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Abstract
International evaluation of Finnish schemes for monitoring game and wildlife populations made by Professor Kjell Danell (Department of Animal Ecology, Swedish University of Agricultural Sciences, Umeå, Sweden) and Professor Bernt-Erik Sæther (Norwegian Institute for Nature Research, Trondheim, Norway).

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International evaluation of the monitoring schemes for game and wildlife in Finland

Preface

According to the mutual negotiations of the Ministry of Agriculture and Forestry (Department of Fisheries and Game) and the Finnish Game and Fisheries Research Institute (FGFRI) it was decided that one of the key tasks of the Institute for 1995 is the international evaluation of the game and wildlife monitoring schemes; their scientific soundness, reliability and applicability, and the need for further development.

I was appointed by the Finnish Game and Fisheries Research Institute as the responsible organizer of the international evaluation. My task was to contact prominent foreign scientists for the scientific evaluation, to provide sufficient written and oral presentations from the Finnish scientists to the evaluators for judgement, to organize the evaluation meetings and discussions, and to act as an informative helping hand during the whole procedure.

The Institute was lucky enough to get the two most desired experts in game animal sciences from Scandinavia to carry out the scientific evaluation itself. Professor Kjell Danell (Department of Animal Ecology, Swedish University of Agricultural Sciences, Umeå, Sweden) and Professor Bernt-Erik Sæther (Norwegian Institute for Nature Research (NINA), Trondheim, Norway) are both scientists of high international reputation, and in Scandinavia their position as leading persons in game and wildlife sciences is indisputable. They have the ability to evaluate the relative importance of monitoring schemes and to see monitoring duties also in scientific phrames. I was proud to assist them in their task, but concerning the evaluation report itself Professors Danell and Sæther are completely responsible of its content.

Harto Lindén
Organizer in charge

General background and procedures

The role of biological monitoring

During recent years monitoring of animal and plant populations has in most countries become an important task. One reason is to fullfil the recommendations set in Agenda 21, and another reason is to study the impact of environmental changes, e.g. climatic changes or changes in the landscape composition, on the probability of survival of individual species as well as on the composition of species diversity in general.

The general evolution of monitoring of game and wildlife

For animal species that are hunted or in some way interact with game species there are high demands for reliable monitoring programmes. Accurate information on population size and harvest level is needed so that the concept of "wise use" can be followed. This is specially important within the EU-community where we can foresee an increased demand for detailed information especially relating to game populations and their use.We expect that the economic value of game will increase and thereby the demand for additional knowledge on the size and composition of game populations and the factors affecting their fluctuations in number. This means that population estimates alone are not sufficient , but an integrated surveillance system into which harvest data is incorporated are needed for a sustainable use of such populations.

Furthermore, there is an ongoing trend, at least in the Nordic countries, to move the implementation of game and wildlife management decisions from central to lower levels of the management organisation. This means that the central organisations form more general goals and the local authorities will transform these goals into more detailed regulations. By this change the information on population sizes etc. will be needed on quite a small geographical scale. In order to produce suitable information at such a local scale higher sampling effort is needed. Further, the simple fact that the information will be utilized by a larger group of people will result in higher demands on the result presentation from the monitoring projects, and also generate a higher need for training of decision makers.

In most countries, long-term infomation on game and wildlife was until quite recently collected by individual researchers within their projects, which often had a long time perspective. The international trend with funding mainly of short-term research project has almost eliminated this possibililty. The responsibility for the monitoring programmes has therefore been taken over by other more permanent structures, e.g. research institutes.

Monitoring of game and wildlife in Finland

The official Finnish game research was founded during the Second World War, and very soon the research policy was created under the leadership of Professor Lauri Siivonen. From the very beginning the need of monitoring game populations was seen as one of the key tasks of the research institute. After the war, the "discipline" in the hunter chorus was high, and the hunters eagerly volunteered to assist the research, e.g. in censusing game populations. The field stations provided rich information to local hunters and hunting organizations in the province, and very soon hunters adopted the assisting of the research to become an essential part of their hunting practice. The most important game animal groups were included in some type of monitoring or research programmes. Different organizations of hunters have always been in close cooperation with the researchers when new monitoring programmes have been initiated. Nowadays, more than ten thousand hunters take each year part in some research programme on a voluntary basis.

In the field of monitoring of game and wildlife Finland has an outstanding international position because of the long history of monitoring programmes and the high number of hunters participating on a non-paid basis. We hypothetize that this high dependence of volountary assistance has given the Finnish model an innate strength by creating monitoring schemes that will stand the critisism of many well-experienced field oriented people and by creating rapid feed-back systems to the observers. We think that Finland by this position has a special responsibility to further develop and refine monitoring programmes for game and wildlife. This work will be highly appreciated within the international community of managers and scientists within e.g. the European community.

Criteria for the evaluation

For the task given us to evaluate the Finnish game and wildlife monitoring schemes we have used the following criteria:

1. Ability of the scheme to document changes in population sizes or trends: representativeness of study sites; inclusion of all possible variation; sufficient sample size; persistance of sample plots etc.
2. Methodological soundness: small biases in estimates of population sizes or trends in relation to overall variation; check for accuracy; calibration to independent methods.
3. Relevance to wildlife management procedures: appropriateness for management tasks at various levels; presentation of data at the relevant time; degree of user-oriented presentation of results.
4. Possibility to explain population changes: appropriateness of data collected for foundation of hypotheses on causal mechanisms for population changes.
5. Research cooperation: level of national and international cooperation within as well as between other related research fields so that rapid assistance can be utilized in explaining population changes and to stimulate the use of the collected data for other purposes, e.g. studies of general ecological problems.

Procedure of the evaluation

Information consisting of descriptions of methods, methodological studies and study reports based on monitoring data was sent to the evaluators seven weeks before the evaluation week. During the evaluation week oral presentations were given by Research Director Eero Helle (about the coverage of game monitoring in Finland, and about the role of monitoring in the research and management strategies), and the researchers responsible for each field (seabirds - Martti Hario, wildlife triangles - Pekka Helle and Marcus Wikman, moose - Tuire Nygrén, large carnivores - Erik S. Nyholm, seals - Eero Helle, game inquiries - Kaarina Kauhala, and waterfowls - Hannu Pöysä). After each presentation there was a clarifying discussion between the scientist and the committee. The evaluators have written the report, except the description of the various monitoring schemes (presented as a background in each of the chapters) which has been compiled by Harto Lindén based on information given by the responsible researchers. The judgments and recommendations are completely the product of the two evaluators.

Specific evaluation of the different schemes

Seabirds

Description (by Martti Hario):

There is a long tradition in surveying seabird colonies along the Finnish coast. However, basic knowledge is based on only seven core areas where extensive counts of breeding birds have been conducted with similar, standardized procedures for several decades. Present "Archipelago Birds Census", conducted together by the Finnish Game and Fisheries Research Insitute and Zoological Museum of the University of Helsinki, aims to monitor changes in size of the breeding stocks of bird fauna in 18 areas totalling 500-600 islands (i.e. <1% of the entire Finnish archipelago). There are also nation-wide species-specific monitoring projects for the Arctic Skua, the Lesser black-backed Gull, and for alcids (irregularly), and an pan-Baltic monitoring on Caspian Terns.

Field work is done by amateur ornithologists and bird ringers. So far, hunters have not been participating , although FGFRI should see its interests in activating them. Most data are filed at the Zoological Museum. Several smaller data sets are situated at different institutions, mostly in non-computerized form (e.g. in various levels of regional administration, National Board of Waters and Environment, private persons etc.). All in all c. 6000 islands have been monitored to various extent during the 1980s.

