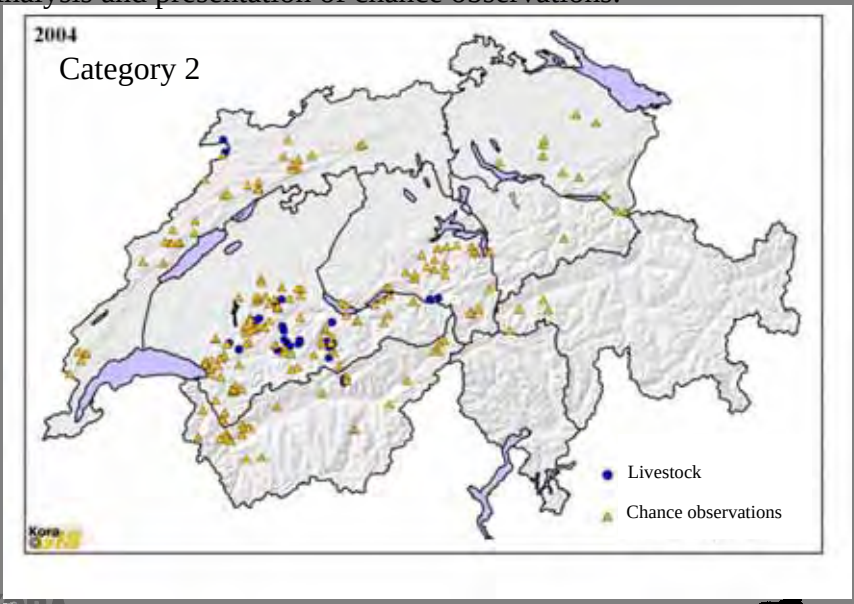
Analysis and presentation of chance observations:



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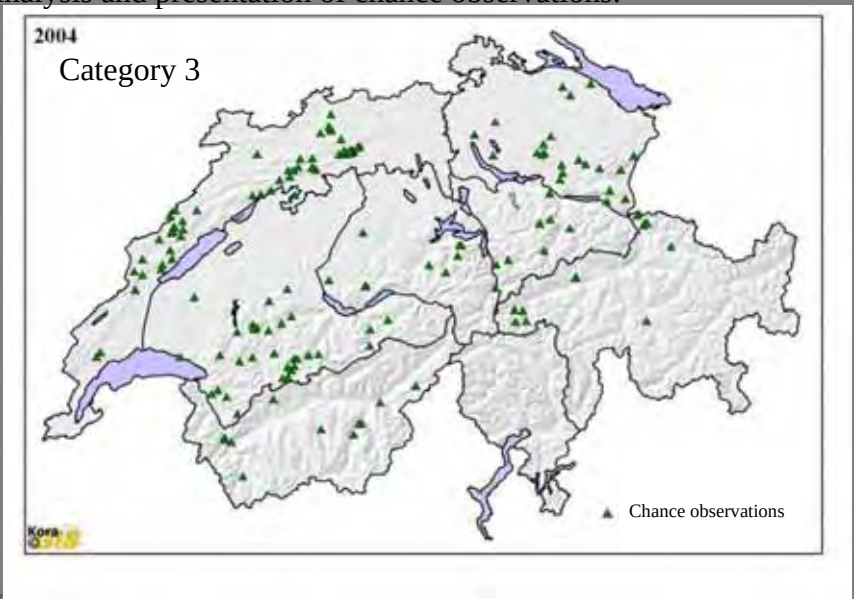
Analysis and presentation of chance observations:



