

GROUSE NEWS



Newsletter of the WPA/BirdLife/IUCN/SSC Grouse Specialist Group

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In this issue of Grouse News you will find interesting information on the situation of the Cantabrian capercaillie, and in Scotland management of capercaillie in the state forests is included in the normal work processes of the state forestry agency. Research reports include comments on Distance sampling method and two papers on rock ptarmigan, one from Svalbard and one from Iceland. Monitoring of capercaillie as an important tool for observing changes in boreal forest ecosystems in Slovenia is also published. Two short articles on plumage of capercaillie, one male female coloured in Norway and one change from female to male in Germany. Also a letter to Grouse News on midwinter display in capercaillie is found. Snippets contain a comment on cripple losses from shooting, Tim Poole that has taken over for Kenny Kortland. Those of you that participated at the conference in China will probably remember the bad repair of the primary school in Lianhuashan Nature Reserve, Gansu, where a spontaneous collecting of money to renovate the building was actuated. This resulted in a better school for the kids as you will see under snippets.

In the paper on Svalbard rock ptarmigan it was decided to use the former scientific name *Lagopus mutus* instead of the new *L. muta* because it is a reprint of the abstract of the original report.

The XIth International Grouse Symposium is coming up very soon. I hope many of you will sign up for the conference. The deadline for abstract submission and registration is 2 June. On the website for the IGS 2008 conference you will find information on program schedule and registration for the conference, <http://www.forestry.ubc.ca/events/conferences/IGS2008/tabid/1822/language/en-US/Default.aspx>.

Thanks to Anne Westerberg who has edited the language on some of the articles.

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From the Chair

Dear members of the Grouse Specialist Group,

In this issue of GN I want to ask for your opinion on some proposals for the future of our Specialist Group, as we near the end of another 4-year period (quadrennium) of activity under IUCN/SSC. This formally ends with the dissolution of the SSC at the upcoming Barcelona World Conservation Congress in October 2008. After this, the SSC is gradually reconstituted for the next quadrennium, starting with the election of the Chair at the meeting itself. In past cycles, The World Pheasant Association (WPA), as our other parent body, has by this point made recommendations to IUCN about who should be the next set of Chairs or Co-Chairs for all the WPA/SSC Specialist Groups for the Galliformes species (including the Grouse SG, the Megapode SG, the Pheasant SG and the Partridge, Quail and Francolin SG and formerly also the Cracid SG).

In mid-February, all the current Chairs of these SGs were invited to Al Ain in the Gulf States by the current SSC Chair, Holly Dublin, to attend a meeting of all the world's SG Chairs. Phil McGowan (Director of WPA) was also there. We took this as a chance to review how we had been performing since 2005, when we were last appointed (or re-appointed). Whilst we can justifiably claim to have operated extremely well up to around 2005 across all our Specialist Groups, our overall performance more recently has been less good:

- Only the Grouse SG recently produced a new Action Plan and has put out its Newsletter regularly since 2005
- The Megapode, Pheasant and PQF SGs have all failed to renew their Action Plans and have had trouble producing their Newsletters.
- Some of our websites are also looking old and uncared for (possibly along with some Chairs and Co-Chairs!)
- There is no longer an SSC/WPA Cracid SG

So an action plan is now needed to revitalise the Galliformes Specialist Groups! All the SGs depend on the efforts of too few people, several of whom are now too busy to run their core functions properly. So unless we do something soon, our precious threatened species may fade from the conservation radar screen, and all the good that has come from our technical advice and training work world wide may begin to dissipate. Over the recent period of decline in SG activity, WPA has grown in stature as a player on the international conservation stage, largely due to Phil McGowan's remarkable work, first as Conservation Director and more recently as (Executive) Director. WPA now runs a substantial portfolio of projects in its own right, usually with technical advice from the SGs.



Our recent experience at the SG Chairs' meeting reinforced very strongly something that several of us already knew. It is very evident that many of the most effective SGs in the SSC network have a close relationship with a professional or charitable organisation that exists at least partly to support its work. So one possible way forward for us, following this proven model, is to pool our human resources into one large Galliformes SG, strongly supported by WPA. The gains to be had from such an arrangement would seem to include:

- Collective experience of running SGs as 'voluntary self-help networks' can be pooled, and the essential tasks can be shared more widely;
- Pooling research experience on determining species status, measuring threats and designing and implementing conservation action;
- Allowing the inclusion of Tinamous in our remit alongside other Latin American species;
- Maximising the chance of raising funds to employ a single Support Officer to provide the focus and dedication needed to operate the SG effectively, whilst liaising continually with WPA;
- Distributing good (and bad) conservation news via one Newsletter;
- Simplifying our relationship with SSC as our other parent body, as well as the thematic SGs (e.g. Re-introductions, Conservation Breeding), the IUCN Species Programme, BirdLife International as the Red List Authority for all birds, and CITES on concerning threats through trade.

A compromise of both structure and function, lying somewhere between the Galliformes SG idea and the present situation with 5 separate SGs (Grouse SG, Megapode SG, Pheasant SG, the Partridge, Quail and Francolin SG, Cracid SG), is also possible. This might have a central hub close to WPA, and a global steering committee consisting of taxonomic, regional and thematic representatives. This would allow some or even all of the existing taxonomic groupings to continue under a larger umbrella, so that members with very focused interests do not feel swamped in such a large group.

The meeting that we all just attended emphasised how difficult it is for the IUCN Species Programme to support our SG activities (or even SSC core functions) in any meaningful way. This is its formal role, but funds are hard to come by, and it has the SSC Chair and c.130 SGs to assist. Even without much concrete help, however, we gain great influence from being in the SSC network under IUCN: this truly is the United Nations of Conservation.

In exchange, however, there is an increasing expectation from SSC that each of its SGs' activities should contribute to the three main objectives set out in the current SSC Strategic Plan (2001-10):

- Conducting the interdisciplinary scientific work necessary to underpin effective conservation action;
- Addressing over-exploitation issues via well-founded sustainable-use programmes;
- Developing global capability for conservation research and action through capacity building and technology transfer.

The increasing emphasis on action is embodied in SSC's future expectations of 'action plans': they are now being labelled Species Conservation Strategic Plans, and as such are expected to be comprehensive and result-orientated. We live in a threatened and rapidly changing world: more than ever, we need to work in close concert with all others sharing our concerns and expertise. For the individual, being a member of a busy, efficient and effective SG seems to be the best way of contributing to the global effort to conserve biodiversity.

Having read what I have had to say above, I would like to hear your views on how you see the future. I hope that other promising ideas will come from you and help us all to achieve our ultimate aim: running an effective network dedicated to saving our species from extinction. We are all volunteers, so we have to reach broad agreement on how to move forward and then abide by it. Please do give the matter some thought and reply soon: we have asked WPA to receive the replies in confidence, so that all views, including any on the conduct of the current Chairs, can be considered objectively and a fair consensus reached.

Please send your replies to Philip McGowan at director@pheasant.org.uk as soon as possible and in any case no later than **Monday 26th May 2008**.

This text was drafted cooperatively by the current Chairs and Co-Chairs of the SGs for the Galliformes species, and is sent out to all members of these SGs.

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CONSERVATION NEWS

Conservation status of sooty grouse in the Sierra Nevada Mountains of California

James Bland

In 2006 blue grouse *Dendragapus obscurus* was restored to two species, sooty grouse *D. fuliginosus* in coastal regions of North America and dusky grouse *D. obscurus* in inland regions. Three subspecies of sooty grouse are currently recognized in California: Oregon sooty grouse *D. f. fuliginosus* in the northwest, Sierra sooty grouse *D. f. sierrae* in the Cascade Mountains and north and central Sierra Nevada Mountains, and Mount Pinos sooty grouse *D. f. howardi* in the southern Sierra Nevada Mountains and Transverse Ranges (Tehachapi Mtns and Mt Pinos). Ongoing mtDNA studies are likely to change our understanding of subspecies boundaries, however (G. Barrowclough, pers. comm.).

In 2007 California Department of Fish and Game (CDFG) designated Mount Pinos sooty grouse as a California Bird Species of Special Concern (Bland 2008). The designation was based on a significant decline in the subspecies' range over the past 60 years. Springtime surveys I conducted throughout the subspecies' range between 2002 and 2005 indicate it has probably been extirpated from all former habitats south of the main Sierra Nevada cordillera. The southernmost habitats are insular and probably served as emigration "stepping stones" to a large block of habitat in the vicinity of Mount Pinos, the former southern stronghold of the subspecies. As a California Bird Species of Special Concern, Mount Pinos sooty grouse is likely to receive better population and habitat monitoring in the future. The California Bird Species of Special Concern document can be purchased through the Point Reyes Bird Observatory for \$12 (www.prbo.org/cms/230).