International and national cooperation: National Environmental Research Institute (Denmark), University of Helsinki, College of Veterinary Medicine, Helsinki

Evaluation

The ability to document population trends

The seabird monitoring programme covers several species,and is geographically restricted mainly to the Gulf of Finland. The major effort is concentrated to following the development of the eider population at the Söderskär bird sanctuary. Here the population size has been precisely estimated over a period of 40 years, in addition to collecting data on several aspects of the reproductive biology of many seabird species. This unique dataset has enabled a very detailed understanding of the factors

governing the increase of the eider populations in this part of Finland. The representativity of the population fluctuations at Söderskär is checked with counts of other populations as well.

Annual counts are also conducted of the breeding populations of other species in selected archipelago areas. Some of these counts go 40 years back in time and provide an important and valuable baseline for examining the impact of human-induced changes on the marine ecosystem in this area. In addition, they provide documentation of the extent of decrease of the Baltic caspian tern and lesser black-backed gull populations in this area.

Methodological soundness

The concentration of the eider duck effort to Söderskär seems to be very wise, because in such a longlived bird it is important to have precise information about several parameters such as population size, recruitment rate and adult survival rate. Small changes in some demographic variables may have large consequences for the population fluctuations and it is therefore important to have small standard error in the estimates. This requires large sample sizes, which is only possible to obtain within a realistic amount of resources only for one population.

For most of the other seabird species the counts occur in a very standardized way, securing comparatibility betwen years. We are, however, concerned about changes in the populations of the alcids: they will not be discovered until at a very late stage due to the low turnover of individuals of these longlived species. We would therefore recommend a greater use of individually colour-ringed birds in these species, in order to detect changes in adult survival rate.

The use in management

The data of the population trends have been published in regular reports and have also on several occasions been summarized in a popular way. This information will give the Finnish environmental management agencies a unique possibility to document changes in the marine environment.

The possibility for detecting the mechanism behind population trends

The long-term datasets have provided an important baseline for explaining the mechanism behind the decline in seabird numbers recorded the last few years. In particular, the eider study with its detailed monitoring of variation in different demographic variables could already at an early stage of the decline be used to examine the explanatory power of several hypothesis suggested for the decrease.

Research cooperation

The data may provide important insight into population biological processes of seabirds, which can only be fully utilized by establishing links to other research

groups both nationally and internationally. Although some cooperation is already ongoing for instance with veterinarians, development of a closer relationship also with other research groups, e.g. in population ecology is strongly encouraged.

Conclusions

The monitoring scheme of seabirds provides an important and very valuable tool for both managing and conserving Finnish seabirds. With some smaller adjustment it has the potential to be an important indicator of changes in the marine ecosystem and to give insight into very general population biological processes of these species which in many respects are very hard-studied.

Wildlife triangles

Description (by Pekka Helle):

Based on earlier experience on grouse brood censuses in August, a new monitoring scheme was launched in Finland in 1988, as a joint project of the Finnish Game and Fisheries Research Institute and the Hunters' Central Organization. The new program was initiated because the former routes covered 'best' habitats only, and they were not permanent but changed from year to year. In the new scheme the routes are permanent and fairly randomly distributed. The basic unit in the monitoring network is an equilateral triangle of 12 km in length. The number of triangles is about 1500, and about 7000 voluntary hunters take care of the field work.

Grouse are counted in the August census by a three-man team, which covers a belt 60 m wide, along the perimeter of the triangle. The census efficiency is about 80 %, and the results are expressed in individuals per km^2 forest land. Some additional species are covered in the August census. In the winter census the tracks of mammals crossing the sides of the triangle are counted after a snowfall or prechecking of the census route. More than 20 mammalian species active in winter are covered. Also observations of grouse and some other species are recorded. Mammal abundances are calculated as relative densities, i.e. number of crossings/24h/10 km. Every observation in both censuses is located on a map.

Three reports on census results are prepared annually and they are delivered to census-takers, hunting associations and other hunting authorities. The August results are reported as soon as possible (by the end of August) in order to give up-to-date information for planning of hunting which usually starts on 10 September. Hunting bag recommendations are also given in this report. Report of the winter census is produced in late spring/early summer. The third annual report is delivered during summer and gives predictions of grouse densities in the coming autumn. This information is desired and needed in making hunting plans in good advance. Predicting is possible because of regularities in fluctuations of grouse populations.

Results of wildlife triangle censuses are used in addition to routine monitoring purposes widely in research. Many special research projects are co-operation studies with other research institutes and universities. The two largest ones concentrate on the importance of forest structure and landscape characteristics on wildlife. One of them is a joint project with institutes of Russian Karelia where similar winter counts are performed as in Finland. The other project, run together with the Finnish Forest Research Institute, deals with satellite-based forest inventory data and located game observations making use of Geographic Information Systems.

International and national cooperation: Karelian Research Center of the Russian Academy of Sciences (Petrozavodsk), University of Minnesota (Duluth), Finnish Forest Research Institute, University of Jyväskylä and University of Turku.

Evaluation

The ability to document population trends

The present design of the wildlife triangle system is very good. The methods used are appropriate and carefully developed. A tremendous amount of data is obtained at low cost.

The design with a great proportion of permanent survey belts gives good possibilities to estimate between-year variations and to correlate the findings to habitat data. Because of the high sampling effort, this monitoring system will provide accurate information also on regional scales.

Methodological soundness

Every new method proposed will be subject to critisism in its early phase. In this respect the wildlife triangle system is no exception. Due to several efforts to cross-check the triangle method with other methods available, the new method has gained scientifically creditability, both nationally and internationally. We are convinced that these efforts to evaluate and refine the method will continue. For example, the ambition to apply newly developed statistical methods is also greatly appreciated.

Winter surveys produce information on numbers of tracks/time/distance. It is, at least in theory, possible to convert this information to absolute numbers. Hower, detailed information on the trail length per time unit for each species is needed. Most likely these figures will vary between regions, snow conditions and years. Therefore a great effort is needed to convert all winter estimates to accurate, absolute density figures. At present, we only recommend this development on a small scale and within specific research projects.

The use in management

Annual data on animal densities is needed for the management of e.g. grouse populations and the wildlife triangle method is for this purpose a valuable tool. In the future we would like to see a linkage of triangle data to harvest data in order to make the management of the game populations even more efficient.

The triangle data collected is rapidly processed and feed-back is given to the observers as well as managers in the different districts. However, the data processing before the opening of e.g. the grouse season has to be done within a relatively short time, where every day is important. In order to speed up the transfer of the recommendations to the users we suggest that electronic transfer (e.g. e-mail) of the information should be tried.

The possibility for detecting the mechanism behind population trends

The wildlife triangle system gives mainly estimates on numbers of animals seen or numbers of tracks recorded. For e.g. grouse estimates on the proportion of young birds in the total count is also given. Over all, the strength of the wildlife triangle

system lies in the possibility to detect changes in population trends, not in explaining them. We recommend that detailed monitoring of demographic variables for the different species are performed within special research projects, when needed.

Research cooperation

The surveys made in western Russia have produced a quite unique database, which combined with the Finnish censuses will make studies on the importance of different habitat characteristics possible. The great contrast in forest structure and other habitat characteristics between the two countries will provide a basis for interesting evaluations of habitat selection by the most abundant species.The linkage of wildlife data to satellite images through GIS-systems is a promising approach.

Conclusions

The wildlife triangle system provides an important tool for monitoring and management of many game species in Finland. We recommend that it even in the future will be the "backbone" of the Finnish wildlife monitoring system. A critical link in this monitoring scheme as well in all other voluntary based observation systems is the motivation of the observers and their persistance in time. We recommend annual estimates of e.g. the turnover of surveyed triangles and a plan for measures to be taken if the continuity level decreases.

