

FIELD RESEARCH: JUSTIFICATION AND RESULTS



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Outline of talk:

- Why is wildlife research needed?
- Short background for use of radiotelemetry
- Examples from earlier and ongoing studies
 - Research on large carnivores; Scandinavian wolf population
 - Research on small game; effects of harvesting and windmills on willow ptarmigan populations
- Conclusion

Why is wildlife research needed?

- To have knowledge necessary to perform an optimal management of wildlife species we need to know, among other things:
 - Population size (harvestable or endangered)
 - Habitat choice and home range size
 - Reproductive biology (age, litter size, sex ratio)
 - Survival and mortality pattern
- There is a continuous demand from managers, politicians and the public for information with a high level of precision; especially for species of positive economic value (e.g. game species) and negative economic value (e.g. large carnivores).
- To meet this challenge, wildlife scientists have continuously used new technology, as e.g. radiotelemetry, remote sensing, DNA-techniques etc.

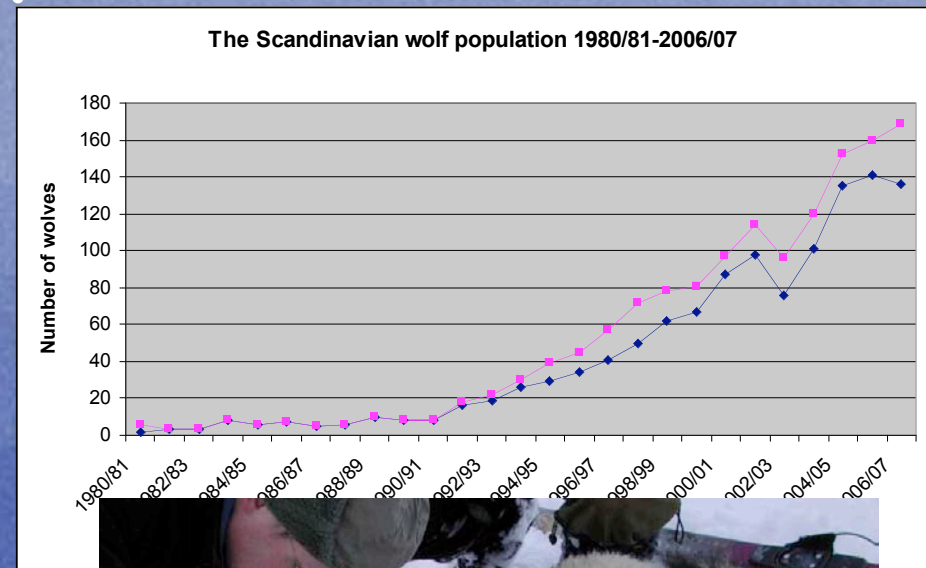


Background for use of radiotelemetry

- Started using radiotelemetry in small game research in mid 1970s (using back-pack mounts in tetraonids)
- Continuously developed new transmitters; longer battery life, lighter, smaller, necklace mounts (tetraonids)
- Given reliable information especially about habitat use, home range size, dispersal, survival/mortality and reproduction
- Several tests of possible negative effects of radiotags in e.g. tetraonids publ. from 1979 to 2007. Majority concludes with no measurable negative effects on survival, reproduction and behaviour
- Only transmitters weighing $\leq 2\%$ of body weight used. Limits use of e.g. GPS-trans. of small game etc.
- Combination of DNA-technology and radiotelemetry gives promising results for the future
- Always been a focus on possible negative effects of transmitters - wildlife biologists in fact do care about the welfare of their study animals!

