

Practical implementation of species' recovery plans – lessons from the White-backed Woodpecker Action Plan in Sweden

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Successful biodiversity conservation requires safeguarding viable populations of species. To work with this challenge Sweden has introduced a concept of Action Plans, which focus on the recovery of one or more species; while keeping in mind the philosophy of addressing ecosystems in a more comprehensive way, following the umbrella concept. In this paper we investigate the implementation process of the Action Plan for one umbrella species, the White-backed Woodpecker (WBW) *Dendrocopos leucotos*. We describe the plan's organisation and goals, and investigate its implementation and accomplishment of particular targets, based on interviewing and surveying the key actors. The achievement of the targets in 2005–2008 was on average much lower than planned, explained partially by the lack of knowledge/data, experienced workers, and administrative flexibility. Surprisingly, the perceived importance of particular conservation measures, the investment priority accorded to them, the money available and various practical obstacles all failed to explain the target levels achieved. However qualitative data from both the interviews and the survey highlight possible implementation obstacles: competing interests with other conservation actions and the level of engagement of particular implementing actors. Therefore we suggest that for successful implementation of recovery plans, there is a need for initial and inclusive scoping prior to embarking on the plan, where not only issues like ecological knowledge and practical resources are considered, but also possible conflicts and synergies with other conservation actions. An adaptive approach with regular review of the conservation process is essential, particularly in the case of such complex action plans as the one for the WBW.



1. Introduction

Successful long-term conservation of threatened species requires not only safeguarding individuals, but maintaining viable populations (Hanski 1998, Fahrig 2003, Traill *et al.* 2010). This often involves large scale activities aiming at maintenance or restoration of habitats of suitable quality and size, which are functionally connected within a landscape (With *et al.* 1997, Hunter 1999). So far the most common strategy for biodiversity conservation has been the creation of networks of protected areas, such as national parks and nature reserves, to conserve sensitive ecosystems and communities or maintain particular species (Roberts *et al.* 2003, Rodrigues *et al.* 2004). However, dealing with species that have large area requirements and that live in production landscapes, e.g., regularly managed forests or agricultural land (Miller and Hobbs 2002, Pierce *et al.* 2005, Mikusiński *et al.* 2007) may require going beyond protected areas and introducing special management measures in other areas as well. Moreover, some particular types of ecosystems need recurring disturbances to maintain their conservation values (Hobbs & Huenneke 1992). This may concern either natural disturbances like fire in boreal forest (Peterken 1996, Kozak *et al.* 2012) or human-induced disturbance regimes like regular mowing of meadows or grazing on pastures by domestic stock in agricultural landscapes (Carvell 2002). In the boreal forests, one challenge is to maintain biodiversity linked to successional phases of forest development after disturbance (Bengtsson *et al.* 2003). In the absence of natural fire regimes and intensive forestry these habitats are very uncommon in today's landscapes and require active restoration in order to support dependent species (Mikusiński *et al.* 2007). This presents further challenges of coordination across different management objectives and scales.

The various approaches to biodiversity conservation are translated into a multitude of plans and programmes to be implemented. These are sometimes successful and sometimes fail in achieving the desired conservation goals (Priddel & Carlile 2009). Studying both success and failure of conservation actions is crucial for the understanding of the complex nature of the conservation strategies' outcome (Knight 2009). In many cases a plan

or a programme does not straightforwardly lead to implementation in practice, since there are many issues of concern and obstacles for effective implementation (Wärnbäck & Hilding-Rydevik 2009). Moreover, the successful implementation of a conservation plan does not necessarily mean the achievement of its main goal, e.g., securing the population survival of the target species. Research into implementation success/results has focused either on the implementing actors and their role in implementation (Petts & Brooks 2006), on the institutional context of implementation (Nykqvist & Nilsson 2009) or both of these (Patel 2006, Blicharska *et al.* 2011a). Three recurring issues in implementation studies are the knowledge (understanding), ability to act (resources and practical constraints) and attitudes of the implementing actors (or their willingness to act) (Sandström *et al.* 2006). In this paper we focus on the implementation of a major recovery plan developed for one species in one country (Sweden), seen from the perspective of the implementing actors, and particularly on the practical obstacles (resources, tools, problems) to its implementation.