In late 2007 the US Forest Service designated sooty grouse as a Management Indicator Species (MIS) for late-seral open-canopy conifer forest in all 10 National Forests in the Sierra Nevada Mountains (www.fs.fed.us/r5/snfmisa/rod/dat/rod-entire.pdf). The designation includes both Sierra and Mount Pinos subspecies (as currently recognized). MIS legislation was enacted decades ago, but implementation had been spotty and ineffective. The reorganized MIS program focuses on just 12 species common to all 10 forests. The program uses the term indicator to signify a species that responds strongly to forest management practices. Funding has been committed for monitoring the populations and habitats of MIS for at least a decade. My ongoing research on habitat associations was instrumental in designating the species as an indicator of late-seral open-canopy forest. Prior to my studies few people recognized the strong association of Sierra sooty grouse with large trees and late-seral forest. This was largely due to: 1) the virtual absence of field studies on sooty grouse in California and 2) the influence of studies conducted in the Pacific Northwest where sooty grouse responded well to intensive forest harvest.

I hope to present some of my research findings at the upcoming International Grouse Symposium at Whitehorse. I am particularly keen to exchange ideas with researchers who study capercaillie habitat use. Sierra sooty grouse appear to be a North American ecological equivalent of capercaillie in many respects. In this regard, I invite any and all capercaillie researchers to visit my ongoing study when they are in North America this fall. Please check my project website for more information: www.geocities.com/Bland_jim/Sierra_Sooty.html.

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Update of the situation of the Cantabrian capercaillie *Tetrao urogallus cantabricus*: an ongoing decline

Maria José Bañuelos & Mario Quevedo

In a previous number of Grouse News (Bañuelos et al. 2004) we reported the drastic decline that Cantabrian capercaillie *Tetrao urogallus cantabricus* had apparently suffered in two decades, from the early 1980's to 2000 - 2001. Based on extensive evaluation of lek occupancy, about 50% of the display areas had been deserted, and the number of remaining cocks was roughly estimated at 300. Accordingly, Cantabrian capercaillie was listed as endangered in Spain, and became the only subspecies of capercaillie qualifying as endangered according to IUCN criteria (Storch et al. 2006). This capercaillie population occupies a very southerly range for a tetraonid (Quevedo et al. 2006a), and has recently been identified as an evolutionary significant unit because of its unique ecological and genetic characteristics (Rodríguez-Muñoz et al. 2007).

Between 2005 and 2007 a new extensive lek survey was performed in the northern watershed of the range (Asturias), over a territory that comprises more than 50% of the population. Almost all known display areas (N=364) were repeatedly surveyed during the lekking season (April-May). Surveys were performed during the day, looking for signs such as feathers, fresh droppings or footprints, so that results were mainly presence-absence data. Occupancy surveys during the day were mostly chosen over more traditional lek counts at dawn to minimize disturbances, but also because the previous survey (2000/2001) showed that less than 10% of the occupied sites had more than one cock. The previous comparison between early 1980's and 2000/2001 was susceptible to differential survey methods or efforts. Such potential differences were minimal between 2000/2001 and the new survey.

The outcome of that new survey is alarming. The acute decline was confirmed, and seems to be even more pronounced. In the Asturias province 27% of the lekking areas holding capercaillies in 2000/2001 showed no sign of the species in 2005/2007. Only 108 leks remained occupied (30% of all known leks), and most of them showed low capercaillie activity, according to the signs. This result indicates an annual rate of occupancy decline of 5.4%. In the southern watershed the situation is not more promising, with just 85 occupied leks corresponding to 34.5% of all known leks in that area (N = 247, Robles et al. 2006). Although we do not have precise data on the southern watershed to elaborate, it does not seem too speculative to say that the population will go extinct in a few years, unless the trend is reversed.

A closer look at the recent Asturian data shows that the central part of the range is almost gone, with just a few isolated spots where capercaillie may still be seen (Figure 1). That poses additional problems to the already serious scenario of decline, because the central part of the southern watershed is basically deforested (Quevedo et al. 2006b). Still lingering and showing a somewhat less dramatic trend of decline are the southwestern areas of Asturias, including the integral biological reserve of Muniellos Forest (55 km²). Forest cover is very high in this area (according to Cantabrian standards of highly fragmented masses), and is also connected to the best areas in the southern watershed, in the León province.

It seems straightforward that urgent measures should be taken. Less clear is which ones. However, the first thing that strikes us is that almost nothing is known about the demography of the population, except for some estimates of very low reproductive output at the end of the summer (Bañuelos et al. 2008). At this point, we believe that an ambitious telemetry project, strictly coordinated among the different regional administrations involved, is the only way of shedding some light on the ultimate causes of the decline. That could be also the only way to identify effective management targets, i.e. to develop strategies to reverse the trend of certain demographic parameters that might have the greatest impact on the viability of the population. However, to the best of our knowledge such a project has never been discussed. One could hesitate to start catching birds because it implies some risks. However, some birds are being caught and tagged within a captive breeding program; apparently, tagged hens will provide the source eggs for such captive breeding program. It may be argued that captive breeding programs are not effective conservation measures for capercaillie (Seiler et al. 2000, Storch 2007), but we have argued that elsewhere (Quevedo et al. 2005, Rodríguez Muñoz et al. 2008) and it is not our point here. Instead, we would like to stress that without knowing which are the key demographic parameters for the wild population there is 1) very little chance of having an effective management, 2) very little chance of population survival beyond a couple of decades and 3) very little chance of success of any captive breeding program. Particularly the latter has been stressed by the IUCN, GSG's parent organization (IUCN 1998).



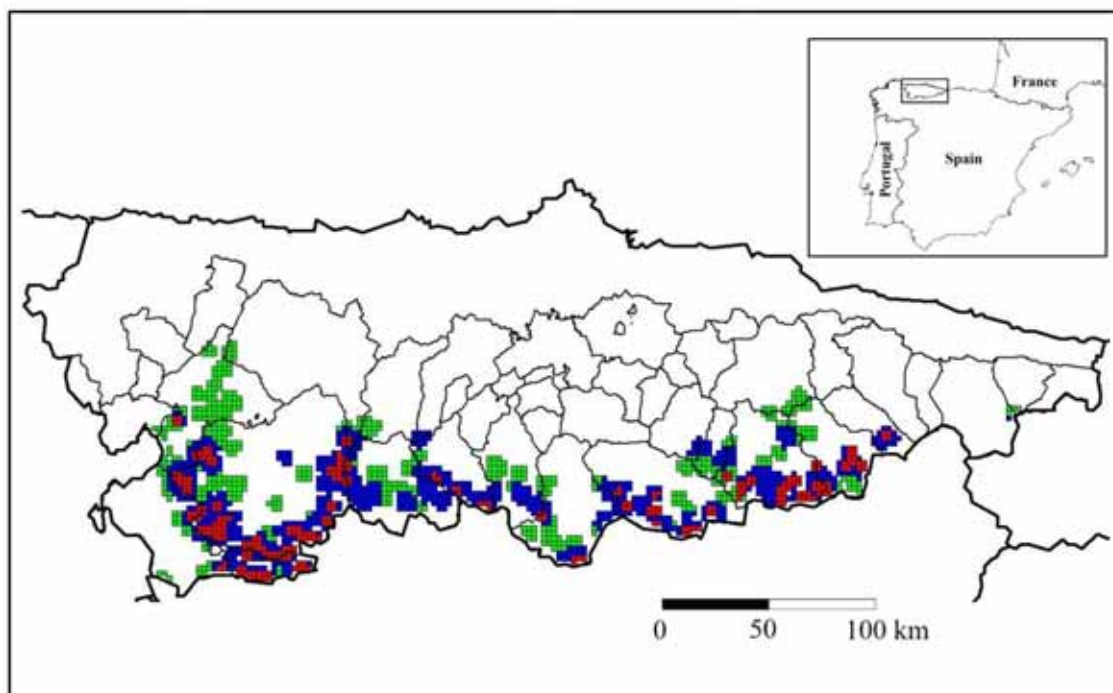


Figure 1. Trends of Cantabrian capercaillie occupancy in 1km² cells. Green cells indicate capercaillie presence in the early 1980's, blue cells indicate occupancy in 2000-2001, and red cells indicate present occupancy (2005 - 2007 survey).

Maybe this critical situation would benefit from direct advice from experienced members of the GSG, as IUCN partners, to the highest instances, at the Spanish Ministry for the Environment. There are few capers in the Cantabrian Mountains, and it is not very likely that they have much influence on the overall ecology of these Atlantic forests. But as Aldo Leopold aptly put it: "In terms of conventional physics, the grouse represents only a millionth of either the mass or the energy of an acre. Yet subtract the grouse and the whole thing is dead" (Leopold 1948).

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Capercaillie conservation in the state forests of Scotland

Kenny Kortland

The Scottish Forestry Strategy (SFS) was launched by the Scottish Government in October 2006 and determines the future direction of forestry in Scotland (see www.forestry.gov.uk). The seven themes of the SFS include not only timber production, but also themes such as access and health, and climate change. Biodiversity is a theme and the explicit aim is to manage landscape-scale areas for threatened species and habitats. For a range of species, ranging from butterflies to mammals and birds, the state forestry agency, Forestry Commission Scotland (FCS), is producing funded programmes of action, which will complement broader habitat work, such as significant native woodland expansion. One of the first programmes to have been produced is the Capercaillie Species Programme, which covers management in both private and state forests. Management in private forests will be funded through a new government grant scheme and is being developed. However, of particular interest to GSG members may be the agreed programme for capercaillie within the state-owned forests in Scotland, which are managed by FCS. The GSG and its members have previously supported efforts to protect capercaillie in Scotland, so they will be happy to see that capercaillie conservation is now a mainstream management objective within state forests in this country.