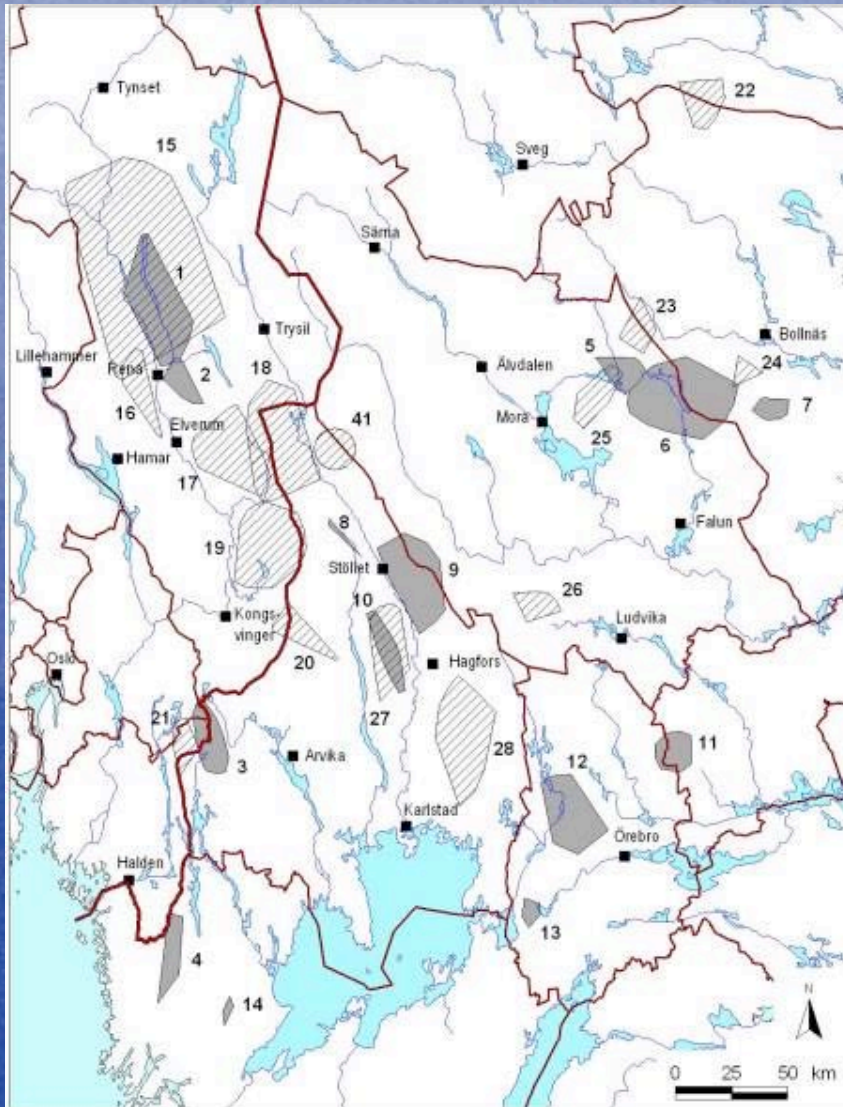
Examples from research on the Scandinavian wolf population

- Protected in 1966 in Sweden and 1972 in Norway - still endangered
- Radiotagging started 1998 - VHF transm. until 2003, only GPS later
- Radiotagged in total 125 wolves (87 new and 38 recap.)
- In 2008 no wolves radiotagged in Norway, primarily due to bad snow conditions but also to lack of a permit from NARA
- Annually 5-10 territories, <10% of individuals in total pop., primarily pack leaders, few pups
- In media often presented as a large part of the wolf population is radiotagged - not correct
- DNA-analyses from radiotagged and dead wolves, and from faeces, hair and oestrus blood



February 12, 2001: GPS on male

Examples from research on the Scandinavian wolf population



- Present Norwegian wolf management;
- Zoning with management goal of 3 annual reproductions within zone
 - Packs > 50% of home range inside zone counts in national goal
 - Packs < 100% of home range in Norway do not count in national goal
 - A precise monitoring of the population and its home range is crucial for a successful management
 - A precise mapping of home range size and area use requires radiotelemetry in addition to DNA-analyses and snowtracking
- NINA

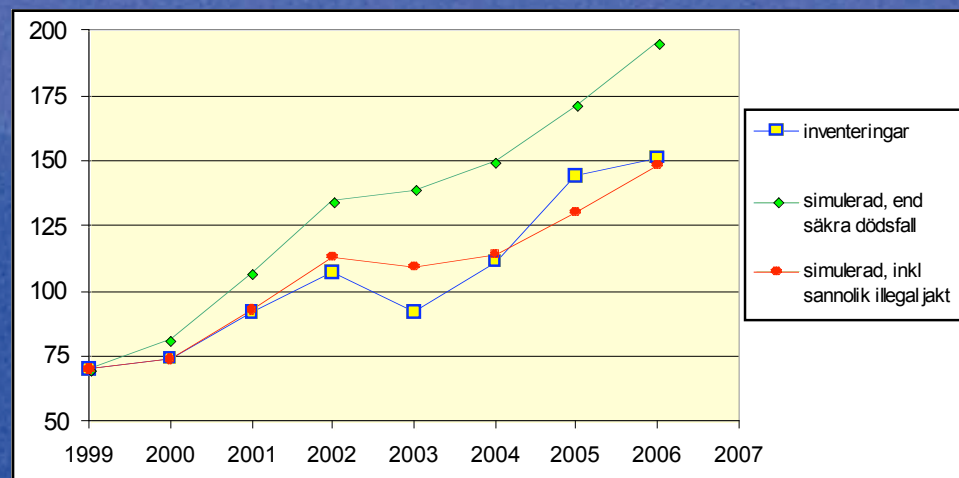
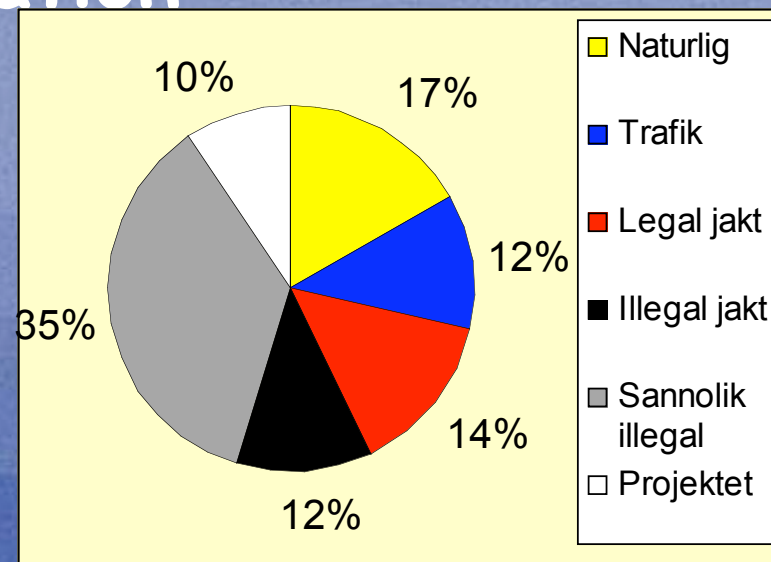
Examples from research on the Scandinavian wolf population