The Swedish approach to species conservation is largely based on work with red-listed species (Gustafsson 2002, Gustafsson & Perhans 2010). To safeguard the most threatened red-listed species in Sweden the concept of Action Plans (Swedish: Åtgärdsprogram) has been introduced (www.naturvardsverket.se). The idea behind an Action Plan (AP) is to focus on a particular species (or group of species) and coordinate activities of different authorities for the species' conservation. The plans include an array of different conservation measures, with the main idea being to focus on both area protection and management to create, restore and maintain high quality, functionally connected habitats for threatened species. The initial intention was to create about 200 APs in Sweden by 2010, however, this has not fully succeeded and presently (2013) there are 114 APs ready (92 for single species and 22 for groups of species). Out of the roughly 200 planned APs, about 90 concern species linked to forest habitats. In Sweden forests are the dominant type of ecosystem and provide habitat for many important species (Berg *et al.* 1994), but the large impact of modern intensive forestry causes rapid decline of many species dependent on the structures and processes found in

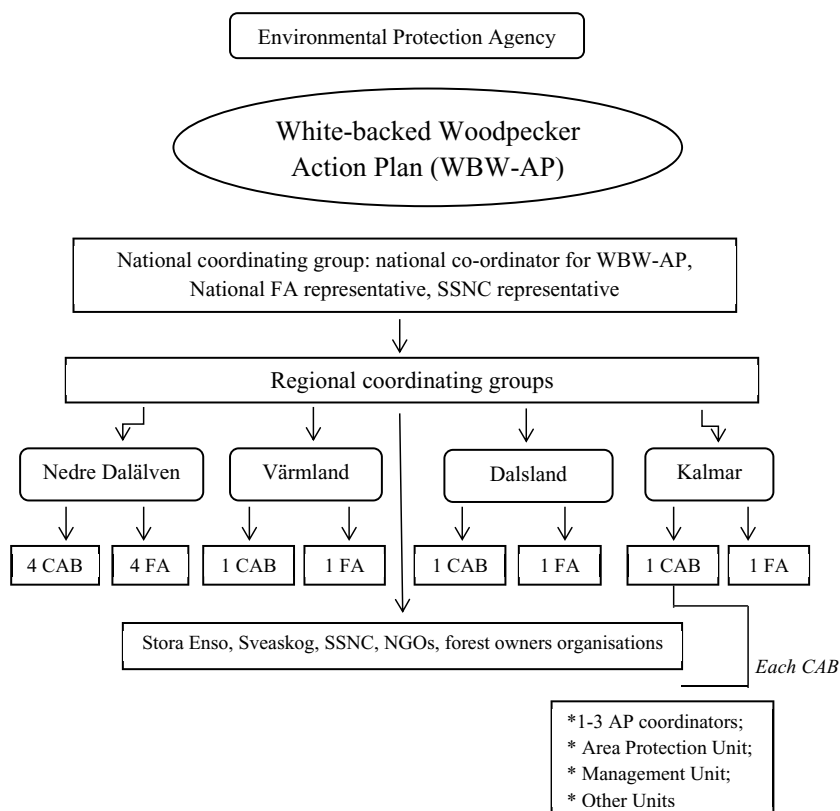


Fig. 1. Organisation of WBW-AP implementation. Note that region of Nedre Dalälven comprised 4 different counties. CAB – County Administrative Boards; FA – Forest Agency; SSNC – Swedish Society for Nature Conservation; NGOs – other non-governmental organisation

pre-industrial forests (Björse & Bradshaw 1998, Nordlind & Östlund 2003).