The aims of the Capercaillie Species Programme for state-owned forests in Scotland are:

1. To contribute to the national capercaillie action plan target of 5000 birds by 2010.
2. To contribute to the national capercaillie action plan target of a range expansion from 40 to 45 occupied 10km² squares by 2010.
3. To ensure management of capercaillie in state forests contributes to wider capercaillie management strategies.
4. To incorporate capercaillie as a management objective in all relevant state forest plans.
5. To maintain all occupied leks in state forests by enhancing existing habitat or by creating new habitat.
6. To enhance habitat around unoccupied lek ranges and in strategically important forests to facilitate range expansion. (Unoccupied leks are those with no cocks recorded in the area in the last three springs.)

The Capercaillie Species Programme is being delivered via action carried out on two levels within a suite of state-owned forests in Scotland. At level one, capercaillie is identified as a formal management objective and included within forest plans. This means that all forest management activities in the selected forests must be planned to avoid any disturbance to breeding capercaillie. In addition, forest management on these sites must aim to increase, or at least maintain, the amount of high quality habitat available to capercaillie – particularly brood habitat. This is usually achieved by adapting forest management practices to suit capercaillie. For example, large scale clear felling is avoided and silvicultural systems that produce more suitable habitat are used wherever possible. These systems include group selection and other forms of continuous cover forestry. Level two action constitutes additional targeted action for capercaillie and is carried out in state forests with active leks. This level of action comprises additional work that would not be carried out as part of normal forest plans. The aim of this work is to increase existing populations by increasing survival and breeding success of capercaillie.

1) Level one action

Level one action applies to all twenty-seven state forests that are important for capercaillie and these are spread across seven forest districts. Eleven of these state forests currently have either very low numbers of capercaillie or have none at all. However, these forests are important in terms of facilitating future



population expansions and are managed for this purpose. As shown in Table 1, over 34,400 hectares of the state forest will be subject to level one action. All of the twenty-seven sites form part of wider capercaillie habitat networks.

Level one action comprises:

- Inclusion of capercaillie as a management objective within forest plans.
- Timing of operations to avoid disturbance of breeding capercaillie (e.g. no forestry operations within 1km of leks in spring).
- Maintaining and increasing suitable habitat – particularly Scots pine.
- Adopting capercaillie-friendly silvicultural systems where possible.
- A presumption against the use of deer fencing and removal or marking of all remaining deer fences.
- Enhancement of native pinewood habitat within the capercaillie range.

Table 1. List of state-owned forests subject to level one action as part of the FCS Capercaillie Species Programme

Capercaillie Species Programme for state-owned forests			
<i>Level one action</i>			
Forest District	No. of forests with level one action	Total area (ha)	No. of active leks (and inactive leks)
Dornoch	1	3513	8 (0)
Inverness	5	9519	6 (5)
Moray	9	11262	5 (1)
Aberdeenshire	5	1232	3 (1)
Tay	5	7330	5 (1)
Cowal & Trossachs	1	641	0 (2)
Fort Augustus	1	1000	1 (1)
	27	34497	28 (11)

By incorporating level one action within forest plans in all twenty-seven capercaillie forests, most of the habitat needs of capercaillie are now met through normal forest management. This means that habitat improvement work for capercaillie is no longer dependent on unpredictable external sources of funding (e.g. LIFE Nature) and is guaranteed to be carried out.

2) Level two action

In addition to the level one action described above, sixteen state forests, containing all of the twenty-eight known active leks, will also be subject to level two actions. This species-specific work is designed to increase local populations to allow capercaillie populations to grow and expand.

Level two action comprises:

- Population monitoring. Lek counts are carried out on most leks in most years. This work is increasingly being done by state forest agency staff. Brood counts are also carried out in several forests.
- Specific habitat work. Although most habitat needs of capercaillie are now met through carefully planned forest management – via forest plans – additional habitat improvement work is carried out where a need is identified. For example, drains are blocked to create insect-rich bog habitat for chicks, and dense ground vegetation, such as heather, is cut to allow capercaillie broods to move around more easily between good feeding areas.
- Predator control. Crow and fox control is carried out in certain forests in springtime. The aim of this work is to reduce the number of crows and foxes present during the breeding season. This work is only carried out in places where it can be targeted effectively and where the likelihood of a beneficial impact is high.
- Deer fence removal. Virtually all fences that pose a threat to capercaillie in state forests have been removed or marked in recent years. However, the few that remain will be removed as part of this Species Programme.



Table 2. Summary of level two action expenditure as part of the FCS Capercaillie Species Programme

Capercaillie Species Programme for state-owned forests				
Level two action				
Year 1	Year 2	Year 3	Year 4	Year 5
2007 – 2008	2008 – 2009	2009 – 2010	2010 – 2011	2011 – 2012
£125,000	£105,000	£115,000	£110,000	£120,000

As shown in Table 2, over £100,000 pounds per year will be spent on level two actions in state-owned forests in the first five years of the Species Programme. All of the work is already planned to various levels of detail and the funding is already allocated within the budgets of the forest districts. This investment is particularly significant given that it builds upon much previous work for capercaillie, such as the Scottish Capercaillie Life Project. In addition, this Capercaillie Species Programme will continue beyond 2012.

Effective targeting of conservation effort for capercaillie in Scotland is achieved by using the Capercaillie Core Areas map (Figure 1), which is maintained as a GIS layer on the FCS monitoring system. The map was developed by an expert steering group, which includes GSG members Robert Moss and David Baines. By including appropriate management in all state forests on this map that have capercaillie, or may have capercaillie in the near future, Forestry Commission Scotland ensures that its efforts in state forests are part of wider strategies for this species. This is important, because capercaillie conservation must be carried out over big areas encompassing many different woodland owners. The map also has a key function for capercaillie conservation in private forests, as it is used to direct government funding to the appropriate private owners. It also alerts FCS staff to the presence of capercaillie when they are assessing applications from private owners for licences to fell trees. This system ensures that felling within lek ranges or areas of important brood habitat is carefully planned.

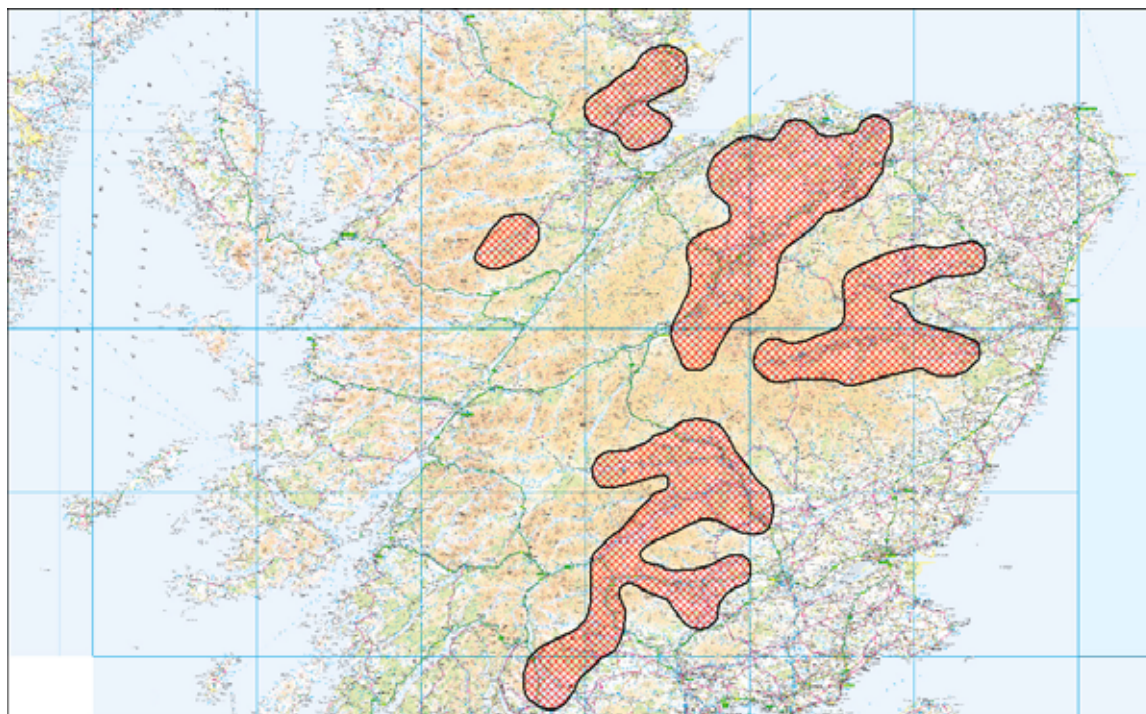


Figure 1. Forestry Commission Scotland Capercaillie Core Areas map. The five hatched areas cover the main distribution of capercaillie in Scotland.