- In population modelling one of the key factors is survival/mortality and the importance of different mortality factors; Accidents, disease, age



Examples from research on the Scandinavian wolf population

- Based on 76 radiotagged wolves during totally 108 "wolf-years" mortality factors was estimated
- Annual mortality was estimated to 30,7%
- Illegal killing was estimated to 16,2% or approx. 50% of the annual mortality
- By using radiotagged individuals this is the first time illegal killing has been quantified
- Illegal killing is at present the most important factor decreasing the population growth in the Scandinavian wolf population, but the population is still increasing



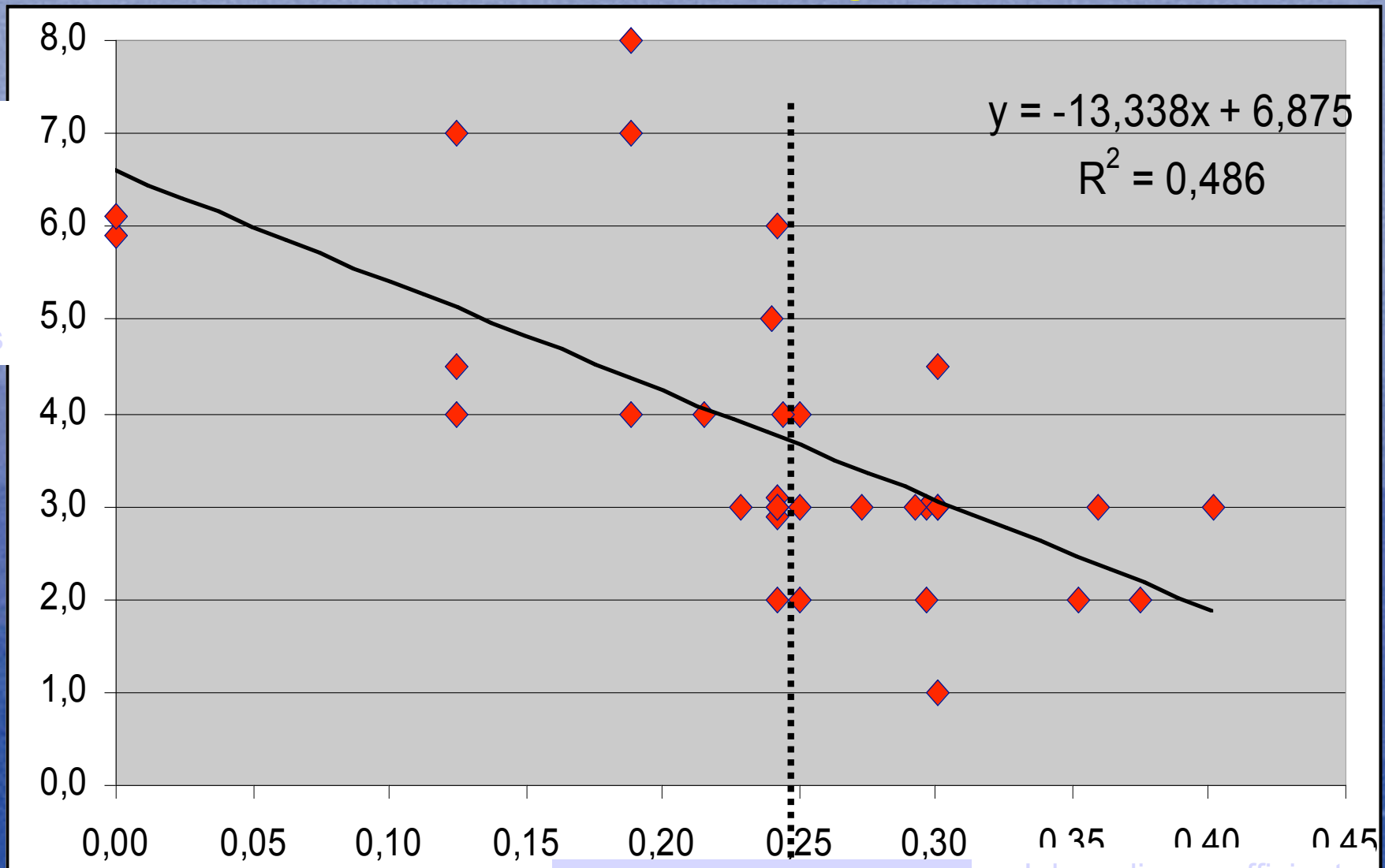
Examples from research on the Scandinavian wolf population