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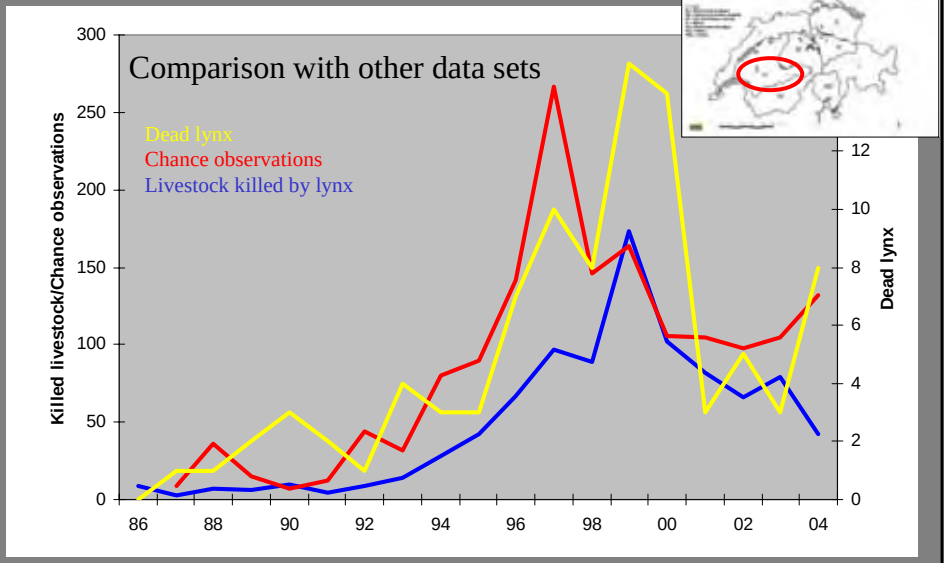


Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

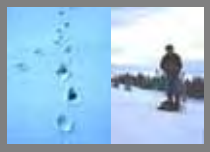
- Chance observations must be interpreted with care, as they likely include several biaises
- At the periphery of the known distribution area, presence or absence of random observations indicate expansion or loss of area
- Within the known area of occupation, they can if collected constently over years be an indicator for population trends.
- Information on reproduction can also be obtained

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into an active monitoring system:

1) Periodical inquiries

2) Track transects



3) Camera trapping (extensive & intensive)

4) Captures and telemetry (VHF, GPS/GSM)

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into an active monitoring system:

1) Periodical inquiries

Questionnaire Lynx

Year concerned 2005

1. Did you have during this year lynx presence in your area?

☐ no ☐ yes ☐ only unconfirmed signs of presence

2. Number of lynx signs in your area during this year:

☐ none ☐ 1 – 2 ☐ 3 – 5 ☐ 5 – 10 ☐ more than ale 10

3. Typ of observation(s)

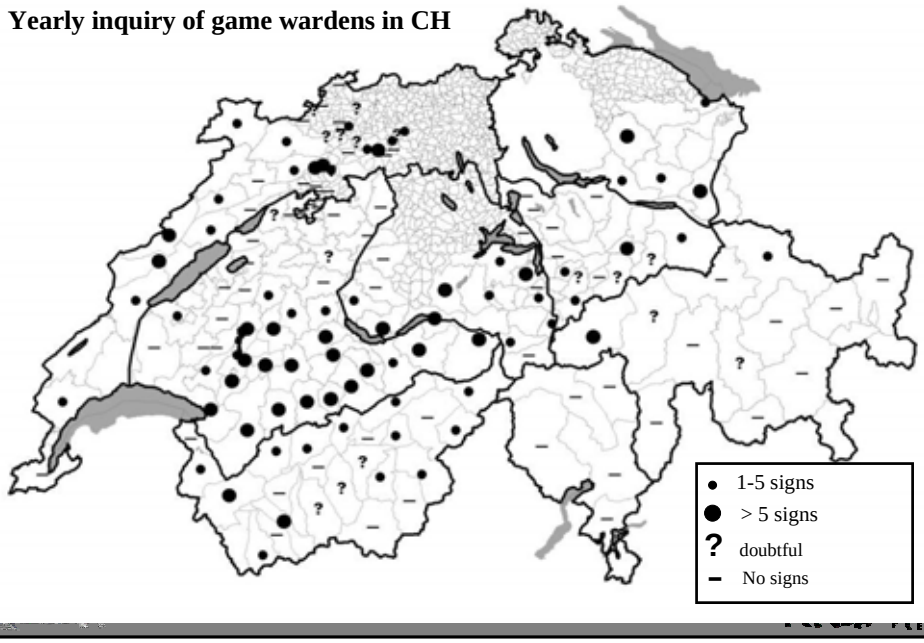
☐ Direct observation of a single lynx
☐ Direct observation of several lynx
☐ Signs of reproduction (direct observation, tracks, etc.)
☐ Lynx tracks (single tracks, trails, scats, hairs)
☐ lynx kill found
☐ dead lynx found

4. Is the lynx occurrence/observation in your area:

☐ stable at high density
☐ increasing ☐ stable at low density ☐ decreasing

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Yearly inquiry of game wardens in CH



Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

- It allows a quick and easy overview of the total distribution area
- Gaps in the lynx distribution area
- Gaps in the monitoring system
- Information on relative density and population trends
- Information on reproduction
- Important for the control of the interpretation of the passive monitoring and to adjust the monitoring if gaps have been identified

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into an active monitoring system:

1) Periodical inquiries
2) Track transect

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Methods:

- Lynx tracks are searched in the snow along forest roads, paths or pred-defined transect lines.
- The survey is made 2-3 days after snowfall
- The number of lynx tracks crossing the transect lines and their direction is recorded
- All tracks are mapped and mesured
- Double counting is avoided by backtracking all tracks or by ensuring that at least one transect without tracks lies between two transects with tracks
- Transect routes can either be positioned randomly or according to a strict pattern
- They should be placed in good lynx habitat and consider the movement pattern of lynx

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

- Presence/absence of lynx tracks on survey routes
- Minimum estimations
- Comparisons between transects or years strongly depend on the variability of the weather conditions

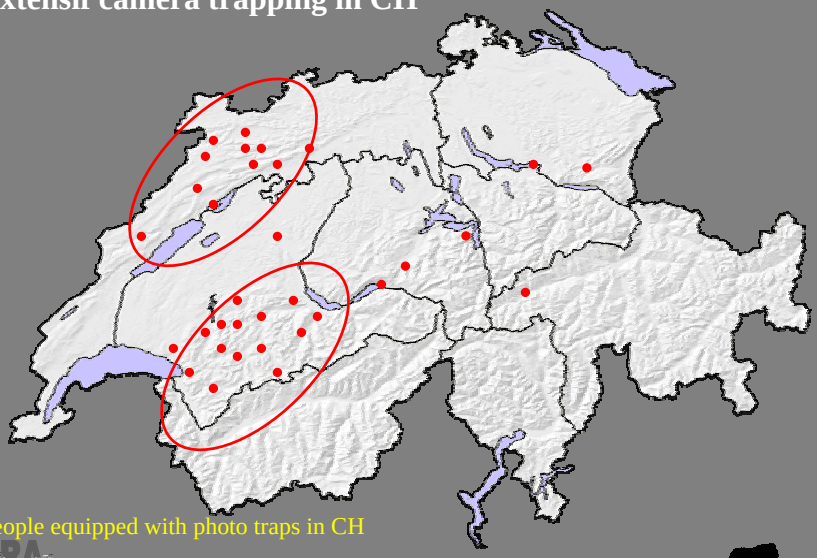
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into an active monitoring system:

1) Periodical inquiries
2) Track transect
3) Camera trapping (intensive & extensive)

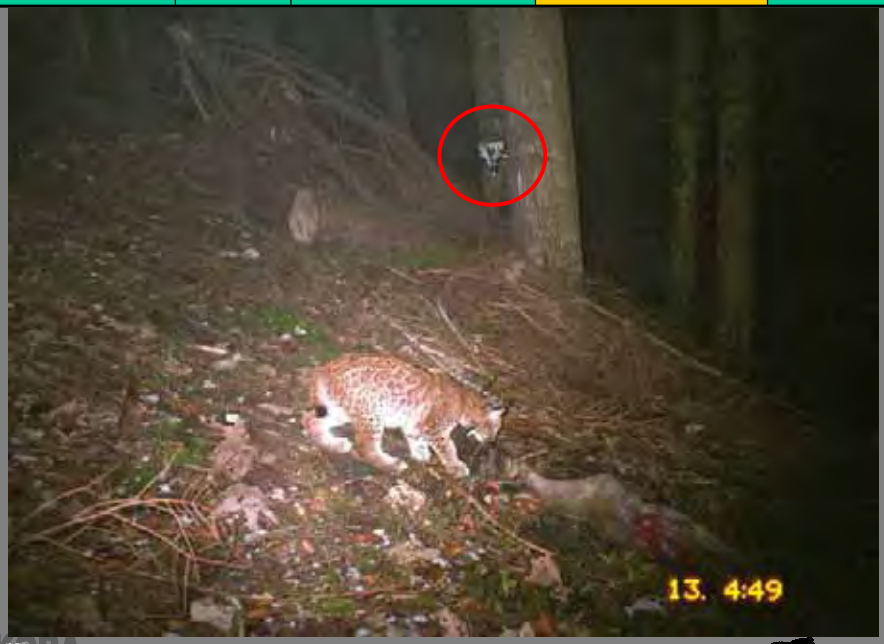
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Extensif camera trapping in CH