In summary, capercaillie has now become a formal management objective for the state forestry agency in Scotland and significant efforts are underway to merge capercaillie conservation with timber production in state-owned forests in Scotland. By including capercaillie management within the normal work processes of the state forestry agency, rather than relying on an ad hoc species project approach, the dependence on external funding sources is removed and long-term, effective management is secured. This model of state management could improve the prospects for capercaillie if it were adopted in other countries and may be useful for GSG members to highlight as an exemplar.

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RESEARCH REPORTS

Distance – a toxic algorithm?

Robert Moss

The simple old King strip census method for measuring grouse densities (Leopold 1933) has, in some field biologists' minds, been replaced by the Distance computer algorithm (Buckland *et al.* 1993). Some workers are not even aware of the King method. Previously (Moss 2007), I showed that the two methods gave similar mean densities for the three national capercaillie counts done in Scotland (1992–4, 1998–9, 2003–4). The King method, however, provided narrower confidence limits and was therefore able to discover statistically significant differences between counts that were undetected by Distance.

Each method is based on estimating the 'effective strip width' of a transect. The number of birds seen outside the 'effective strip width' equals the number unseen inside it. The King method assumes that the effective strip width equals the birds' average flushing distance. This is the actual or radial distance from bird to observer. Distance, however, uses an opaque algorithm based on the perpendicular distance of bird to transect.

The idea underlying the King method is simple enough. Imagine yourself appearing, as if by magic, in the midst of grouse habitat. Bird flush in a disc around you. The radius of this disc is the flushing distance. Now start to walk along a transect and the disc moves with you, its radius defining the effective strip width. Reality, of course, presents complications. These can be addressed by simulation and observation.

Distance gurus (Buckland *et al.* 1993) dismiss the King method as 'not robust' and then go on to discuss the conditions under which their own more elaborate approach can be used to estimate effective strip width. In particular, their 'shape criterion' states that detectability must not fall off sharply near the transect line or the estimation of density will tend to be poor. This, of course, is another way of saying that the Distance method also suffers from a lack of robustness. Indeed, simulations suggest that the King method is quite robust under a wide range of conditions.

I appealed to readers of Grouse News 33 for feedback, especially for more examples comparing field results from the King and Distance methods. I expected that the many workers with Distance data sets, including perpendicular distances between bird and transect line, would also have the flushing distances from bird to observer, as needed to recalculate their results with the King method.

Apparently not. Four people responded to my request and each explained that they recorded only perpendicular distances, not actual flushing distances. One of them enlightened me further by explaining that he had been so instructed during a training course provided by the St Andrews group, originators of the Distance algorithm.

In nature, competition between organisms is often mediated via toxins. One organism succeeds by poisoning others. In science, competition between ideas ideally depends upon their value or usefulness. In practice, of course, scientific ideas attract adherents who use diverse and sometimes unseemly methods to suppress competing ideas. In the present case, adherents of the Distance algorithm seem to have devalued the older King method, not only by claiming that King is 'not robust' but also by training students not to record actual flushing distances, data that – beyond the time required to record them – require no extra effort to collect. Consequently, thousands of hours of field work have been undermined.

Workers seem to have had their critical faculties paralysed by a Distance toxin that operates in two ways. Awesome mathematics blow the mind. Then the entranced student is given a fun computer game with impressive output. Few seem able to resist such brainwashing.

There are two morals to this tale: 1) understand your methods, and 2) record radial flushing distances as well as perpendicular ones. That way, you might get reliable results with usefully narrow confidence limits.

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Svalbard Rock Ptarmigan (*Lagopus mutus hyperboreus*) – a status report

Eva Fuglei & Åshild Ø. Pedersen

Abstract

The Svalbard rock ptarmigan (*Lagopus mutus hyperboreus*) is the only resident terrestrial bird in Svalbard. The ptarmigan is also by far the most important small game species for hunting in Svalbard. Research performed to date on the Svalbard rock ptarmigan has mainly been physiological studies focusing on adaptations to Arctic conditions. Current ecological knowledge is limited and available information focuses mainly on breeding biology including behaviour aspects of breeding and social ecology.

The Svalbard rock ptarmigan demonstrate different physiological and morphological adaptations. They are heavier and show substantial annual variation in body weight compared to the rock- and willow ptarmigan (*Lagopus mutus* and *Lagopus lagopus*) in mainland Norway. In September–October the Svalbard rock ptarmigan increase their body weight due to fat accumulation, and body fat may exceed 30% of body weight in November–December. The fat depot makes them independent of a continuous access to food when feeding is restricted during winter, and contributes to the thermal insulation. A question still not answered is whether the ptarmigan puts on fat and double their body weight in autumn while they at the same time reduce their food intake. Or whether they increase both body weight and food intake, but reduce the activity level in autumn. In April they are almost fat-free even with the doubling of food intake from February until March. During summer they stay lean despite a high and stable food intake. The seasonal variation in body weight cannot be explained by variation in food intake and locomotors activity alone, though seasonal variation in daily energy expenditure must be taken into consideration. The Svalbard rock ptarmigan is able to reduce their energy consumption by 16% from summer to winter. They can also seek shelter in snow burrows to escape low temperatures and strong winds.

The only ecological study on the Svalbard rock ptarmigan was carried out in 1980-1986 and focuses on breeding biology, behaviour, social ecology and diet. In 2000 an annual monitoring project on spring densities of Svalbard rock ptarmigan cocks was started. In Svalbard the ptarmigans use separate habitats during the winter and breeding season. The wintering areas and the extent of true long-range migration of the Svalbard rock ptarmigan are not known. Flocks of migrating ptarmigans return to the breeding grounds in mid March, cocks arrive first followed by hens in early April. Altitude, terrain ruggedness and vegetation characteristics are the most significant landscape attributes that determine the presence of cocks. During breeding the cocks defend a territory varying between 3.5 and 50 hectare, which is significantly larger than found for rock ptarmigan in Alaska and willow ptarmigan in Norway. In Svalbard the cocks show periodically territorial behaviour throughout 24 hours due to continuous daylight in the breeding season. This is in contrast to willow ptarmigan and rock ptarmigan in mainland Norway showing territorial behaviour in the morning and evening. Currently there is very little information about the population size and variance in abundance of the Svalbard rock ptarmigan. Limited data on breeding density in Ny-Ålesund from 1981 and 1982 show a variation between 5.4 and 4.1 cocks per km². Results from the ongoing monitoring study in Adventdalen/Sassendalen (data from 2000-2004) shows that the population of territorial cocks vary between 2.7 and 4.9 cocks per km². These numbers are in agreement with breeding densities of rock ptarmigan in Iceland. Knowledge about population dynamics in Svalbard rock ptarmigan is limited due to lack of long-term time series data. Moreover, factors that could be responsible for ptarmigan population cycles are not studied in Svalbard. Both climate and predators are suggested as important factors that determine chick production; however, fluctuation in numbers may be caused by a combination of many aspects also including parasites, social factors and hunting.

Hunting in Svalbard requires a hunting license, and since 1997 annual harvest has varied between 824 and 1739 ptarmigans. The Svalbard rock ptarmigan show less marked fear behaviour to disturbances during incubation compared to willow ptarmigan in mainland Norway. Though the Svalbard rock ptarmigan is regarded to be extremely tame, the high Arctic climate makes them vulnerable to disturbances during incubation. The levels of persistent organic pollutants and heavy metals in the Svalbard rock ptarmigan are unlikely to cause physiological problems. We suggests future research and monitoring needs based on existing research and monitoring data on the Svalbard rock ptarmigan presented in this report. The most important research topics are winter biology (wintering grounds and migration routes) and population dynamics.

For further information see the full report: Pedersen, Å.Ø., Overrein, Ø., Unander, S. and Fuglei, E. 2005. Svalbard Rock Ptarmigan (*Lagopus mutus hyperboreus*) – a status report. – Rapportserie nr. 125, September 2005, Norsk Polarinstittutt, Polarmiljøseneteret, Tromsø.



<http://npweb.npolar.no/filearchive/1201533766.41>.

In order to provide better information about the different sub-species of rock ptarmigans, we are interested in getting in contact with researchers/scientists or environmental managers working with or that can provide samples (muscle/feather) from sub-species of the rock ptarmigan for genetic studies. We are working with the sub-species, Svalbard rock ptarmigan *Lagopus muta hyperborea*, and have collected samples for DNA studies. Our interest is to get samples from other distribution areas. If there are other groups planning to do the same type of studies we can provide samples for cooperation. Thank you for your help.

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Monitoring and status of the rock ptarmigan population in Iceland

Ólafur K. Nielsen

The reason for this note is to inform interested readers of Grouse News on the situation of the rock ptarmigan *Lagopus muta* in Iceland. The rock ptarmigan (hereafter ptarmigan) is the number one game bird in Iceland and has been harvested since the time of the settlement 1100 years ago. The population is monitored annually both to gather information on the population ecology of the species and also to provide information for management purposes.