There is now and then criticism to systems in which hunters themselves are collecting information that later will be used for e.g. determining hunting quotas. In order to keep the creditibility at a high level we suggest some further security tests as an addition to the one already existing, e.g. by performing parallell estimates and by having the information available for evaluation by independent groups.

Moose

Description (by Tuire Nygrén):

The main goal of the moose monitoring scheme is to produce yearly information on the status of the moose population and to predict the development before the next hunting season. After the game management districts have decided the hunting quotas up to the present goals, the recommendations for selective hunting are made simultaneously. All the estimates, predictions and recommendations are given for each moose management area (51 areas in Finland). The winter densities are determined by combining information from several different types of censuses and from moose observation cards giving the number of living moose on the hunting ground after the harvest.

The structure of the moose population is studied by utilizing moose sighting reports (from moose observation cards). In addition, hunting statistics, population information from previous years and retrospective calculations are used when estimating the present status of the population. After the status determination, the effects of dispersal on the population development are judged, and the structure of the adult population, the calf productivity, and the sex ratio of calves are predicted. Based on these information and utilizing the simulation model, the alternative recommendations for hunting quotas are computed to stabilize or change the present population size. The recommendations for the selective hunting are calculated, respectively. All the recommendations and status information are presented to the game management districts to support the decision-making in controlling the population fluctuations.

International and national cooperation: Different hunting organizations in Finland.

Evaluation

The ability to document population trends

Estimation of population trends in moose populations by indirect data collected by hunters is an important management method all over Fennoscandia. The Finnish monitoring scheme is very properly done because all data are handled, analyzed and interpreted by only a few people. In this way, the monitoring scheme has been able to document important changes in the moose populations in different parts of Finland.

A lot of recent research have shown that moose population dynamics are complex, characterized by weak regulatory processes, generating the potential for large fluctuations in population size. A consequence of this is that there may be long time delays from a change in a demographical variable occurs until its effect on population size can be recorded. In particular, changes in the adult mortality among females due to variation in the hunting pressure may have large consequences on the yield, but

may be very difficult to predict. Thus, considering the recent changes in the Finnish moose populations, we believe that the current monitoring scheme is insufficient for predicting the future development of the Finnish moose populations. It will therfore in the near future be very difficult to derive the harvest rates that will give a sustainable use of the Finnish moose populations. Such predictions will be dependent on additional data on the age composition and age-specific fecundity rates of the different moose populations.

We recommend that the current monitoring scheme is continued in a similar way as today, but that it is immediately complemented with data on age-specific demography from most Finnish moose populations.

Methodological soundness

The data are interpreted in a very careful way, taking into account the weaknesses inherent in such indirect population indices based on records provided by the hunters. We recommend that great care is taken in keeping the continuity in both data-handling and interpretation of results, in particular during a time with great changes in the moose populations.

In order to improve the precision in the predictions from hunter-recorders it is important to calibrate the indexes derived from such data to actual population numbers. This will be a laborious task that should involve closer cooperation between the Fennoscandian countries.

The use in management

The moose monitoring scheme has provided rapid recommendations back to the local hunting boards. This information has been crucial for the Finnish moose management.

The possibility for detecting the mechanism behind population trends

The current monitoring scheme has recently documented large decreases in several Finnish moose populations, which in itself are important and crucial knowledge. The current data base will not be sufficient for predicting the future population trends. We strongly recommend that data are collected on age-specific fecundity rates and age composition at least over a three year period.

Research cooperation

A weakness with the Finnish moose monitoring programme is that it has not developed closer relationships to similar work in Sweden and Norway. We recommend that steps should be taken as soon as possible to develop such closer integration, for instance with regard to population modelling. In this way, a more efficient use of the money can be achieved.

Conclusion

The moose monitoring scheme provides an important foundation for the management of the Finnish populations. We are impressed by the cost efficient way these large amounts of data are handled and reported back to the hunters. In order to avoid exhaustion of the people involved we recommend that the relative amount of resources for this task is increased.

The data from the monitoring scheme has documented population fluctuations typical for intensive managed moose populations. In order to control the future population development and avoid a chaotic population dynamics, we strongly recommend that resources are immediately made available for collection of data from shot animals so that age specific mortality and fecundity rates can be estimated.

Moose management is difficult and costly. We believe that it is important that Finnish moose monitoring programmes become more integrated to similar schemes in Norway and Sweden. In this way, the costs may be reduced.

Large carnivores

Description (by Erik S. Nyholm):

Since 1978 the monitoring of large carnivore populations in Finland has been based on close cooperation between the Ministry of Agriculture and Forestry, Hunters' Central Organization, the Frontier Guard of Finland, the Reindeer Herding Association and the Finnish Game and Fisheries Research Institute. Throughout the year 1,500-2,000 field observers in different parts of the country observe large carnivores; there is at least one observer in each of the 297 game management associations.

For the monitoring purposes Finland is divided into four areas: both the northern reindeer herding region and the southern part of the country are each divided into two parts - the western and the eastern part. The predator project receives three times a year (30. April, 30. August and 31. December) filled observation forms from the field observers. The filled forms are annually handled using a special method developed for this purpose. Each observation is carefully checked and then accepted or rejected. Overlapping observations are recognized. Exceptionally large observation numbers in a given area usually need to be checked in the field by the scientist.When calculating the minimum population size the so called correction percentage (coefficient) is used. This percentage is estimated with the aid of special emptying-drive counts, which give reliable population sizes, which again may be compared with the estimates made by field observers. The final estimate of the minimum population size is the counted number corrected with the coefficient.

In Finland the large carnivore populations are estimated annually to find out the trends of the minimum populations, not to give any definite numbers on population size. The results are yearly reported to the authorities deciding on the management of the populations.

International and national cooperation: Karelian Research Center of the Russian Academy of Sciences, hunting and reindeer herding organizations in Finland.

Evaluation

The ability to document population trends

A monitoring scheme pretending to give almost total counts of the population sizes of species in a large country such as Finland is in itself very ambitious. The success of this approach will depend on the ability to gather information from all parts of the country in a standardized way. This scheme has in fact managed to establish an impressive network of recorders which collect data from all parts of the country - in itself a very labourious task. Another requirement for such a monitoring scheme is to

get a representative sample of data and being able to distinguish the records of different individuals from each other. There has, however, been no attempt to examine the accuracy of the ability to identify individuals from data collected by voluntary recorders, for instance against data from radio-collared individuals. Furthermore, it is not known how this ability to recognize individuals will change with changes in population sizes, which in turn may cause differences in social organization among the animals. Such variation in social organization is likely to influence the ranging behaviour of large carnivores.

We believe that the monitoring scheme has provided valuable information on the size of the populations of large carnivores in Finland. However, great care should be taken in interpreting changes in population sizes from this monitoring scheme since they are based on assumptions whose validity is not carefully examined.

Methodological soundness

No examination of the validity of the method is conducted. For instance, there has been no examination of the reporters' ability to detect tracks and to separate different individuals from each other. In Finland, no data have been published on the ranging behaviour of large carnivores, so the size of home ranges are not known. This makes it difficult to relate records to particular individuals in an objective way. A comparison with the results from the wildlife triangle system should provide the possibility for a first examination of the ability of the reporters to detect individuals of large carnivores. Furthermore, a larger proportion of the records should be checked by persons attached to the monitoring scheme, in order to secure similar evaluation of the recordings.

The use in managament

The close connection between the monitoring scheme and large number of reporters have led to a good knowledge about the status of the large carnivores. It would be desirable that the monitoring results as well as management recommendations should be presented widely both to the hunters and to the general public including conservationists.

The possibility for detecting the mechanism behind population trends

The lack of testing the validity of the assumptions makes it difficult to find the mechansims for changes in numbers of Finnish large carnivors from the population indices provided by the monitoring scheme.