• People equipped with photo traps in CH

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting



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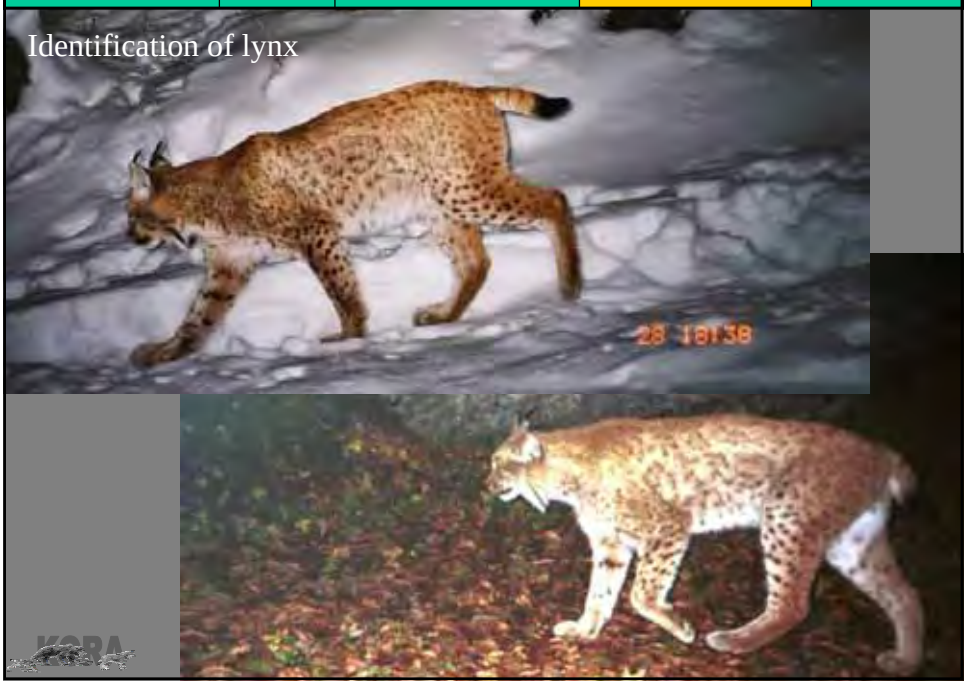
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Identification of lynx



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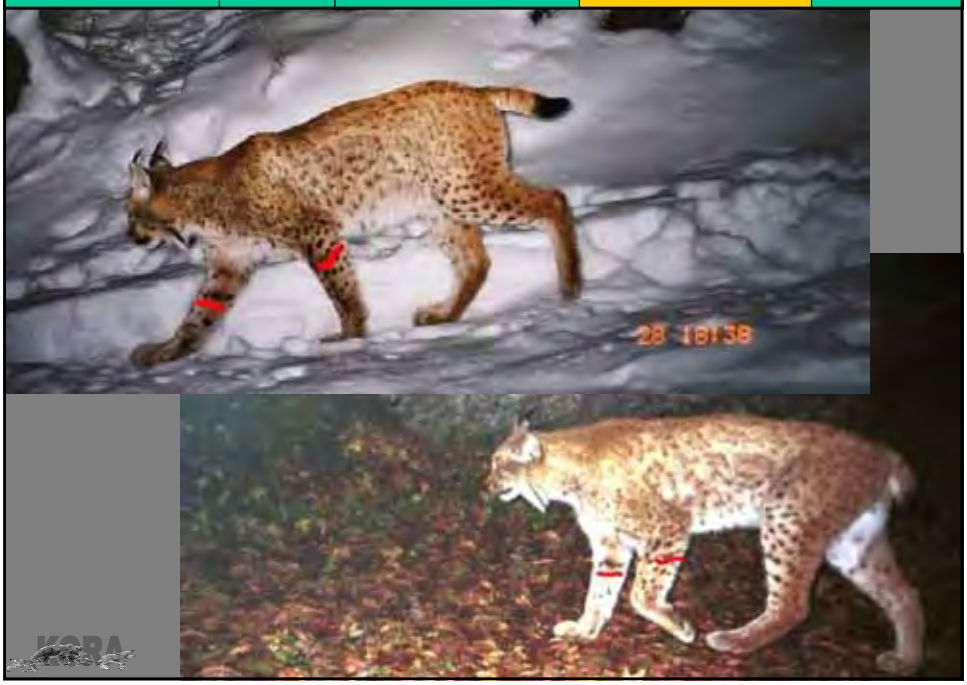