The ptarmigan is quite a common breeding bird in Iceland found in all parts of the country from the coast to the interior, but the main breeding grounds are in lowland areas. It is the only tetraonid and for that reason the only gallinaceous bird species breeding in Iceland. It is of Nearctic origin and the Icelandic population has been given a sub-specific status *L. m. islandorum* (Holder et al. 2004). The “gateway to the west” is still open and Greenland ptarmigan *L. m. captus* have been collected repeatedly in Iceland (Gudmundsson 1972, Icelandic Institute of Natural History, unpublished data). The Icelandic breeding population, based on ringing and radio-tracking, is sedentary but the birds move on a seasonal basis between summering and wintering areas (Icelandic Institute of Natural History, unpublished data). There is a north-south gradient with respect to the extent of these travels, the two extremes being the south-west and the north-east parts of the country. The breeding birds in the south-west only make local movements, maximum 20-40 km, and many have their breeding areas within their winter home range. Birds breeding in the north-east make the most extensive movements, part of the population winters locally but parts migrate to east Iceland (100-200 km) or to south and south-west Iceland (200-350 km).

The Icelandic ptarmigan population has multi-annual cycles with peaks approximately every 11 years (Gudmundsson 1960; Nielsen and Pétursson 1995). The main predators include gyrfalcon *Falco rusticolus*, Arctic fox *Alopex lagopus*, common raven *Corvus corax* and the introduced American mink *Mustela vison*. The gyrfalcon can be defined as a “resident specialist” with respect to the ptarmigan but the three others as “generalists”. The gyrfalcon shows both a numerical and a functional response to changes in ptarmigan numbers. The numerical response has a 2-3 year time-lag and it has been suggested that the gyrfalcon is one of the factors driving the grouse cycle in Iceland (Nielsen 1999).

The ptarmigan is the only upland game bird and as such the most popular quarry for Icelandic hunters, succeeding both waterfowl and seabirds. Ptarmigan hunting is defined as sport by the responsible authorities, The Ministry for the Environment, and to ensure sensible use of the resource the population is monitored on an annual basis (Nielsen et al. 2004). Most of this monitoring that has been followed up since the 1990s traces its origin to earlier works on the population ecology of the ptarmigan in the 1960s (Garðarsson 1971), and ptarmigan-gyrfalcon relationship in the 1980s (Nielsen 1986). The monitoring projects include:

1. Censuses of territorial cocks in spring
2. Measuring age ratios in spring, late summer and late fall
3. Collecting hunting bag statistics

The first two projects are the responsibilities of the Icelandic Institute of Natural History (IINH) and the third project falls under the Environment Agency of Iceland (EAI).

All hunters in Iceland have to have a valid hunting card issued on an annual basis by the EAI. Hunters have to return annual statements listing the number of individuals of every species taken, in what sectors of the country the birds were hunted (6 sectors), and the number of hunting days devoted to each species. This system was adopted in 1995 and is obligatory; to renew their licence hunters have to turn in



a report. The data for 1995-2002 shows that the numbers of ptarmigan hunters has remained fairly stable, c. 6000, but the harvest has varied between 80.000 and 166.000 birds (<http://www.ust.is/Veidistjornun/>).

The main purpose of the spring censuses for ptarmigan is to derive a population index to study population change and trends. About 40 areas are censused every spring. The traditional way to census ptarmigan in Iceland has been to count territorial cocks on census plots that are visited in spring (Gardarsson 1988). Lately, extensive areas have been censused using transects and the Distance sampling approach (Nielsen et al. 2004). The longest time series go back to the 1950s, some few were started in the 1960s and 1980s but most in the 1990s. Combined the census plots and the areas counted using transects cover c. 3% of the total breeding habitat of the ptarmigan in Iceland.

Age ratios are important to study the demographics of the population. Age ratios are collected three times per year, in late summer and again in late fall and then in spring. Age ratios in late summer (chicks/adult) are collected only in the north-east and the south-west. This is done by flushing birds and counting chicks and adults. Age ratios in late autumn (juveniles/adults) are based on wings collected from hunters and these samples come from all parts of the country. Age ratios for the spring population (juveniles/adults) are collected only in the south-west and the north-east. The sample are birds trapped for ringing, birds found dead out in the field (mainly killed by gyrfalcons) and lately birds flushed and photographed with high speed digital cameras.

This monitoring data has been used to study cyclic changes in numbers, population trends and mortality rates (Brynjarsdóttir et al. 2003; Magnússon et al. 2004; Nielsen et al. 2004). It is generally acknowledged that ptarmigan peaks in Iceland during the first part of the 20th century were big (Nielsen et al. 2004). The last of these peaks was in 1956 and the peaks that have followed have been only 1/5-1/2 the size compared to 1956. Time series analysis of count data from north-east Iceland 1981-2002 shows that this downward trend has continued and the long-term decline since 1981 amounts to c. 4% per annum (Brynjarsdóttir et al. 2003) (Figure 1). Calculated total autumn numbers in 1998 were 0.8 million birds compared with 2.5-3.1 millions in 1956. The main reason for the decline at least post-1981 are increased mortality rates (Figure 2). A population model based on the data from north-east Iceland predicts that increased mortality rates will reduce the size of the peaks and that at some level the cycle will collapse and the population remains at low numbers (Magnússon et al. 2004).

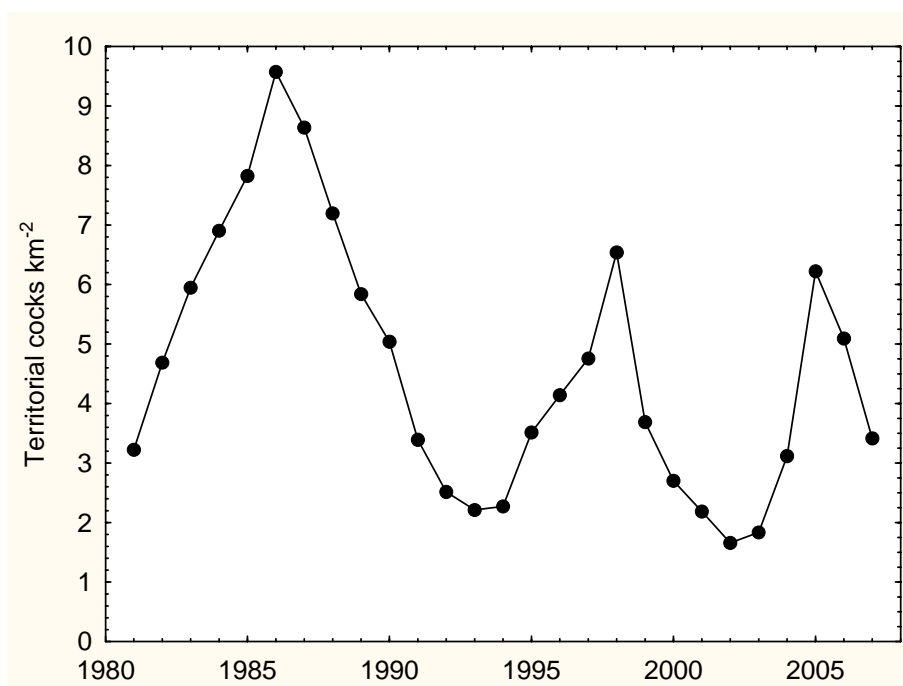


Figure 1. The weighted average densities of territorial rock ptarmigan cocks on 6 census plots in north-east Iceland 1981-2007 (cf. Nielsen 1999).

The plight of the ptarmigan population has been of general concern. The minister for the environment decided to take action and imposed a hunting ban in 2003 and again in 2004. The traditional hunting period had been from 15 October to 22 December. The response of the ptarmigan population was



immediately noticed in spring 2004. The population increased with an almost doubling from one year to the next, and mortality rates were reduced to levels not observed before. This was repeated again in spring 2005. In fall 2005 hunting was again allowed, but at much reduced levels, the take was c. 50% of what it had been at similar population levels in the 1990s. This reduction in the catch was accomplished by shortening the season, prohibiting market hunting and by an information campaign on behalf of the ministry and the hunting association directed at the hunters and encouraging them to adopt a voluntary bag limit (c. 12 birds per hunter). All the same, as soon as hunting was allowed again the demographics of the ptarmigan population was back to what it was before the hunting ban. The population decline that started has continued since and mortality rates were back to previous levels. This last increase phase was then very short, only two years.