Research cooperation

Few links have been developed to other research groups either nationally or internationally.

Conclusions

The large carnivore monitoring scheme has built up a large network of observers which has provided data that allow estimates of the gross population sizes of the large predators in Finland. We recommend that this network is maintained, but more effort should be used to evaluate if the different types of records reflect the actual number of animals in an area. In this way, a more objective way of assessing the population size of those species can be developed. Furthermore, it is important that a larger proportion of the records are checked by a few experienced people in order to get a uniform interpretation of the data.

Seals

Description (by Eero Helle):

There is a great international demand to monitor the population trends of the Baltic seals. In addition, the Helsinki Commission has recommended in 1988 that there should be a ban on hunting, and it should be maintained until a normal reproduction and health status can be scientifically shown. These facts are the background for the monitoring, which includes the population size and health status of the Baltic seals.

The grey seal is surveyed from small skerries in the outermost archipelago in May-July, when seals are intensively hauling-out on land during the molt. Two methods have been used: boat censuses and aerial surveys coupled with photography. A common time schedule has been adopted internationally to avoid doublecounting. Monitoring the numbers of grey seals has been carried out under WWF Finland, with FGFRI being involved as one of the partners. Molting ringed seals are surveyed from aircrafts flying over the ice in spring. Three areas are of main interest: the Gulfs of Bothnia, Finland and Riga. Since 1975, the ringed seal population of the Gulf of Bothnia has been monitored by a low-altitude aerial survey. In the Gulf of Riga, FGFRI has participated in an international effort (with Swedish, Estonian and Russian scientists) to census ringed seals, starting in 1994. A corresponding trial has been under way for the Russian waters in the Gulf of Finland, but without a satisfactory success so far.

The monitoring of the unique health status of the Baltic seals has been based on two sets of autopsy material in Finland: first, seals drowned in fishing gear or found dead on shore, and second, specimens sampled specifically for this research purpose. Both sets of material has been studied in cooperation with the National Veterinary and Food Institute. Several hundreds of seals from fishing gear and those found dead have been studied both in Finland (and Sweden). A general view on the pathology and causes of death have been recorded. Sampling of ringed seals has been carried out in the Bothnian Bay since 1989 (4-10 spec. annually) and started for the grey seal in 1995 (10-15 spec. annually). This material is well representative in regard to age stucture and it offers excellent material for pathological and physiological sampling.

International and national cooperation: National Veterinary and Food Institute (Helsinki), WWF Finland, WWF contacts in the Baltic countries.

Evaluation

The ability to document population trends

The data collection is concentrated to some core areas along the coast. With increasing seal populations we may expect that the seals will spread outside the core

areas and the relative abundance within the core areas decreases. At given time intervals nationwide monitoring will be needed to evaluate the present concept of core areas and the relative proportion of animals that are found in these areas.

Methodological soundness

The present design for monitoring scheme of grey seal and ringed seal is very good. The methods used are appropriate and carefully developed.

The programme for checking the health status of seals is also appropriate. We are especially positive to the development from a more passive scheme, in which only specimens found dead (often very young or very old individuals) were analysed, to the present, active programme in which live animals of different age classes are collected. The approach to compare the health status of ringed seals within the Bothnian Bay with seals from areas less affected by human impact (i.e. Svalbard) is valuable.

The use in management

This monitoring scheme has a strong relevance to the HELCOM recommendation of 1988, which clearly states a responsibilty for monitoring the size and health status of the seal populations.

The possibility for detecting the mechanism behind population trends

The present design, including health status monitoring, will permit possibilities to test some major hypotheses on the mechanisms behind future population changes.

Research cooperation

The seal populations are shared between different countries. We greatly appreciate the joint efforts, especially between Finland and Sweden, to monitor the seal populations, to compare population estimates and to cross-check information collected by different methods. We recommend further work along these lines, especially as regards the development of a common method for airborne monitoring of ringed seals in the Bothnian Bay.

Conclusions

The monitoring programme for seals is of an overall high quality, which gives valuable data to a low cost. We strongly support continuation according to the present schedule.

Game inquiries

Description (by Kaarina Kauhala):

Game inquiries have been carried out since 1945. Observers (mean: 473/year) give their opinions about the occurrence and abundance of different game species (including wild berries) in their observation area; they estimate the abundance as: 0 = absent, 1 = rare, 2 = common and 3 = abundant. *Frequency of occurrence* (FO) and *abundance index* (AI) are then calculated for each province and each year. FO gives the proportion of observers who report that the species is found in the area. AI gives the relative abundance of the species (minimum = 0, maximum = 3).

FO should be quite reliable because it is easy to detect the occurrence of a species in the area. But, AI may be more unreliable, especially when one compares different areas; opinions of the abundance level may differ between areas. Probably AI is more reliable when between-year variation is concerned. But even then it may be problematic: observers may change or opinions of same observers may change during long time periods.

Thus, AI should be used very carefully unless its reliability can be tested in some way. The reliability also depends on the species concerned: species which are commonly hunted, leave many tracks or have dramatic fluctuations in numbers should be easiest. Also the abundance of berries is very easy to detect.

I have used game inquiries in my studies of the raccoon dog, badger, mink and otter. I have used mainly FO because I consider it quite reliable. I have also used AI of raccoon dogs bacause it correlated significantly with the trap index (raccoon dogs trapped/100 trap-nights in September-November). Besides, the raccoon dog should be among the easiest species bacause it is a new species, people are interested in it, and it is commonly hunted. When studying between-year variation I divided the study period into shorter parts in order to avoid the problem caused by changing opinions. I have also used AI of voles and wild berries as independent variables in regression analyses when I examined the variables affecting the between-year variation in AI of raccoon dogs and badgers.

In conclusion, game inquiries provide valuable data if used correctly. In many cases no other data are available. Game inquiries have been carried out for 50 years now, and it is a cheap and easy method.

International and national cooperation: Individual scientists in Finland.

Evaluation

Comments and recommendations

Finland has about 50 years experience with game inquiries. This data set which is collected by a very limited amount of money provide important data on longterm changes in the distribution of several species, and also, for a more limited number of species, information with regard to fluctuations in population size.

Many pitfalls exist in interpretation of such indirect data set. Based on the long experience with this type of material, the data seem to be used in a very careful way, as examplified by the work on raccoon dogs. We recommend that more testing should be done between trends recorded from the questionnaries and the pattern of population fluctuations recorded, for instance, from the wildlife triangles. In this way, more firm conclusions can be drawn on the reliability of the data obtained from the game questionnaries.

The potential use of game inquiries is dependent on the longterm consistency in the data collection. We suggest that more effort should be placed into maintaining the network of reporters, for instance by providing more summarizing reports. In this way, the recruitment of new recorders into the scheme in the future may be facilitated.

Waterfowl

Description (by Hannu Pöysä):

Waterfowl are migratory and spend the most part of the year outside their breeding areas in Finland. Because of this we have a limited control of populations and are not able to give, for instance, reasonable harvest recommendations to manage our breeding populations prudently. Accordingly, the main goal of waterfowl monitoring in Finland is to give yearly estimates of the population status and breeding success of the different species. All waterfowl breeding in inland waters are included but, especially the monitoring of breeding success concentrates on the most important game species as mallard, teal, wigeon and goldeneye. The monitoring of breeding populations was started in 1986 and that of breeding success in 1989. Pair counts are made twice in May-June and brood counts once in June-July. The bird censuses are made mainly by volunteer hunters and ornithologists. The standardized waterfowl point count is the main census method in both censuses. In this method, the observer counts, using binoculars or a telescope, all the birds seen on a predefined sector of water. Fixed census points and sectors are used each year. Census-site network has become denser all the time but, at the level of whole country, has covered all parts of Finland from the first beginning. In 1995, pair counts were made at about 790 sites (218 volunteers) and brood counts at about 580 sites (170). However, because the numbers of pair and brood observations are quite small from different parts of Finland estimates of population status and breeding success are reported only at the level South and North Finland (pair counts) or the whole country (brood counts). Results are reported each year in early August well before the coming hunting season.