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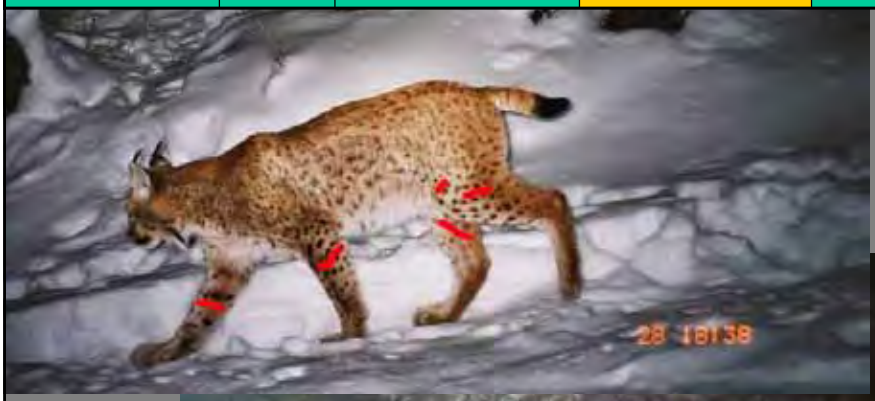
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting



Code:
U = could not be identified
L = only left flank
R = only right flank
B = both flanks

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

- C1 data SCALP criteria
- Minimum number of lynx present in the area
- Confirm the presence of the species in a new area (hard facts)
- Information about reproduction
- Anecdotic information about dispersal
- Anecdotic information about spatial use
- Survival and population trend if conducted over several years
- Enables to collect pictures of both flanks of the individuals (important in case an intensive session is planed in the futur)

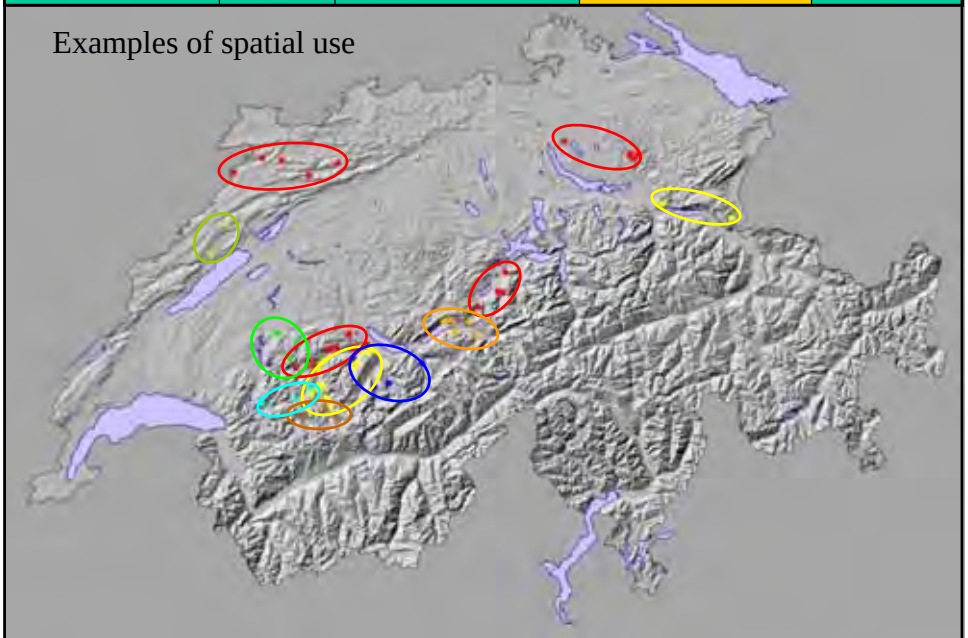
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Minimum number of lynx pictured

Compartiment	2002	2003	2004
I Jura	4-5 (+2 juv.)	5 (+4 juv.)	4
II North-eastern CH	0	4	1
III Central CH West	0	1-2	3
IV Central CH East	0	0	0
V Grisons	2	0	0
VI North-western CH Alpes	18-21 (+6 juv.)	17-20 (+1 juv).	18-19 (+10 juv.)
VII Valais	0	0	(1 juv.)
VIII Ticino	0	0	0
Total	24-28 (+8 juv.)	27-32 (+5 juv.)	26-27 (+11 juv.)