Although APs in most cases focus on one or few selected species, there is a further aspiration of addressing ecosystems in a more comprehensive way, following the concept of umbrella species (Roberge & Angelstam 2004). One species considered as possessing the umbrella function in Swedish forests (Roberge *et al.* 2008), the White-backed Woodpecker (WBW) (*Dendrocopos leucotos*), has generated one of the most ambitious and expensive APs to date. The WBW is a specialist species that requires extensive areas of forest usually dominated by deciduous trees, of which a sufficient amount should be old and dead or dying, to act as a foraging substrate (Aulén 1988, Carlson 2000, Edman *et al.* 2011). This specialisation is the main reason for the decline of the species in landscapes with intensive forest management that de-

creases the volume of dead wood and promotes coniferous tree species, which are more economically profitable (Virkkala *et al.* 1993, Wesołowski 1995, Czeszczewik & Walankiewicz 2006). The WBW is considered Critically Endangered in Sweden under the IUCN criteria, and it is one of the most threatened vertebrate species in the country. In Sweden the WBW has declined steadily with only single breeding attempts recorded at present (Aulén 1988, Mild & Stighäll 2005). For that reason, a recovery plan for the conservation of the White-backed Woodpecker population in Sweden (henceforth, “WBW-AP”) was launched in 2005 (Mild & Stighäll 2005). The plan encompassed different measures for the conservation of this species for four years, from 2005 until 2008, with the intention of reviewing and updating the plan regularly to ensure eventual species recovery. Moreover, the WBW-AP set quantitative targets,

such as aiming to have a specific number of breeding pairs by a given year (200 breeding pairs in 2070 with associated interim goals). Such a quantitative approach to conservation is very uncommon, and has rarely been applied in recovery plans around the world (Possingham *et al.* 2010). After 2008, the revision of the plan was prepared, however, it is still (as of 2013) not formally accepted.

The goal of this study is to analyse the implementation of the first phase (2005–2008) of the WBW-AP in Sweden. First, we describe the WBW-AP, its organisation and goals. Second, we examine the implementation of the WBW-AP in terms of the accomplishment of practical conservation measures in the field at regional and national levels. Third, we examine possible reasons why the planned conservation measures have not been fully realised and how their implementation differed among particular regions. Finally, we discuss the implications of our results for practical implementation of recovery plans in general.

2. Material and methods

2.1. Action Plan for White-backed Woodpecker in Sweden

The AP for the WBW was created by the Swedish Environmental Protection Agency (EPA) (Fig. 1). Its long-term objective was to re-establish a favourable conservation status for the species and its habitat (Mild & Stighäll 2005). By 2030 the Swedish population of WBWs should be at least 50 reproducing individuals, with at least 100, 200 and 500 reproducing individuals by 2040, 2050 and 2070, respectively. The short-term objective was to reverse the negative population trend. The choice of conservation measures in the first phase of the WBW-AP was based on the available knowledge concerning the ecological requirements of the species, current and predicted availability of habitat (i.e., older deciduous-rich forest with high amount of dead-wood), its former and current distribution in Sweden, existing engagement of regional authorities and NGOs, the legal context and available financial resources. The work has been planned to take place in four regions that have been assessed as having the highest potential for successful species recovery i.e., the

eastern part of Småland province (from now on “Kalmar region”); Nedre Dalälven, the area around the lower Dalälven river; and the provinces of Värmland and Dalsland (Fig. 1). Most of the conservation measures had clear quantitative goals to be achieved during the implementation. For example, a total area of 1850 ha was planned to be covered by 2008 by conservation agreements designed to increase the amount of deciduous trees in the landscape.

The main units responsible for the implementation of the AP were seven County Administrative Boards (from now on “county boards”) from the four “WBW regions”, and corresponding four regional offices of the national Forest Agency (Fig. 1). The WBW-AP was coordinated by the national coordinating group that met 2–3 times a year and, in addition, had regular telephone and e-mail contact. They coordinated WBW-AP conservation measures in particular regions and at different levels, and motivated other actors to work with the WBW-AP. The next level of organisation was regional coordinating groups consisting of representatives of all county boards and regional units of Forest Agency within a region, representatives of forest companies (such as Sveaskog), the Swedish Society for Nature Conservation, other non-governmental organisations, and forest owners’ organisations.

Both the Forest Agency and all relevant county boards, after negotiations with the EPA, decided to allocate some amount of money for the WBW-AP. Altogether, the money allocated for the WBW-AP from 2005 to 2008 was intended to be 200 million SEK (Swedish kronor; roughly €23m). However, the budget for the WBW-AP was preliminary and in reality this action plan competed for funding with other action plans and measures.