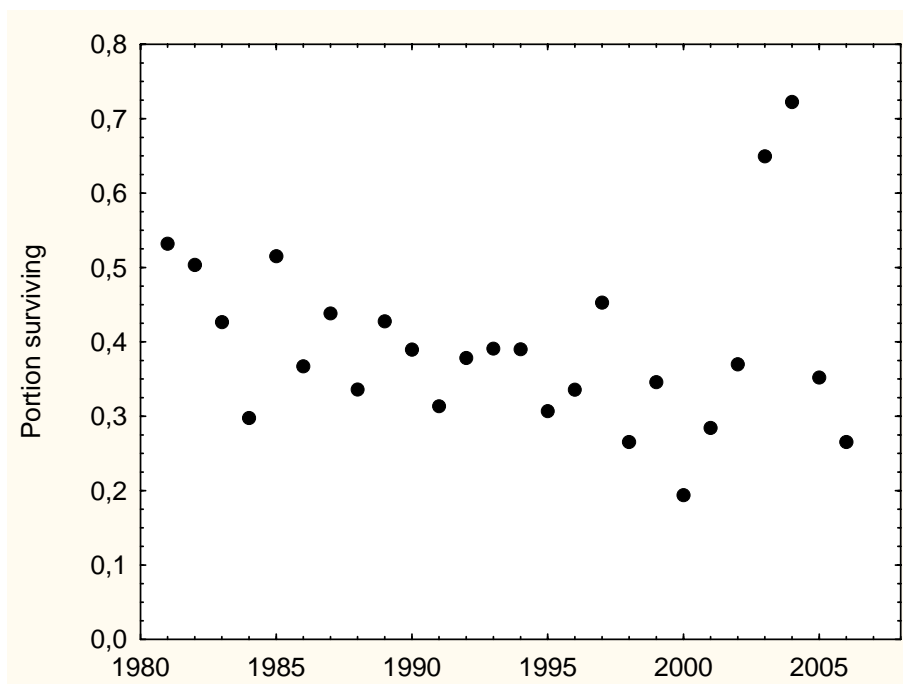


Figure 2. Survival (return rates) of adult rock ptarmigan in north-east Iceland. Calculations are based on spring censuses for territorial cocks and age ratios for the spring population.

One interesting part of this story is that the demographic parameters measured showed the same values both on an hunted area in north-east Iceland (c. 5000 km²) and a protected area in south-west Iceland (2600 km²). In both areas population increased during the hunting ban and decreased at similar rates after the ban and same relates to mortality rates. There is no doubt that hunting levels in both 2005 and 2006 were much reduced from what it was at similar population sizes earlier. This is confirmed both by reports by hunters to EAI and also by an independent consumption survey run by Gallup in both years. If hunting is one of the factors responsible for the decline of the ptarmigan population how do we then account for the fact that hunting only explains part of the increased mortality since 2005, and also the identical population change on hunted and non-hunted areas? Is there interaction between hunting and other mortality factors; is density dependent predation or dispersal in late winter responsible for identical population changes on hunted and non-hunted areas as measured in late spring?

To summarize, the ptarmigan in Iceland is important both with respect to its position within the food-web and also because of its importance as a game bird for humans. The population is cyclic, with peaks approximately every 11 years. The first part of the 20th century was characterized by “big” peaks, but the last part of the century by a steady downward trend of the population. The population still shows cycles but the peaks are getting lower. A two year hunting ban led to dramatic changes in the demographics of the population not witnessed before. With lifting of the hunting ban the demographics of the population returned to the pre-ban levels even though the hunting pressure was much reduced.



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Capercaillie monitoring is an important tool for observing changes in boreal forest ecosystems, but introduction of a hunting ban in the Slovenian Alps has highlighted certain problems

Miran Čas

Introduction

In the light of changes in land use and natural forest structures within the habitats of capercaillie and other grouse species within their European distribution range over the last four decades, we have investigated the permanent decline in population densities of these species and their gradual disappearance along the latitudinal and altitudinal boundaries of their ranges. Regional differences in forest and hunting management systems and in the interpretation and application of the multipurpose use of forest ecosystems in diverse landscapes throughout Europe, results in variations in the degree to which the natural forest biodiversity is preserved. Capercaillie is classified as one of the key species for biodiversity control in maintaining multipurpose co-natural forest management in boreal and mountain forests of mixed coniferous trees: It has been recognized as an indicator species for primary or secondary forests with natural form and structure and as an indicator of various levels of biodiversity and conservation need. Capercaillie distribution and population density monitoring is used as the main tool for monitoring the species' forest ecosystems, together with landscapes changes and habitat suitability (e.g. Eiberle 1984; Wegge 1985; Rolstad and Wegge 1987, 1989; Schroth 1995; Beškarev *et al.* 1995; Čas 1996, 1999, 2000, 2002, 2006, Storch 1999, 2002, 2007, Klaus *et al.* 1997, Čas and Adamič 1998, Angelstam 1999, 2004; Angelstam and Lazdinus 2000; Mikusinski *et al.* 2001, Angelstam and Čas 2002; Perco 2002, Sjöberg and Ahlen 2002, Spidso *et al.* 2002, Sachot *et al.* 2003, 2006, Saniga 2004, Pakkala *et al.* 2003, Suter *et al.* 2002, Menoni *et al.* 2002, Kutnar *et al.* 2005, Roberg and Angelstam 2006, Duriez *et al.* 2007). Analyses of hunting statistics can only be used as general tools for monitoring the species' population dynamics in countries with hunting in optimal parts of its range, or in countries where the species is endangered and where no data is available on monitoring about endangerment and no protection laws. The conditions for grouse monitoring were based on the example of Slovenia (20,269.79 km²) serving as a model region within South Central Europe (geographical crossing point of the Alps and Dinaric Alps, sub-



Pannonian and sub-Mediterranean region). In the Slovenian area, hunting statistics were examined for the period 1874-1984 and capercaillie were monitored between 1979 and 2000.

Problems with monitoring in relation to the introduction of the hunting ban (1984) in Slovenia as a post-socialist state (1991)

The problem today in monitoring capercaillie and other grouse species on leks is that this is a continuation of the monitoring undertaken in 2000, when social changes arising from the disintegration of the former socialist state of Yugoslavia in 1991 began to be reflected in changes in state property and the economy. Forests cover 60% of Slovenia. The new concept of privatization has also affected the ownership structure of forests, with the proportion of forests in common ownership dropping from two-thirds of the total forest area to only a quarter (SFS, 2006). Despite all the above changes, multi-purpose, sustainable forest management has been maintained. Reduced support from the new state for the non-material and non-profit functions of forests as a common resource, has also led to a reduction in support for monitoring. Meanwhile, financial income in the State or European Community projects aimed at monitoring is very complicated and only partial, orientated above all to Natura 2000 sites or to targeting certain extremely rare species or habitats. Thus, the population status of many rare species remains unknown, especially with regard to dynamic conservation for human use in the Natura 2000 sites (Jančar 2007). Even more problematic is the status of non-charismatic species, and in particular the status of unknown 'new' species of invertebrates living in soil (pedofauna) on permanent forest ground (Čas 1996, 2002, 2006; Mršić 1997, Čas & Adamič 1998).

Grouse hunting ban leading to decreased motivation for monitoring

As for other grouse species (*Tetrao tetrix*, *Bonasa bonasia* and *Logopus mutus*) in Slovenia, with ranges bordering the alpine and dinaric distribution region of capercaillie, future monitoring of capercaillie metapopulation distribution and density is becoming more and more difficult. The monitoring of Capercaillie on leks in Slovenia started in 1979, but the last lek counts were undertaken in 2000, more than seven years ago.

The first problem preventing continuation of grouse monitoring projects is the money needed for the previous research organization (Slovenian Forestry Institute) and for specialists such as foresters and hunters (Slovenian Forest Service, Slovenian Hunting Association).

The second problem lies in the decreased motivation of hunters for the difficult task of monitoring grouse species on leks. Similarly, the motivation of specialists (hunters) to act as volunteers in capercaillie monitoring has decreased with the prohibition of hunting in Central Europe (Storch 2000, 2007). Some people in Slovenia and Europe believe that the solution to the problem is to allow sporadic hunting in those habitat areas with high densities of grouse species, as a tool for the sustainable use of natural resources; this would increase motivation for grouse monitoring and assure conservation of habitats and stable population trends (Čas and Savič 2008).

A similar phenomenon has been observed in Finland, where the motivation of volunteers for the wildlife triangle scheme (WTS) census of wildlife monitoring is greater where field conditions are easier and within the hunters' own hunting areas (Pellikka *et al.* 2007).

The third problem is the age of volunteer hunters and foresters. Many older capercaillie hunters who, as volunteers, had observed and studied the species up to the abolition of hunting in 1984, and some other species up until 1993, have now become elderly or died.

In addition, the number of young hunters has been declining and at the same time they are not so eager to learn monitoring methods; with the prohibition of hunting, the number of mentors has declined, while, particularly in hard weather (snow), the remote leks become harder to reach, exacerbated by the steepness and inaccessibility of the high mountain slopes and ridges (Čas 1999, 2006).

However, specific research into the effectiveness of capercaillie monitoring on leks in regions where the bird is more endangered and on the edge of its range at lower altitudes above farmland, demonstrated a higher motivation amongst volunteers who made frequent observations on the active or abandoned leks (three or more visits). The lek surveys of capercaillie in 2000, carried out on this bird as a charismatic species, monitored 290 active leks (42.6 % of all 681 known leks), 94 inactive leks, and 297 abandoned leks. 106 of the leks which had been abandoned in the last 10 years (Čas 2006), were found to be occupied (15.6 % of all leks).

Conclusions regarding problems with monitoring grouse

1. Reduced support from the new post-socialist states for the non-material and non-profit-making functions of forests as a common resource has also led to decreased support for species monitoring. Meanwhile, financial assistance from State or European Community projects aimed at monitoring is very complicated and only partial.