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Examples of spatial use



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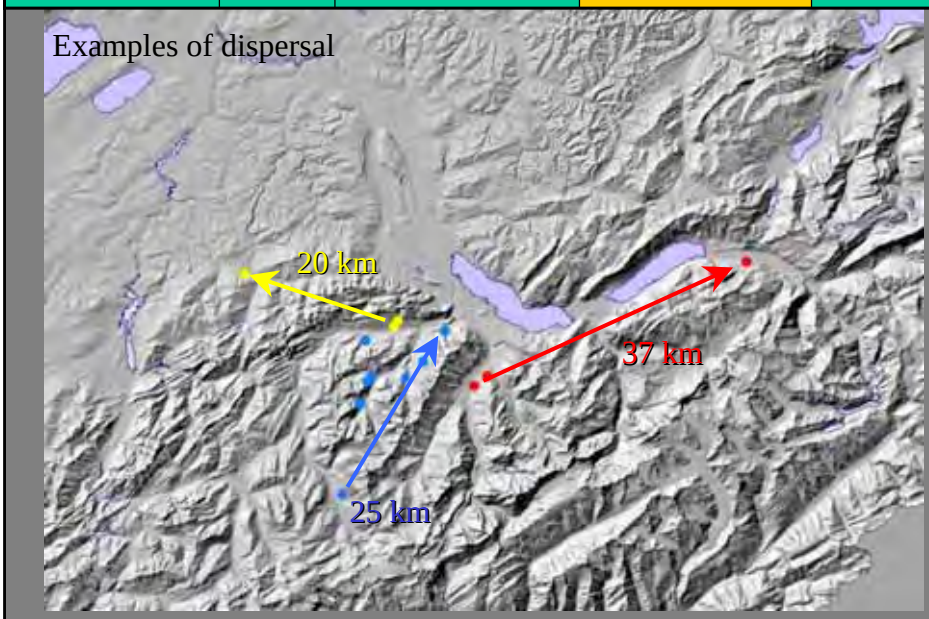


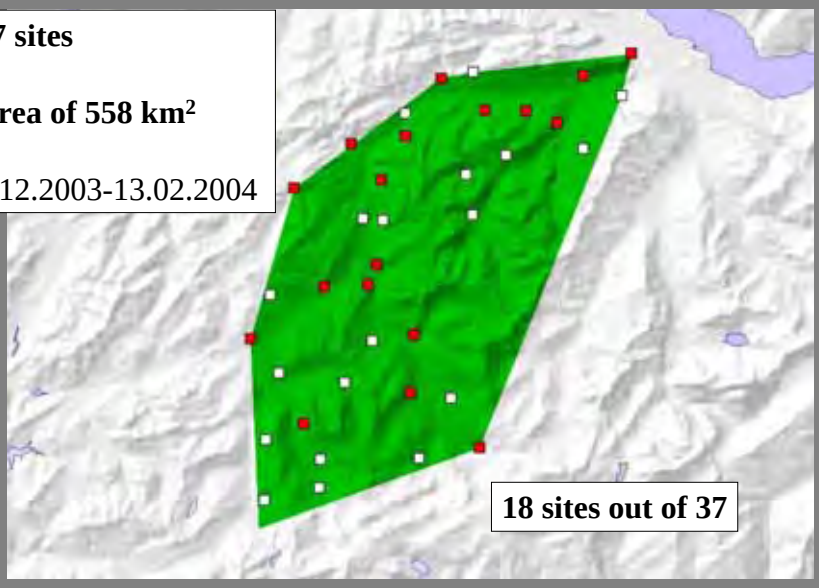
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

37 sites

Area of 558 km²

3.12.2003-13.02.2004

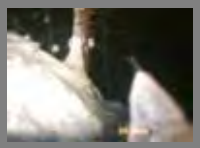


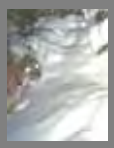
18 sites out of 37

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

- 35 lynx pictures

- 3 of them could not be clearly identified





- both side of the lynx could be pictured in 49% of the cases

- The combination of pictures from the extensive session and the slaves enable to identify both flanks of 11 individuals out of 12