- DNA-analyses are carried out to:
 - Monitor population genetics in Scandinavian wolf population
 - Detect possible inbreeding problems
 - Detect immigration and emmigration
 - Give additional information in population monitor program
 - Detect hybridization with dogs and illegal release of wolves
 - In combination with telemetry studies, snow-tracking and other field studies give data for constructing a pedigree



Winter litter size vs inbreeding

Litter size, first born litters



0,25 corresponds to breeding between full sibs

Inbreeding coefficients

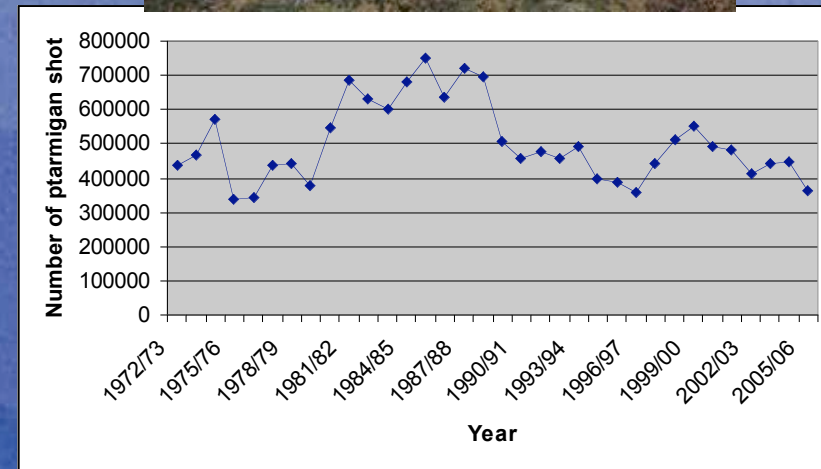


We leave the wolf and look at the willow ptarmigan



Examples from research on willow ptarmigan

- Willow ptarmigan is "the game of the people" in Norway
- Approx. 60 000 - 100 000 people hunt ptarmigan each autumn
- Population size changes and number of shot ptarmigan varies between 300 000 and 750 000
- Hunting mortality has been regarded as unimportant for population changes
- Experimental studies from 1996-2000 using radiotelemetry to a great extent showed that hunting mortality had substantial effects on population changes
- This has resulted in changes in management practice making the harvest more sustainable



Examples from research on willow ptarmigan

- Wind turbines and their effects on birds of great importance
- Willow ptarmigan a suitable terrestrial "model species"
- Smøla willow ptarmigan (*Lagopus l. variegatus*), subspecies with special status
- Radiotelemetry suitable to answer questions about deflection from wind parks, increased mortality due to collisions or predation, behavioural effects etc



Conclusion

- Much of present knowledge about wildlife species such as large carnivores, cervides and small game is due to the use of radiotelemetry
- Wildlife management is to a great extent dependent upon such knowledge
- Radiotelemetry technology is continuously being refined making it more suitable for answering research questions and reducing the possible negative effects on wildlife
- An increase in combining different methods as DNA-analysis, radiotelemetry and other field methods will improve the data collected
- Non-invasive methods like DNA-analysis cannot however replace the use of radiotelemetry
- The 3 Rs
 - Replace; At present time not possible
 - Reduce; With improved technology it is possible to reduce the number of individuals instrumented
 - Refine; The techniques are continuously improved and thus refined



Thank you