International and national cooperation: Zoological Museum of the University of Helsinki, Hunters' Central Organization (Finland).

Evaluation

The ability to document population trends

The waterfowl scheme presented will have good possibilities to detect future population trends at least on the nation level.

Methodological soundness

The present design for monitoring scheme for inland waterfowl is very good. The methods used are appropriate and carefully developed. We appreciate the cooperation between the Finnish Game and Fisheries Institute and the Zoological Museum at the

University of Helsinki by which hunters and non-hunters jointly assist in collection of bird data.

The present level of data collection permit that data is presented for northern and southern Finland, but cannot be presented in a greater detail. We recommend that more effort is taken to increase the number of observers, especially in northernmost Finland. It is of outmost importance to maintain the number of observers and sites investigated and to keep the turnover rate of these at a low level. In order to keep a high quality of especially the brood counts we suggest some efforts for stimulation and quality control of the observers. The data obtained is rapidly processed and a feedback is nicely given to the observers.

The use in management and Research cooperation

At present the information is not used for direct management purposes, but we can foresee a greater interest for fluctuations in population size of European waterfowl species. These populations make up a common resource shared between many countries. Therefore, each country will have the responsibility to obtain estimates on population size, breeding success and mortality, including hunting. For Finland the elements for this task is already existing but we would recommend a synthesis of the information from the different sources, e.g. more detailed knowledge on the wintering areas of Finnish waterfowl. The ongoing, and scientifically productive cooperation with Sweden is a constructive link towards these goals.

Conclusions

The waterfowl monitoring scheme produces high quality data at a low cost. Our overall impression is that the work is of high quality and that it deserves to be continued.

General recommendations

For the different monitoring schemes evaluated above we suggest that special consideration is given to the monitoring programmes for moose and large predators. Here we recommend that the moose monitoring scheme is continued in its present form, but it must be immediately complemented with data on age-specific demography. We suggest that the personel involved with monitoring could concentrate on this task, and that the moose research should proceed with several immediate problems, e.g. calibration of indices, modelling of populations, in a closer cooperation with Scandinavian scientists. We also recommend that the network of large carnivore observers should be maintained, but more attention should be paid to estimate how the records reflect the actual number of predators in a certain area. More detailed suggestions are given under the specific project descriptions.

For the rest of the projects we recommend only minor changes. Our overall impression is that these projects are highly appropriate and need continuous support. We found that the present projects cover the most relevant fields and do not suggest any great changes in the relative priorities between the projects. We are impressed by the overall efficient use of economic resources. A large volume of high quality results is obtained at a relatively low cost.

We are also impressed by the high number of voluntary participants in the different monitoring programmes. In this respect Finland has a long tradition and we hope that this tradition will continue. In order to keep the continuity of observers and inventory sites at a high level we feel that in the future it may be necessary to increase the feed-back to the observators. A greater exchange of information, constructive criticism and ideas may also help to keep the high standard of the voluntary staff. In order to maintain the hunter´s great interest and competence for wildlife monitoring we suggest that the aims and techniques of monitoring are incorporated into different training programmes for the hunters.

We do not support the idea of transferring a greater proportion of the work to other organisations or working groups even if it can be shown that in some cases it may give some short-term economical benefits. Such a transfer may reduce the working load of project leaders but this eventual gain may be lost in the greater time needed for training assisting staff and for quality checks. Further, it is important in order to secure the reliability of the management recommendations that the monitoring data is handled by an independent agency such as the Finnish Game and Fisheries Research Insitute.

Under a budget situation with no expected increase in funding we do not recommend more projects to be included even if we understand that there is a need for monitoring of other species such as e.g. beaver and roe deer. Even under a budget situation with a 25% increase we do not recommend any further inclusion of new projects. Because all projects are working under tight economical restrictions (e.g. not employing extra manpower) we feel that an increased funding would be most efficiently used by strengthening the ongoing monitoring schemes which already cover species of greatest management interest in Finland.

Most individual researchers have broad contact nets with other researchers, institutes and universities inside as well as outside Finland. Our opinion is that a broad contact

area is of high importance for securing the scientific quality of the different projects. We appreciate the open attitude and willingness to share data with other researchers inside as well as outside Finland.

We would like to see more prograduate and graduate students involved in the monitoring projects. There are well established links between the Finnish Game and Fisheries Research Institute and the universities which could be developed even further. As one measure to increase this exchange we suggest special stipends for students participating in the monitoring projects.

Based on our background from Norway and Sweden we have the impression that there is a great similarity between the three Scandinavian countries in the most urgent problems with regard to wildlife management and the methods employed to solve these problems. We recommend more intense communitation between the different countries and the individual researchers. Some developments that are needed are costly and cannot be supported by each country alone. Therefore we recommend discussions on joint projects and shared responsibility for different tasks. We are convinced that such efforts will be regarded as positive measures among the researchers in Finland.

RKTL:n riistaseurantojen kansainvälinen evaluointi (suomenkielinen tiivistelmä)

Riistakantojen runsauden, usein myös kannan rakenteen, seuranta on riistantutkimuksen puolivuosisataisen historian ajan ollut keskeisen tärkeä tehtävä. Seuranta palvelee riistanhoidollista ja metsästyksellistä päätöksentekoa kaikilla tasoilla, toisaalta se antaa biologiselle tutkimukselle perustuen, eräänlaisen kivijalan. Seurantojen tärkeys edellyttää tietenkin myös laadukkuutta. Tämän vuoksi maa- ja metsätalousministeriön ja riista- ja kalatalouden tutkimuslaitoksen välisissä tulosneuvotteluissa päätettiin, että eräs vuoden 1995 tulostavoitteista on riistaseurantojen kansainvälinen tieteellinen evauointi eli arviointi: kansainväliset huippuasiantuntijat arvioivat seurantaohjelmien tieteellisen laadukkuuden, luotettavuuden ja sovellettavuuden sekä tekevät myös kehittämissuosituksia. Tutkimuslaitos määräsi allekirjoittaneen evaluoinnin vastuulliseksi johtajaksi eli hankkeen organisoijaksi.

Tutkimuslaitos voi pitää itseään onnekkaana, sillä onnistuimme hankkimaan kansainvälisiksi asiantuntijoiksi alan johtavat tiedemiehet. Professori Kjell Danell (Sveriges Lantbruksuniversitet, Uumaja, Ruotsi) ja Professori Bernt-Erik Sæther (Norsk Institutt for Naturforskning, Trondheim, Norja) edustavat riistabiologian ehdotonta kansainvälistä kärkeä ja tuntevat lisäksi hyvin skandinaavisen ongelmakentän

Itse tapahtuma oli nelipäiväinen (28.11.-1.12.1996). Arvioitsijoille oli jo kuukausia aikaisemmin toimitettu runsaasti kirjallista aineistoa seurannoista. Tutkimusjohtaja Eero Helle esitteli riistaseurantojen yleistä kattavuutta Suomessa sekä seurannan merkitystä tutkimuksessa ja riistanhoidossa. Vastuulliset tutkijat esittelivät suullisesti omia seurantojaan, niiden tavoitteita, menetelmiä, rajoituksia jne. Kunkin esityksen jälkeen oli perusteellinen keskustelu tutkijan ja arvioitsijoiden välillä. Vastuullisia tutkijoita olivat Martti Hario (saaristolinnut), Pekka Helle ja Marcus Wikman (riistakolmiot), Tuire Nygrén (hirvi), Erik S. Nyholm (suupedot), Eero Helle (hylkeet), Kaarina Kauhala (riistatiedustelut) ja Hannu Pöysä (vesilinnut). Allekirjoittanut osallistui kaikkiin tilaisuuksiin ja keskusteluihin sekä pyrki antamaan taustatietoja ja lisävalaistusta arvioitsijoille. En kuitenkaan millään tavoin osallistunut itse englanninkielisen arviointiraportin sisällölliseen muotoiluun. Itse arviointi, kiitoksineen ja moitteineen, on täydellisesti kahden arvoisan asiantuntijamme käsialaa.