Actual conservation measures on the ground were carried out at the level of county boards and regional units of the Forest Agency. There were two main groups of measures, namely 1) creation of protected areas and 2) practical management measures. County boards were responsible for creation of nature reserves. Forest Agency regional units worked mostly with establishing cooperation with forest owners, in the form of nature conservation agreements (Swedish: Naturvårdsavtal) and habitat protection areas (Biotopskydd). A nature conservation agreement was a long-term (up to 50

Table 1. Conservation measures planned in particular regions (the planned amount of interventions and the associated costs in SEK 000 (thousands Swedish kronor).

Region		Nature re- serve (ha)	Habitat pro- tection (ha)	Conserv. agree- ment (ha)	Remo- val of spruce (ha)	Pre- scribed burning (ha)	Fen- cing (ha)	Creation of dead wood (no. trees)	SUM of costs
Dalsland	Measure	800	300	550	790	120	90	9,300	57,475
	Cost	28,000	14,400	8,800	2,465	2,750	840	220	
Nedre Dalälven	Measure	915	280	450	1,715	177	138	7,000	46,657
	Cost	20,650	13,440	7,200	3,456	955	816	140	
Värmland	Measure	730	310	850	1,665	105	33	9,400	56,232
	Cost	21,345	14,880	13,600	4,441	1,520	396	160	
Kalmar	Measure	545	0	0	1,220	100	20	4,800	22,675
	Cost	18,775	0	0	1,920	1,500	360	120	
All	Measure	2,980	890	1,850	5,390	502	281	30,500	183,039
	Cost	88,770	42,720	29,600	12,172	6,725	2,412	640	

Note: the table presents only costs by county boards and FAs, and does not include costs by other actors (e.g., the forestry companies Sveaskog or Bergvik); therefore in some cases the costs of particular measure may be different for particular regions, even if the area of particular measure (or number of trees) is almost the same (e.g., number of trees used for dead wood creation in Dalsland and Värmland). The table includes only costs of particular measures, but does not encompass other costs of the AP, such as coordinator's employment or information and dissemination activities.

years) agreement with the forest or land owner about what could be done in a particular area. Habitat protection was a tool to protect smaller forest habitats (usually 2–10 ha), while the owner was compensated for profits foregone. The main on-ground management measures proposed within the WBW-AP were removal of spruce and prescribed burning (both to promote deciduous succession), fencing (to exclude herbivores and promote regeneration of deciduous species) and creation of dead wood by girdling or creating high stumps (to provide foraging substrate for the WBW). Management was conducted within areas that were already under some form of protection or agreement with the owner. Usually, private contractors were hired to carry out the management. However, occasionally a county board or Forest Agency's own employees worked with particular management measures. The WBW-AP delineated, in each of the four WBW regions, a number of tracts (13 in total) that were characterised by the high amount of deciduous-rich forests and high number of areas being considered particularly valuable for the species ("värdekärnor" in Swedish) encompassing older forests with high proportions of deciduous component with a lot of dead wood, and often being protected already. The implementation of the conservation measures was

planned to be conducted within those tracts. Apart from area protection and management measures, the WBW-AP measures included a captive breeding and release program, annual monitoring and targeted information to landowners and other concerned stakeholders.

The planned levels of conservation measures in different regions are presented in Table 1. There were differences between regions both in terms of quantity of measures planned and their costs. At the national scale, the majority of costs (~80%) were linked to creation of protected areas and conservation agreements. Among different management measures, most money was allocated to the removal of spruce and prescribed burning, while fencing and creation of dead wood were rather minor elements of the AP.