2. The source of the problem is a decline in the motivation of hunters to carry out difficult monitoring of grouse species on leks. Similarly, specialist volunteers (hunters) are far less motivated to monitor capercaillie as a result of Europe-wide hunting bans.
3. Volunteer hunters and foresters are increasingly elderly. The number of young hunters is declining and these are not so eager to learn monitoring methods.

Possibilities for maintaining grouse monitoring in Central Europe

1. Observers of grouse species on leks at the edge of the species' ranges, demonstrated higher motivation, since they are in mountain regions with higher density.
2. Some people in Slovenia and in Europe believe that the solution to the problem is to permit sporadic hunting in habitat areas with high densities of grouse species, as a tool for the sustainable use of natural resources.
3. Can funding for grouse monitoring be secured on the level of the IUCN Species Survival Commission?

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Male capercaillie with female plumage. Tor Kristian Spidsø & Per Gustav Thingstad

Each year birds with abnormal behaviour are reported in Capercaillie. Males display against and attack people and females do behave as if it was a displaying male when facing people. Also hybrids are found where different species of grouse mate. Hybrids between capercaillie *Tetrao urogallus* and black grouse *Tetrao tetrix* are well-known. Also different colouring has been reported by private people, but as far as we know not published.

In November 1998 a capercaillie was shot in Sognedalen, Midtre Gauldal in central Norway. However the plumage of this bird was like a hen except for some feathers at the breast (Figure 1). The bird had a size typically for a big capercaillie, being 4.98 kg when it was handed over to the Museum of Natural History and Archaeology for preparation, implying a living weight of more than 5 kg. For comparison the male in the background on the picture had a weight of 5.1 kg. When the bird was examined at the laboratory the capercaillie hen showed to be a cock with full-grown testicles.



Figure 1. A normal coloured and a female-coloured capercaillie male. Photo: PGT

Klaus & Dietzel (2008) report in this issue of Grouse News on a capercaillie hen with completely male-coloured plumage in the 3rd year of life. This shows that discoloration may occur in capercaillie. Males may have plumage like females and females like males. The reason for the discolouring of grouse may presumably be hormonal. It is widely assumed that the development of male secondary sexual traits in birds and mammals is testosterone-dependent. However, male-type plumage is, generally, the neutral state of development (Owens & Short 1995). Ovariectomizing a female peacock causes her to develop male-type plumage while castrating a male peacock has no effect on his elaborate plumage. This indicates that the female plumage of this capercaillie cock not necessarily is a result of hormones, and placing the proximate control of plumage dichromatism in a phylogenetic context suggests that estrogen-dependent



plumage dichromatism, found in some avian orders of birds like Galliformes, is likely to be ancestral in extant birds (Kimball & Ligon 1999).

If anyone have similar observations of grouse species with plumage that differ from what is normal it would have been very interesting to get information on it.

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Male-plumage of a capercaillie hen Siegfried Klaus & Wolfgang Dietzel

The life history of this captive capercaillie female is well known: the bird hatched in the capercaillie breeding station in Thuringia in 2004, grew up and was marked individually with colour rings and developed a normal female plumage. In 2005 this female was not ready to copulate. In 2006 the female produced 8 eggs, incubated and raised six chicks successfully. During the moult the bird's plumage changed to male colour: The tail feathers were black, head, neck and back grey and the wings dark brown like a cock. There was no brown-black spotting in the plumage, but in sun light the typical female-like pattern within the dark feathers became visible to the trained observer's eye.

In 2007, the female did no longer take part in reproduction and after finishing the moult in summer 2007, the bird was more deep dark, completely resembling a cock: the beak was white, the black tail feathers prolonged, with some white marks at the tail covers. The black breast had a metallic green area like in cocks. The combs were bigger and more red as compared with normal females. The size and weight of the bird resembled a normal hen.

The male-coloured female increased the food intake markedly indicating also some physiological changes as well as behaviour. In spring 2007 the female did not show any courtship behaviour, nest building and egg laying did not take place.



Figure 1. The female in the 3rd year of life (December 2007) with fully developed male-coloured plumage, a white beak and more big and red combs. The body weight corresponds to a female.



There are only few examples of male-coloured capercaillie females described in the old literature. Wurm (1885) found three male-coloured females in the museum collections of Vienna, Nefchatel and Würzburg, some wrongly described as *Tetrao intermedius*. There is little chance to identify such aberrant birds in free nature. Therefore, the few individuals in collections result from shot birds, often collected at the historical game marked in St. Petersburg/Russia.

The change of plumage colour from female to male phenotype is probably of hormonal origin resulting from degeneration by illness (cancer or experimental castration) of the functional ovarium located on the left side of birds. The normally inactive ovarium on the right then develops into a testicle-like organ producing testosterone causing the change into male plumage. This is an interesting opposite example of the female-coloured cock described by Spidsø & Thingstad (2008).

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Landscape change and extinction processes – the case of black grouse in lowland Central Europe.

Tobias Ludwig

The rationale behind my PhD thesis “Landscape change and extinction processes – the case of Black Grouse in lowland Central Europe” was applying a landscape ecological framework to black grouse populations in the Central European lowlands where the species lost great amount of its former distribution. The main objective was to assess the hypothesis that large-scale land use changes have contributed to the declines of black grouse. In four chapters I address spatial and temporal patterns of black grouse distribution and abundance and landscape scale factors that might explain them. Consequently, the spatial extent is large and encompasses many lowland black grouse populations. Since present-day lowland black grouse populations are small and isolated, I based my thesis on historic data from the federal state Lower Saxony, north-western Germany.

The first part contains a reconstruction of black grouse distribution and abundance in Lower Saxony since the 1950s. It tries to answer the question how the species declined in different parts of the federal state and provides a framework for more detailed studies of possible factors behind these declines. Published and unpublished historic information on local occurrences of black grouse in 37,000 km² of the German federal state of Lower Saxony were used to reconstruct changes in the species' distribution and abundance since the 1950s. Population trends over 52 years (1955-2006) were calculated using software TRIM (Trends and Indices in Monitoring Data). Trends showed two phases: an initial crash phase (1950s-1980s) when many local populations went extinct, and a recovery phase (1990s-2000s) for the remnants of the initial distribution. Differences in timing and extent of the crash were related to habitat type. The study indicates that reconstructing population trends and distributions across larger geographic areas from historic data may enable comparative analyses of drivers of population dynamics across sites, and thus contribute to a better understanding of the causes of black grouse decline.

In part two, I investigate changes in land use intensity and land cover between 1952 and 1973 as possible drivers behind the declines. This part examines whether spatial variation in black grouse population trends and abundance are correlated to variations in these changes across three hierarchical spatial scales. I considered three hierarchic levels of administrative units: governmental regions (~6000km²), districts (~1000km²), and municipalities (~10km²). The extent was chosen as in part one. At the district level, land cover proportions remained relatively stable whereas indices of agricultural intensification heavily increased from 1952 to 1973. However, multiple regression showed that change in farmland area was the best predictor of the trends across scales. Correlates of historic black grouse abundance were moor land at the district scale and pasture cover and fallow land at the municipality scale. The results support the hypothesis that black grouse population dynamics in the lowlands of Central Europe are critically linked to land use changes. They may provide additional explanation where underlying factors on the habitat scale can not fully explain the declines.

In the third part, historic topographic maps from 1958 and 1975 were analyzed to track land cover changes and to model past black grouse distribution and persistence in large farmland-forest mosaics (c. 1270km²) in eastern Lower Saxony. The results show profound conversions of habitat area to forest and



farmland but also an increase in settlement area. Habitat conversions and suburbanization were negative correlates of black grouse persistence. Habitat models from before and after a decline period differed in some of the predictors and suggest black grouse habitat to be more diverse before the land cover changes. Results also show that landscape factors affect black grouse distribution predominantly from an area much greater than an individual black grouse home range. They can be used to evaluate potential black grouse habitat in present-day landscapes.

Using atlas data for the federal state Lower Saxony, part four examines which semi-natural areas explain black grouse and other red listed bird species occurrences in the 1980's. It evaluates if atlas data provide useful information for modelling breeding bird distributions and whether black grouse can be regarded an umbrella species for red listed bird diversity in farmland landscapes of Central Europe. I used breeding bird and biotope type atlas data from the early 1980s to explore whether the occurrence of selected red listed farmland bird species can be predicted with biotope types as characterized by dominant vegetation. Cover of degenerating peat bogs and wet grassland, but also biotope type richness and precipitation sum from May to July were related to the richness of red listed species. These variables were also important in different species-specific habitat models. From 16 logistic models of species occurrence, 13 retained precipitation sum from May to July. The inclusion of heather-moorland and other biotope types highlights their importance as semi-natural habitats for several selected species. In areas of black grouse occurrence there were significantly more red listed species than in former and never settled black grouse areas. Results indicate that secondary semi-natural biotope types, as characterised by dominant vegetation, are important for the large scale occurrence of red listed ground-nesting and farmland birds in the lowlands of central Europe. Furthermore, the management of black grouse habitat is likely to support a multitude of bird species and other taxa in the open landscape.

The first part of this thesis will be published soon as:

Ludwig, T., Storch, I. & Wübbenhorst, J. 2008. How the Black Grouse was lost: reconstruction of its status and distribution in Lower Saxony, Germany. *Journal of Ornithology* 00: 000-000.