Tämä suomenkieleinen arviointiteksti on tekemäni lyhennelmä englanninkielisestä arviointitekstistä. Tämä ei siis ole suora käännös, vaan yksityiskohtaisempaa informaatiota haluavan pitää tutustua alkuperäisversioon, jota on saatavilla ainakin tutkimuslaitoksesta. Lajikohtaisissa arvioissa olen pyrkinut melko sanatarkasti kääntämään johtopäätöskappaleen, joka on kunkin lajiryhmän viimeisenä (kursivoituna teksitinä). Myöskin viimeinen luku "Yleissuosituksia" on melko tarkka käännös alkuperäistekstistä. Monet painotukset ovat omiani, samoin kuin tulkintavirheet. Lopuksi haluan todeta, että oli suuri ilo ja kunnia saada avustaa asiantuntijoita heidän vaativassa evaluointityössään. Olen vakuuttunut siitä, että riistantutkimus tulee syvällisesti perehtymään tehtyihin ehdotuksiin ja kehittämään seurantojaan entistäkin paremmiksi.

Harto Lindén

Esipuhe

Suomalainen riistantutkimus virallistettiin toisen maailmansodan aikana ja hyvin nopeasti tutkimuspolitiikka luotiin professori Lauri Siivosen johdolla.Alusta pitäen riistakantojen seuranta nähtiin erääksi tutkimuslaitoksen avaintehtäväksi. Sodan jälkeen "kuri" oli korkealla metsästäjäjoukossakin ja metsästäjät innolla avustivat tutkimusta, mm. erilaisissa riista-arvioinneissa. Myöhemmin riistantutkimusasemat ovat toimineet tehokkaina tietokeskuksina maakuntien metsästäjille ja heidän organmisaatioilleen, ja hyvin nopeasti metsästäjät omaksuivatkin riistantutkimuksen avustamisen oleelliseksi osaksi metsästysharrastusta. Kaikki tärkeimmät riistaeläinryhmät sisällytettiin johonkin seuranta- tai tutkimusohjelmaan. Erilaiset metsästäjäjärjestöt ovat aina toimineet läheisessä yhteistyössä tutkijoiden kanssa silloin kun uusia hankkeita on pystytetty. Nykyään yli kymmenen tuhatta metsästäjää osallistuu vuosittain vapaaehtoisena johonkin tutkimustehtävään.

Riistaseurantojen rintamalla Suomi on kansainvälisesti merkittävässä asemassa seurantojen pitkän historian ja vapaaehtoisvoimien tuoman suuren panoksen vuoksi. Hypoteettisesti ajatellen vapaaehtoistyövoiman käyttö ja riippuvuus siitä on tuonot suomalaiseen malliin luontaista lisävoimaa, mikä näkyy tiukankin kritiikin kestävinä seurantaohjelmina ja toisaalta nopeana ja hyvänä palautteena metsästäjille ja havainnontekijöille. Poikkeuksellisesta asemastaan johtuen Suomella on myös erikoisvastuu kehittää ja hiota entisestäänkin riistanseurantamenetelmiään. Tätä työtä tullaan arvostamaan korkealle sekä kansainvälisessä tiedeyhteisössä että luonnonhoitoväen keskuudessa.

Yksittäisten hankkeiden evaluoinnit

Saaristolinnut

Arvioitsijat pitivät erittäin järkevänä periaatetta, että saaristolintututkimus on keskitetty Söderskärin tutkimusasemalle, keskittämällä saadaan korkeatasoista mutta yleistettävissä olevaa tutkimusta. Esimerkiksi pitkäikäisestä haahkasta, joka on päätutkimuskohteemme, tarvitaan tarkka ja luotettava tieto useista populaatioparametreista, koska pienetkin muutokset saattavat olla merkityksellisiä kannansäätelyssä. Yli 40-vuotinen aineisto on ainutlaatuinen ja mahdollistaa säätelymekanismin erinomaisen "ymmärtämisen".

Tuloksia on julkaistu sekä tieteellisesti että yleistajuisesti, ja informaatio antaa hyvät lähtökohdat merellisten ympäristökysymysten päätöksentekijöille. Vaikka arvioitsijat olivatkin tyytyväisiä alalla tehtyyn yhteistyöhön, he painottivat yhteistyön lisäämistä sekä kansalliseti että kansainvälisesti populaatioekologien kanssa.

Saaristolintujen seuranta tarjoaa tärkeät ja arvokkaat välineet ja tiedot lintukantojen hoitamiseksi ja suojelemiseksi. Pienillä lisäsäädöillä seurantaohjelma voisi nousta keskeiseen ja tärkeään indikaattoriasemaan meriekosysteemien muutosten selvittämisessä. Tehty tutkimus pystyy myös syventämään yleistä populaatiobiologista tietämystä näistä vaikeasti tutkittavista lajeista.

Riistakolmiot

Riistakolmioseurannassa käytetyt arviointimenetelmät ovat tarkoituksenmukaisia ja huolella kehitettyjä. Suunnaton aineistomäärä saadaan alhaisin kustannuksin. Pysyvät arviointireitit mahdollistavat vuosien välisen vaihtelun arvioinnin sekä elinympäristöaineiston riistantutkimuksellisen käytön. Arvioitsijoille tehtiin tiettäväksi, että riistakolmiotulosten luotettavuudesta on esitetty myös runsaasti kritiikkiä Suomessa. Arvioitsijat kuitenkin kiittävät monipuolisia hankkeita vertailla riistakolmiotuloksia muihin olemassaoleviin arviointimenetelmiin. He toteavat, että kolmio-ohjelma on tieteellisesti luotettava ja ansainnut kiitokset sekä kansallisesti että kansainvälisesti.

Vuosittaisia tiheystietoja tarvitaan riistanhoidollisiin tarkoituksiin, ja tässä mielessä riistakolmiot tarjoavat olennaisen avun. Arvioitsijat haluaisivat nähdä tiiviimmän yhteyden saalistilastoihin, jolloin aineiston riistanhoidollinen ja metsästyksellinen käyttö paranisi entisestään. He suosittelevat myös, että tutkittaisiin mahdollisuuksia nopeuttaa tiedonvaihtoa tutkimuksen ja päätöksentekijöiden välillä hyödyntämällä sähköistä tiedonvälitystä.

Arvioitsijat painottavat, että riistakolmioiden vahvuus on populaatiotrendien havaitseminen, ei varsinaisesti niiden selittäminen. Yleensä tarvitaan erityisprojekteja, jotka selvittävät lajikohtaisia demografisia tunnuslukuja. Hyvänä esimerkkinä arvioitsijat pitävät Suomen ja Venäjän Karjalan riista-arviointien vertailuja, joissa metsien rakenteen ja riistaelinympäristöjen kontrastit maiden välillä tarjoavat kiintoisan

näkökulman yleisten lajien elinympäristövalintaan. Riista-aineiston yhdistäminen kaukokartoitustietoihin GIS-menetelmin on lupaava lähestymistapa.