2.2. Data collection and analysis

To gain general insight into the WBW-AP background, its organisation, goals and main players, we first studied the text of the plan (Mild & Stighäll 2005). Secondly, we conducted open qualitative interviews (Kvale 1996) with two of the three members of the national coordinating group, one at the end of 2009 and the second at be-

ginning of 2010, where we focused on the implementation of the WBW-AP and the implementing actors. One of them was also additionally interviewed in February 2013 to gain updated information about the WBW-AP. Moreover, we had a regular telephone contact with the third member of the national group, through whom we got many updates on the AP's developments. We extracted data on the quantitative goals of the WBW-AP and their achievement from the report delivered by the WBW-AP national coordinating group (Sjöberg *et al.* 2009). Using these data we compared planned levels of conservation measures for 2005–2008 with what had been achieved in this period. In addition, since to date (August 2013) work has continued despite no new version of the WBW-AP being adopted, we also compared these planned levels with achievements up to end of 2011 (Sjöberg, unpubl. data).

To investigate the implementation process of particular WBW-AP conservation measures and to understand the reasons for differences between planned and performed measures, we conducted an online survey (using web-based tool survey-monkey.com) of relevant actors implementing the WBW-AP in four regions (response rate 86.3%). These were representatives of each regional Forest Agency and county boards executing the WBW-AP, as well as other relevant actors (See Appendix, Table A).

The surveys consisted of 14 questions for the representatives of county boards (and other actors playing role similar to county boards in AP implementation) while representatives of Forest Agencies (and other relevant organisations) got 15 questions (see Appendix). Most of the questions to both kinds of actors were the same. Only the specific questions concerning details of particular conservation measures differed due to the fact that each actor was involved in slightly different types (and amount of) measures. The survey consisted both of general questions that aimed at overall evaluation of the WBW-AP's implementation, and detailed questions about particular conservation measures within the AP from the perspective of the implementing actors (see Appendix). In several questions the respondents were asked to reply on an interval scale ranging from 1 (strongly disagree) to 5 (strongly agree), corresponding to the Likert scale (Likert 1932). In other questions we

asked respondents to rank different alternatives (e.g., the perceived level of costs for particular conservation measures). Seven open questions, where people could give comments, complemented the scoring and ranking questions, supplying us with some background information and insight into the perceptions and preconceptions of the implementing actors.

We analysed the data by relating particular answers to the degree of the fulfilment of quantitative conservation targets in both the entire country and the particular regions for each of the planned conservation measures. Our analysis assumed a number of relationships between the degree of target achievement and perceptions of the respondents concerning different issues relevant for the WBW-AP implementation. These concerned, for example, the level of priority given by the respondents to the WBW-AP, or the effectiveness/relevance of particular conservation measures and possible obstacles in implementing these measures as perceived by the respondents. For instance, we expected that a high priority given by the respondents to a certain conservation measure would result in a higher level of achievement of its goal, while perceived obstacles would result in lower achievement of the goal. When relevant, we applied Spearman Rank Correlation Coefficients, using SPSS v.17 software (SPSS 2008), to test the strength and direction of these relationships.

3. Results

3.1. Achievement of the planned conservation measures

The achievement of the targets in 2005–2008 was on average much lower than planned. At the national level the best-achieved targets were creation of dead wood and establishment of nature reserves (on average 107.3% and 72.9% of the target, respectively) but these exhibited very large variation among regions (Fig. 2). Achievement of all other conservation measures failed to reach 50% of the targets at the national level with fencing being an extreme (6.4% of the target). Creation of nature reserves in Kalmar and creation of dead wood in Värmland and Nedre Dalälven were the only three cases where specific regional targets were fully