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LETTERS TO GROUSE NEWS

Capercaillie midwinter display - again

In May 2007 we wrote to you in GN about the midwinter display of the capercaillie. Our article was based on observations made on several leks in the region of Aust-Agder, south of Norway, during the time 2003 to 2007.

However, the response to our article may indicate that we have been somewhat imprecise regarding our description of the site, display behaviour and intensity, or have been misunderstood. Therefore we would like to add a few details:

- It was not our intention to describe the midwinter display as something new for the GN's readers since we are well aware that this phenomenon is well known and described before.
- However, our aim was to describe an aspect of the midwinter display we think is less known, for this reason we would like to present a written account of our observations as precise as possible, and by this eliminate possible misunderstandings.
- Before we do that it is probably useful to describe the behaviour of the capercaillie on the leks in Norway.

A general description of the leks in Norway

In the capercaillie habitat the centre of the lek sites are situated within a distance of 2 to 2.5 km. A lek is a clearly defined site, usually restricted to a habitat of old pinewood. A lek including eight males, as an example, can have their display within an area of about 75,000 square metres. Within this area every male has its own display spot (see image). The display spot is usually a defined area around small tufts which each of the cocks regard as its own territory, this spot is normally no more than 100-250 square metres. On this small spot each of the individuals sits and makes the display. Between each of the displaying capercaillies, or every territory, there is a distance of around 20 to 60 metres. These distances vary according to the number of males taking part in the display.



Figure 1. Male territories at a capercaillie lek in southern Norway.



In 2004 we visited seven leks. The highest number of cocks taking part in a lek that we observed was 15. It seems like the males have established a strict hierarchy among themselves at the lek, and the fact that every cock has its own spot at the lek makes it easier for us to observe them. Thus we know exactly where the capercaillie will make the display the next day, and where to put the camouflage tent. In some cases it is possible to recognise an individual based on certain distinct features. We have observed that an older male (three years or older) has occupied the same small spot on a lek for three or four years. This is naturally a well-known fact for many of us; however responses from Storch in Germany indicate a different display pattern from what we describe here.

Then a little about the midwinter display

We are familiar with the fact that midwinter display is well known, so it was not our point to introduce this as a new observation. Capercaillies make sporadic displays during midwinter; this fact has been documented for quite some time. The midwinter display has often been observed within and outside the lek site. Moreover, it is relatively common to spot males on midwinter display close to females feeding. Many people have written about this and considered it a more or less random display linked to weather conditions, light change and the presence of other males or females. However, what we meant by midwinter display is something else:

Our observations show that:

- The capercaillies gather at the lek sites as early as in the midwinter. Here they mark their territory, which is about 100- 250 square metres.
- This suggests that the hierarchy which is evident at the mating season in April, to a high degree is decided at midwinter. Note that this is long before the mating season, which is from 15 to 20 April in our region.
- Our observations indicate that this organising often takes place in January and February. This is notably three months before the females visit the display sites for the purpose of mating.

This fact, however, was what we thought might be a possible unknown phenomenon among capercaillie scientists.

We might be wrong, but we have never heard that this characteristic ranking takes place at midwinter. We have discussed this with the biologist Erlend Rolstad. He has studied capercaillies for many years and is known for his research on this breed. He visited several leks in December 2007 and observed this specific type of behaviour mentioned above. Moreover, he claims he has not found any literature that describes or explains this specific behaviour among capercaillies.

In the end of February and in the beginning of March there is relatively little activity on the leks here in our region. However, in the last week of March and in the time between March and April the activity increases considerably. Then we can see the cocks coming to the display site at sunset, and in a determined manner go straight to their small spot at the lek. In our opinion, this seems to be predetermined. Each capercaillie has its own spot, and it appears to be mutual agreement within the group regarding the boundaries between these small defined territories at the lek. Therefore we maintain that our observations give evidence to the fact that the midwinter display at the lek is a crucial time where the cocks establish the ranking within the group, long before the mating season in April.

With this letter we hope to have made matters more clear and hopefully our viewpoints will reach the many readers of GN.

Yours Sincerely,
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SNIPPETS

Comments on 'Cripple losses from grouse-shooting, a brief review'

It seems likely that the percentage cripple losses of driven red grouse on Scottish moors may now exceed the very low ones reported from the 1950s and 1960s by AW in the above review. At grouse drives in recent decades, DD has often seen red grouse being hit and then glide for a kilometre to the other side of a corrie, especially if they have a tail-wind to help them. Hence, the topography of the moor can be important, as well as wind speed and direction. In the rush to get the next drive started, such birds that have been hit but manage to fly far out are not picked up.

Also, modern shooters are generally less experienced than their 1950s and 1960s counterparts, many of whom were crack grouse-shots, such as Sir Ian Walker-Okeover at Glen Muick and the Duke of Roxburghe at Millden. Some of them travelled the world to improve their skills by pursuing their hobby with other game-birds, although they regarded the red grouse as the climax to their year. We would expect a decline in experience to result in a greater proportion of cripple losses, and also a larger ratio of cartridges fired to birds in the shooting bag.

Some gamekeepers on Scottish grouse moors tell us that an experienced 'gun' (hunter) fires about 2-3 shots per bird hit, and one can see this at grouse-drives. The ratio increases with an inexperienced gun to about six shots per bird hit, especially after a heavy liquid lunch! Some estates that let their shooting now charge per cartridge fired rather than per grouse or brace. Such an estate has a person who counts all shots during a grouse drive, and the spent cartridges are picked up from the shooting butts. Hence the hunters pay for seeing birds and firing at them, whether or not they hit any. Estates should have data on the ratio of shots per brace in the bag, a field for new study.

Keepers often stress nowadays the importance of 'showing' many grouse to hunters, so that guests feel satisfied. Showing many birds can be impressive, even if a strong wind prevents most of the birds from coming over the butts, or if the wind raises them wild and out of range when hunters 'walk up' in a line with keepers with dogs. Much depends on how good the visibility is for the hunters. If they can see approaching grouse at far range, they are better placed to fire at them. By contrast, if birds appear suddenly at close range, inexperienced guns are taken aback and kill few of them.

Weather on the day can also affect the success of the shoot. On hot still days, some head keepers cancel the shooting or stop it during the course of the day, because red grouse in such conditions fly so slowly that they are easier targets. Easy targets would reduce losses from crippled birds. However, keepers often cancel or stop the shooting for other reasons of animal welfare, as well as for hunter satisfaction. They have seen from past experience that birds become stressed in hot conditions and often fly only short distances, so that over the course of a drive they may be flushed four or five times and frequently are hardly fit to fly over the shooting butts.

Footnote: Clarification on "Cripple losses from grouse-shooting, a brief review", p.4. Larry Ellison has pointed out an ambiguous sentence in the paragraph on black grouse, where I cited what he wrote to me about woodcock. It could easily be misinterpreted that he once shot at three woodcock which flew without any of them falling and that his dogs found them dead a few minutes later. As Larry says, that would be quite a feat! In fact these three cases of dogs later finding birds that had earlier shown no signs of having been hit concerned three different incidents during about 12 years of hunting woodcock.

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Grouse people helped a primary school in the Lianhuashan Natural Reserve, Gansu, China

During the post symposium excursion of the 9th International Grouse Symposium in 2002 held in Beijing about 60 grouse specialists from about 20 countries visited the Lianhuashan reserve to see first time in their life the Chinese grouse, the blue-eared- and blood pheasants, the chestnut-throated partridge and many famous small birds, some of them endemic to China.

A visit to the primary school of the small mountain village Huo Shao Wa at 2,600 m a.s.l. located in the reserve brought the idea up to collect money to buy a new stove for this tiny school in the village. This money and additional money supported from Sun Yue-Hua's and Fang Yun's projects helped to



restore the school in the best way: new windows for the three rooms were bought, the floor of the whole building simply made by clay before was covered with bricks, new stoves for all rooms and white painting inside and outside the building was realized.



Pupils at the renovated primary school of the small mountain village Huo Shao Wa at 2,600 m a.s.l.



Pupils and Sun Yue-Hua, Fang Yun and Siegfried Klaus outside the renovated primary school of the small mountain village Huo Shao Wa.

When we visited the school in May of the last year, a series of photos was made to show the participants the outcome of these activities.

A good relationship between the native people in the reserve and the scientific staff would form a good base for environmental education to create the understanding of the need to protect the wonderful nature of the Lianhuashan natural reserve with its famous forests, flowers, birds and wildlife, including the Chinese grouse as a main target of our studies.

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Tim Poole has taken over for Kenny Kortland as Capercaillie Project Officer in Scotland

Kenny Kortland has recently left his post as Capercaillie Project Officer in Scotland to take up a position as Woodland Ecologist with Forestry Enterprise. He has been replaced by Tim Poole. Tim was until last autumn, Scientific Assistant at A Rocha France based near Arles. For 18 months, Tim carried out research on the European roller; monitoring the local population and studying foraging and breeding behaviour. Prior to that, Tim completed his Masters in Biodiversity and Conservation at Leeds University and his Honours degree in Zoology from Cardiff University.

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