Riistakolmiomenetelmä tarjoaa tärkeän työkalun monien suomalaisten riistalajien seurantaan sekä riistanhoidon perusteiden selvittämiseksi. Suosittelemme, että tulevaisuudessakin riistakolmiot muodostavat suomalaisen riistaseurannan selkärangan. Tässä, kuten monessa muussakin vapaaehtoisuuteen perustuvassa havainnoinnissa, motivoinnin ja pitkäjänteisen työn varmistaminen on keskeisen tärkeää. Suosittelemme selvityksiä ylläpidettyjen kolmioiden pysyvyydestä ja mahdollisia toimenpidesuunnitelmia, mikäli jatkuvuudessa ilmenee ongelmia.

Menetelmät, joissa metsästäjät itse keräävät perustietoa metsästyksen suunnittelemiseksi, joutuvat aina aika ajoin kritiikin kohteeksi. Jotta menetelmän luotettavuus pysyisi korkealla tasolla, ehdotamme joitakin luotettavuustestejä jo olemassaolevien lisäksi, esimerkiksi tekemällä rinnakkaisarvioita ja antamalla riippumattomien ryhmien arvioida saatavilla olevaa informaatiota.

Hirvi

Suomen hirviseuranta on pohjoismaisittain hyvin tehtyä, koska aineisto käsitellään ja tulkitaan vain muutaman ihmisen toimesta. Seuranta on kyennyt dokumentoimaan tärkeitä muutoksia kannoissa eri puolilla maata. Hirven populaatiodynamiikka on vaikeaselkoista. Sille on tyypillistä pitkät aikaviiveet, ts. kestää kauan ennekuin pienikään muutos populaation tunnusluvuissa näkyy populaatiokoossa. Arvioitsijat uskovat, että nykyinen seurantajärjestelmä ei yksinään riitä ennustamaan Suomen hirvikantojen kehitystä tulevaisuudessa eikä kestävien verotussuositusten laadintaan. Tarvitaan välttämättä lisätietoa kannan ikärakenteesta ja ikäluokkakohtaisesta syntyvyydestä. He suosittelevat nykyseuranann jatkamista ennallaan, mutta että sitä täydennettäisiin välittömästi ikädemografisella aineistolla.

Aineiston tulkintaa ja käytännön yhteyksiä kiitetään, mutta samalla painotetaan tarvetta kalibroida tämän kaltaista aineistoa muiden kannanarviointimenetelmien kanssa. Tässä kohdin arvioitsijat ehdottavat pohjoismaista yhteistyötä. Hirviseurannan heikkoutena on liian vähäinen yhteistyö samanlaista työtä tekevien Ruotsin ja Norjan kanssa. Arvioitsijat rohkaisevat yhteistyöhön ja sen ripeään käynnistämiseen, etenkin populaatiomallintamisen saralla. Pohjoimaisittainkin tämä olisi taloudellista.

Hirviseurantajärjestelmä muodostaa tärkeän perustan Suomen hirvikantojen hoidolle. Olemme vaikuttuneita siitä tehokkaasta ja taloudellisesta tavasta, jolla massa-aineistot käsitellään ja raportoidaan metsästäjille. Suosittelemme resurssien suhteellista lisäämistä seurantaan, jotta vastuulliset ihmiset eivät uupuisi taakkansa alle.

Seuranta on dokumentoinut kannanmuutoksia, jotka ovat tyypillisiä intensiiviseti hoidetuille hirvikannoille. Jotta tulevaa kannakehitystä voidaan kontrolloida ja välttää kaoottinen populaatiodynamiikka, suosittelemme voimakkaasti resurssien välitöntä osoittamista ikäluokkakohtaisen syntyvyys- ja kuolevuusaineiston keräämiseksi metsästyksen yhteydessä. Aineistot on analysoitava välittömästi.

Hirvikannan hoito on vaikeaa ja kallista. Uskomme tärkeäksi lähentää Suomen seurantajärjestelmää vastaavanlaisiin hankkeisiin Norjassa ja Ruotsissa. Näin kustannuksia voidaan vähentää.

Suurpedot

On varsin kunnianhimoinen tavoite selvittää suurikokoisen maan, kuten Suomen, suupetokantojen koko. Tehtävässä onnistuminen riippuu siitä, miten standardoidusti aineisto kyetään keräämään eri osista maata. Arvioitsijat pitävät perustettua havainnontekijäverkostoa vaikuttavan kattavana. Toisaalta he eivät ole täysin tyytyväisiä kerätyn aineiston edustavuuteen, ts. havaintoja ei ole varmennettu esim. käyttämällä apuna radiomerkittyjä eläimiä, varmentamalla havaintija yms. Havaintojen määrän vertailu muuhun kantatietouteen on vajavaista eli menetelmän kalibrointi puuttuu. Riistakolmioaineiston hyödyntäminen voisi tuoda ensi käden apua.

Arvioitsijat uskovat menetelmään sinänsä, kuitenkin he varoittavat liian pitkälle menevistä tulkinnoista, koska eräiden perusolettamusten varmentaminen puuttuu. Kehittämistyötä tarvitaan ja arvioitsijat toivovat myös avoimempaa tiedotusta hoitopolitiiksta paitsi metsästäjille myös suurelle yleisölle.

Suurpetoseurannasta vastaava tutkimus on pystyttänyt laajan havainnontekijäverkoston, jonka tuottamaan tietouteen perustuvat arviot Suomen suurpetolajien kokonaiskannoista. Suosittelemme tämän verkoston yllpitoa, mutta lisätutkimuspanosta tarvitaan selvittämään miten hyvin eri tyyppiset havainnot kuvaavat alueen todellista petokantaa, Tälltä tavoin voidaan kehittää objektiivisempi tapa arvoida petolajien populaatiokokoa. Lisäksi on tärkeää, että nykyistä suurempi osa havainnoista tarkistetaan muutaman kokeneemman henkilön toimesta, jotta aineiston tulkinta saataisiin yhdenmukaiseksi.

Hylkeet

Hyljekantojen seurantaa tehdään tietyillä rannikon ydinalueilla. Hyljekantojen kasvaessa on kuitenkin odotettavissa, että näiden ydinalueiden suhteellinen merkitys vähenee. Tämän vuoksi arvioitsijat suosittavat kattavaa kansallista arviointia tietyin vuosivälein. Halli- ja norppaseurantojen nykymallia pidetään varsin hyvänä. Myös lukumääräseurantoihin kiinteästi liittyvää terveysseurantaa pidetään kokonaisuudessaan tarkoituksenmukaisena ja HELCOMin suositukset ja vastuuasettelut (vuodelta 1988) hyvin täyttävänä.

Hyljekannat ovat valtioiden yhteisiä. Suomen ja Ruotsin yhteistyötä kiitetään ja samalla kehotetaan kehittämään yhteisiä lentolaskentamenetelmiä norppakannoille.

Hylkeiden seurantaohjelma on kokonaisuudessaan korkealaatuinen, se antaa arvokasta tietoutta alhaisin kustannuksin. Suosittelemme lämpimästi ohjelman jatkamista nykymallin mukaisesti.

Riistatiedustelut

Seuravassa lyhyt evaluointiteksti kokonaisuudessaan käännettynä:

Suomella on 50 vuoden kokemus riistatiedusteluista. Tämä vähäisin kustannuksin kerätty aineisto tarjoaa arvokasta tietoa useiden lajien pitkäaikaismuutoksista ja levinneisyydestä. Muutamien lajien kohdalla saadaan tietoa jopa kannanvaihteluista.

Tällaisten epäsuorien aineistojen tulkinta on täynnä "ansoja". Aineistoa kuitenkin näytetään osaavan käyttää huolellisesti, esimerkkinä supikoiratutkimukset, kiitos pitkäaikaisen kokemuksen. Suosittelemme, että riistatiedustelutuloksia verrattaisiin

enemmän esimerkiksi riistakolmiotuloksiin, jotta tiedusteluaineiston luotettavuutta voitaisiin varmistaa.