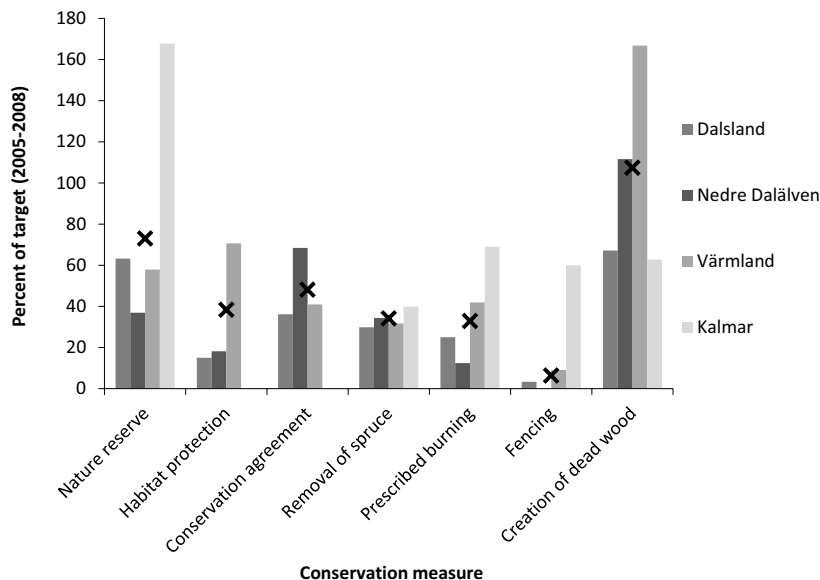


Fig. 2. Percentages of different conservation measures that were achieved (% of the measures planned between 2005 and 2008), by region. Crosses represent the mean for all regions. Note: there was no planned habitat protection, nor conservation agreements in the Kalmar region.

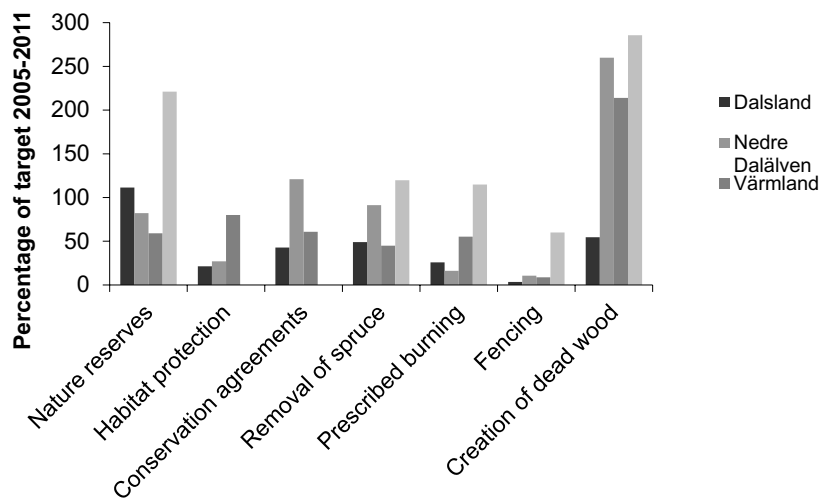


Fig. 3. Percentages of different conservation measures that were achieved (% of the measures planned between 2005 and 2011), by region. Note: there was no planned habitat protection, nor conservation agreements in the Kalmar region.

achieved or exceeded (Fig. 2). The degree of implementation varied broadly among regions and depending on the conservation measure. Averaging across all WBW-AP components (targets for particular measures), the Kalmar region achieved its targets to the highest degree, while the lowest level of achievement occurred in Dalsland (Fig. 2). The relative difference among target achievements of particular conservation measures expressed by the coefficient of variation was highest in Nedre Dalälven. As the implementation of the plan continued until 2011, the achievement levels in general increased for all the regions, however,

with growing differences among regions. By the end of 2011 though, none of the regions attained the planned levels for all the measures (Fig. 3).

3.2. Implementation of the WBW-AP as perceived by actors

According to both interviewed members of the national coordinating group, one of the main problems in the implementation process was a lack of full-time staff employed to work with the WBW-AP. The WBW-AP work was just added to the regular workload of existing staff. Consequently,

Table 2. Average rankings of the priority given and of the importance assigned to particular conservation measures (number of respondents, N = 44). CV = coefficient of variation

Conservation measure	Average priority given (scale 1–10)*		Average perceived importance (scale 1–10)**	
	Average of all regions	CV	Average of all regions	CV
Nature reserve ¹	6.4	0.24	6.0	0.28
Habitat protection ²	6.0	0.17	4.9	0.37
Conservation agreement ²	6.6	0.18	6.1	0.20
Removal of spruce ^{1,2}	8.0	0.04	7.3	0.06
Prescribed burning ^{1,2}	5.1	0.19	6.4	0.11
Fencing ^{1,2}	3.1	0.25	4.0	0.33
Creation of dead wood ^{1,2}	6.6	0.10	7.1	0.14