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Interpretation of the data:

- Provides a population and density estimation with a confidence interval
- If the confidence interval is to high (small sample size) than it is still possible to estimate a minimum number of individuals in the study area
- If conducted over several years it gives an excellent indication of the population trend, enable to estimate survival rates, and rate of population change
- Information such as reproduction; spatial use, and last but not least information about other species than lynx

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Information to be integrated into an active monitoring system:

1) Periodical inquiries
2) Track transect
3) Camera trapping (intensive & extensive)

} Non invasive methodes

4) Captures and telemetry (VHF, GPS/GSM)

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Captures: footsnares (Breitenmoser 1989)

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Captures: MICS (Ryser et al. 2005)

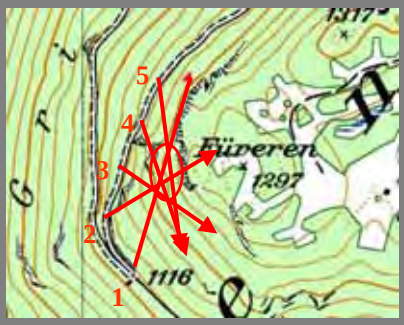
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Captures: box traps (Haller & Breitenmoser 1986)

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Radio-telemetry:



Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Absolute abundance
(Eurasian lynx)
Radio-telemetry, camera trapping

Polygons: Home ranges resident **males**, females
Lynx symbols: Resident **males**, females confirmed presence (C1, C2), camera trapping
Footprints: **Males**, females asumed from indirect observations

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Telemetry studies:

Radio telemetry is the most efficient way to study the biology and ecology of the lynx in the field. Only the aspects of direct importance for the monitoring area outlined

- Provides information that can be used to calibrate the results of the monitoring
- Enables to optimise the design of monitoring programmes
- The resulting home range and population density can be used to estimate the population size or regional abundance from the relative values gained with the monitoring programme

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Online damage statistics

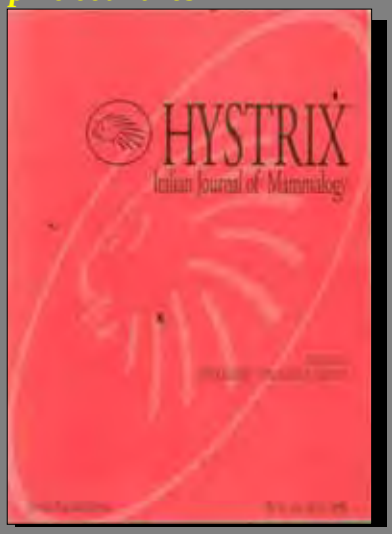
Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Switzerland

Explications

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Alpine countries



Hystrix 10(1), 1998

Period: from the re-introduction until 1995

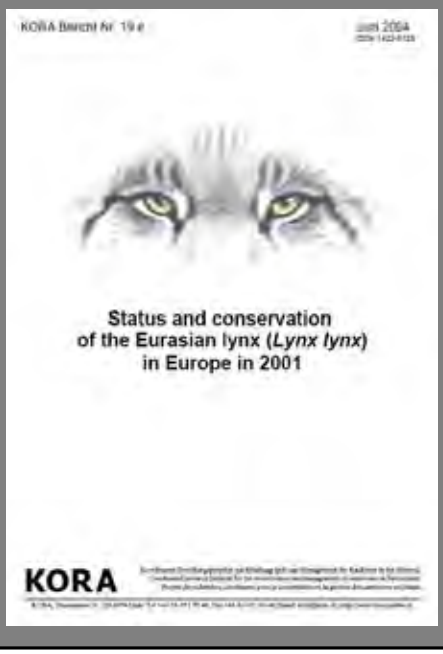
Hystrix 12(2), 2001

Period: from 1995 until 1999

Monitoring type	Analysis	Passive monitoring	Active monitoring	Reporting

Europe

ELOIS



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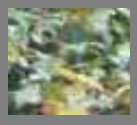

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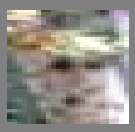

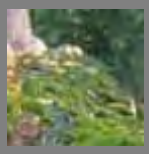

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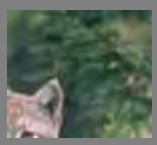

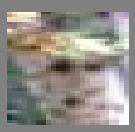

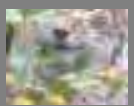

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