Riistatiedustelujen potentiaaliset käyttömahdollisuudet riippuvat itse tiedustelun jatkuvuudesta ja vakioisuudesta. Ehdotamme, että tulisi panostaa havaintoverkoston ulläpitoon esimerkiksi tekemällä entistä runsaammin yhteenvetoja ja raportteja. Tällä tavoin myös edesautetaan uusien havainnontekijöiden saamista tutkimuksen avuksi.

Vesilinnut

Nykyinen sisävesien vesilinnuston seurantajärjestelmä on erittäin hyvä. Arvioitsijat pitävät riistantutkimuksen ja Helsingin yliopiston eläinmuseon yhteistyötä erinomaisena asiana, koska metsästäjät ja lintuharrastajat kokoavat yhteisvoimin aineistoja. Havainnontekijöiden määrä voisi olla suurempi etenkin Pohjois-Suomessa. Tärkeää on myös ylläpitää nykyverkosto tässä laajuudessaan ja vaivaa kannattaa myös nähdä havainnontekijöiden motivoimiseksi ja kouluttamiseksi. Nyt metsästäjät saavat nopeasti ja hyvin palautetta työstään.

Arvioitsijat ennakoivat kansainvälisen vesilinturiistan nousemista entistä tärkeämmälle sijalle. Suomi on hoitanut vastuunsa hienosti, mutta esimerkiksi metsästyksen vaikutuksen selvittäminen edellyttäisi lisäinformaatiota esimerkiki talvehtimisalueilta. Kansainvälinen yhteistyö on näissä kysymyksissä tärkeää, ja arvioitsijat kiittävätkin tieteellisesti tuottavaa yhteistyötä Ruotsin kanssa.

Vesilintuseuranta tuottaa korkealaatuista tietoa vähäisin kustannuksin. Kokonaisvaikutelmamme on, että tätä korkealaatuista tulee jatkaa nykymuodossaan.

Yleissuosituksia

Edelläarvioiduista seurantaohjelmista haluamme keskittyä nimenomaan hirvi- ja suurpetoseurantoihin. Suosittelemme hirviseurannan jatkamista nykymuodossaan, mutta sitä tulee välittömästi täydentää näyteaineistolla, josta analysoidaan ikäluokkakohtaiset demografiset parametrit. Hirviseurantaan osoitetun henkilöstön tulisi voida keskittyä seurantatehtäviinsä, ja hirvitutkijoiden tulisi päästä monien välittömien tutkimusongelmien pariin, joita voisivat olla esimerkiksi runsausindeksien kalibrointi, populaatiomallit jne. Näöitä voisi tehdä läheisemmässä yhteistyössä pohjoismaisten kollegojen kanssa. Suosittelemme myös, että suurpetohavainnontekijäverkostoa ylläpidetään, mutta lisähuomiota tulisi kiinnittää siihen, miten hyvin havainnot kuvaavat petojen todellista määrää tietyllä aluella.. Yksityiskohtaisemmat ehdotukset on annettu lajikohtaisten evaluointien yhteydessä.

Lopuille seurantaohjelmille suosittelemme ainoastaan vähäisiä muutoksia. Yleisvaikutelmamme on, että nämä seurantaohjelmat ovat erittäin tarkoituksenmukaisia ja ne tarvitsevat jatkuvaa tukea. Mielestämme nykyprojektit kattavat olenanisimmat tarpeet, emmekä ehdota mitää suurempia muutoksia projektien keskinäiseen priorisointiin. Olemme otettuja seurantaohjelmien yleisestä tehokkaasta taloudenpidosta. Suuria määriä korkealaatuista tietoutta saadaan suhteellisen alhaisin kustannuksin.

Olemme myöskin hämmästelleet vapaaehtoisten suurta määrää eri seurantaohjelmissa. Tässä suhteessa Suomessa on pitkä perinne ja tämän perinteen toivomme jatkuvan. Jotta havainnontekjöiden ja havaintopaikkojen määrän jatkuvuus pidettäisiin nykyisellään, meistä tuntuu että tulevaisuudessa saattaa olla tarpeellista lisätä palautteen määrää havainnontekijöiden suuntaan. Laajempi tiedonvaihto ja -välitys, rakentava kritiikki ja ideat voisivat auttaa ylläpitämään korkealaatuista vaapaehtoisavustajien joukkoa. Metsästäjien mielenkiinnon ja pätevyyden ylläpito seurantatehtäviin voisi edellyttää, että seurannan perusteita ja tekniikoita sisällytettäisiin erilaisiin metsästäjille järjestettäviin kursseihin ja ohjelmiin.

Emme kannata seurantatyön osien työstämisvastuun siirtämistä muille organisaatioille tai työryhmille, vaikka sellainen näyttäisi antavan lyhyen tähtäimen taloudellista hyötyäkin. Tällainen siirto saattaisi vähentää vastuullisen tutkijan työpainetta, mutta mahdollinen työaikahyöty saatettaisiin menettää lisääntyneenä ajankuluna avustajien neuvonnassa sekä työn laatuvalvonnassa. Lisäksi on tärkeää hoitotoimenpidesuositusten järkevyyden ja luotettavuuuden kannalta, että seuranta-aineistosta ja sen käsittelystä vastaa riippumaton elin, Riista- ja kalatalouden tutkimuslaitos.

Nykyisessä taloudellisessa tilanteessa, missä oleellista lisärahoitusta ei ole ennakoitavissa, emme suosittele uusien seurantojen perustamista, vaikka ymmärrämme tiettyjä tarpeita olevankin, esim. majava ja metsäkauris. Vaikka budjettitilanne paranisi 25 %, emme silloinkaan suosittelisi lisäprojekteja. Koska kaikki seurantaohjelmat työskentelevät tiujoissa taloudellisissa puitteissa (lisätyövoimaa ei palkata), meidän mielestämme mahdolliset lisävarat käytettäisiin tehokkaimmin vahvistamalla nykyohjelmia, jotka jo kattavat olennaisimmat riistanhoitotarpeet Suomessa.

Useimmilla yksittäisillä tutkijoilla on laajat kontaktiverkot toisten tutkijoiden, laitosten ja yliopistojen suuntaan niin kansallisesti kuin kansainvälisestikin. Mielipiteemme on, että laaja kontaktipinta on mitä tärkein eri projektien tieteellisen laadun kannalta.

Arvostamme sitä avointa mieltä ja ymmärrystä aineistojen yhteiskäsittelyyn sekä kansallisesti että kansainvälisesti.

Haluaisimme nähdä entistä enemmän opinnäytetyöntekijöitä ja jatko-opiskelijoita työskentelemässä seurantaohjelmien parissa. Riista- ja kalatalouden tutkimuslaitoksen ja yliopistojen välillä on hyvät ja vakiintuneet yhteydet joita voitaisiin entisestäänkin parantaa. Eräänä keinona lisätä vuorovaikutusta voisi olla erityisstipendin myöntäminen seurantatutkimuksiin.

Naapurimaiden edustajina (Norja ja Ruotsi) meillä on vakaa käsitys siitä, että polttavimmat riistanhoidolliset ongelmat ja niiden menetelmälliset ratkaisukeinot ovat hyvin samankaltaisia näissä kolmessa pohjoismaassa. Suosittelemme intensiivisempää yhteydenpitoa maittemme välillä sekä yksittäisten tutkijoiden kesken. Jotkin kehittämistarpeet ovat kalliita eikä niitä kannata sälyttää kullekin maalle erikseen. Siksi suosittelemme neuvotteluja yhteisprojekteista sekä eri tehtävien jaetusta vastuusta. Olemme vakuuttuneita suomalaisten tutkijoiden positiivisuudesta yhteishankkeisiin.