*Ranking from 1 to 5 for county boards (1) respondents who worked with five conservation measures, and from 1 to 6 for Forest Agency (2) respondents who worked with six conservation measures) standardized to ranking from 1 to 10, as most of the conservation measures overlapped. Also the values of the perceived importance of particular measures for the WBW are standardized to ranking from 1 to 10. Highest score means highest priority given/importance perceived.

the national coordinating group had limited influence to motivate them to work with WBW issues. Personal engagement of people working with the WBW-AP was thus crucial for the implementation of the plan. Another important obstacle was that the budget that was finally assigned to the WBW-AP work was only about 70% of the budget originally proposed. Furthermore, other conservation objectives were, according to the interviewees, often in conflict with the WBW-AP goals. One example was the environmental quality objective “Sustainable Forests”, running parallel with the

WBW-AP, and also recommended by the EPA. The main aim of this conservation strategy was to protect representative old growth forest, thus younger stands – prospective habitat for WBW – were neglected. Moreover, the interviewees indicated that there were in general no legal tools to protect young forest and manage it for future stands suitable for WBW. In addition, conservation agreements or habitat protection required a lot of work before becoming acceptable to land owners. In some cases a lot of time was spent in negotiation with the owners, but there was no outcome in

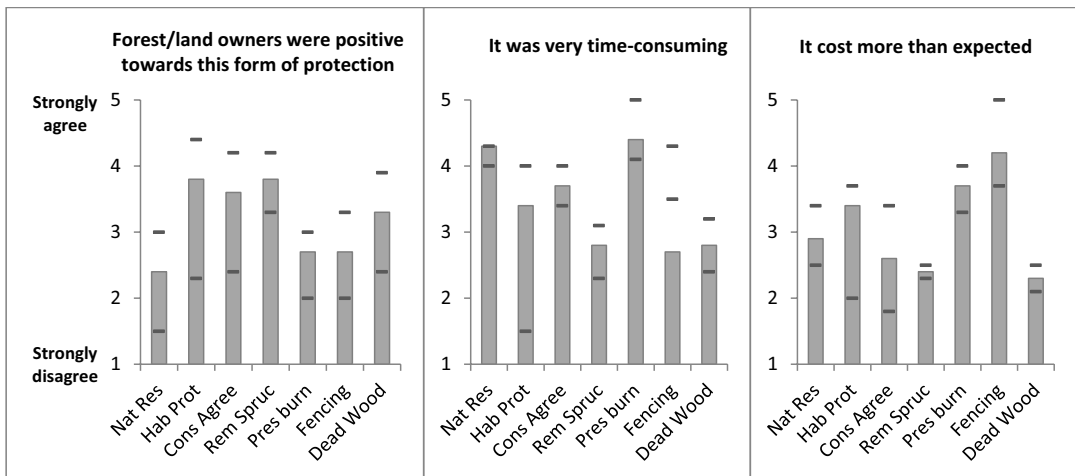


Fig. 4. Opinion of respondents about different activities, all regional together. Vertical lines indicate minimum and maximum answers represented by respondents from particular regions.

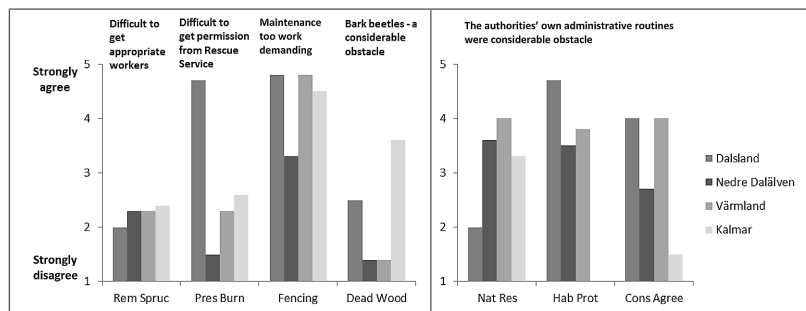


Fig. 5. Opinion of respondents from different regions on particular obstacles related to individual management measures and creation of individual protected areas.

the form of an achieved agreement or protected area if the owner did not agree at the end. According to the interviewees, there should be a “buffer” in the planned budget for these kinds of situations.

The respondents of the survey ranked different conservation measures according to their priority given in their particular region (question 1 in the survey) and according to their perceived importance for WBW conservation (question 5). At the national level, the highest priority was given to removal of spruce and creation of dead wood while fencing was accorded the lowest priority (Table 2). Similarly, the respondents perceived, on average, removal of spruce and dead wood creation as the most important measures, while fencing was considered least important. However, these numbers varied among regions (Table 2).

According to the respondents from all the regions, fencing costs were markedly higher than expected, while prescribed burning, creation of

nature reserves and conservation agreements were seen as very time-consuming. In general, most of the management measures were seen by respondents as relatively time-consuming. However, variation did occur (Fig. 4, see marked minimum and maximum values represented by particular regions). Creation of habitat protection areas was, according to the respondents, well or neutrally perceived by forest/land owners in all regions except for Dalsland. A similar pattern was observed in the case of prescribed burning. Creation of dead wood seemed to not bother forest owners much in any region (Fig. 4).

According to respondents, only in the case of creation of nature reserves in the Dalsland region was the administrative burden not seen as a problem. In other cases administrative routines were, on average, seen as an obstacle in area protection activities (Fig. 5). In relation to the management measures, the largest perceived problem was the

Table 3. Reported conflicting interests or competing activities with other conservation-related action (in brackets number of respondents – if more than 1).

Conflicting interests/competing activities with	
Other AP	<i>Saxifraga osloënsis</i> (Sw. hällebräcka)
Other programmes	Wooded pastures (Sw. Trädbärande betesmarker)
Protected areas	Management plans for nature reserve (6) Management plans for a national park
Conflicts with other natural values	Open areas that were maintained before, now with some forest succession in some areas
Other	Some broadleaved forest – conservation value not high enough to be protected as nature reserve Priorities of the Sustainable Forests objective/national forest strategy aiming at protecting late-succession forest habitats, making it impossible to protect young forest (5) Some contradictions within rural landscape where WBW conservation measures are in conflict with cultural values Natura 2000 bureaucracy

Table 4. What would be needed to make the implementation of WBW-AP better/more effective? Other comments, grouped.

Comment group	Summary of comments (what would be needed for better WBW-AP implementation)
Understanding	Change in attitude of the AP management (positive focus) Increased acceptance and interest among land owners More interest and knowledge of forest managers More comprehensive considerations (regional, integrated thinking) Consensus on the central and regional level on habitat restoration Better understanding of EPA and Forest Agency of the importance of restoration More attention to wetland restoration
Resources	More data for prioritising More money More resources
Co-operation	Better communication with project leaders Better coordination of WBW-AP with many other activities Work routines More effective work methods (less strict routines) More flexibility in the work with conservation agreements Easier routines to deal with contractors Possibility to concentrate on AP work, not many different tasks at once Own staff for management
Other	Prioritising guidelines from EPA Advice about and more respect for broadleaved production Study trip to see WBW habitats

maintenance of fences, seen as too labour-intensive in all the regions (Fig. 5).

Out of 44 respondents, 15 believed that there were some problems because of conflicting interests/competing activities of the WBW-AP and other APs or strategies implemented in their organisation (Table 3). Several respondents mentioned conflicts with different management plans, while several others underlined that work for the WBW-AP means creating and protecting (often young) forest habitats “for the future”, which is in conflict with the general Swedish strategy (e.g., “Sustainable Forests” objective).

Over 70% of respondents claimed that, to improve implementation of the WBW-AP, they would need more money. The second most important issue was the need for more staff working full-time with the WBW-AP (54.4%). Relatively few respondents felt that additional data and knowledge (20.5%) or experience (18.2%) would improve the WBW-AP’s implementation. Some of the respondents indicated other things that would be necessary, such as less complicated routines for work, better coordination of the AP with other activities, or more comprehensive, holistic thinking about conservation in Sweden (both in terms of

large-scale regional implementation of the WBW-AP and in terms of its relation to other APs; Table 4).

When considering the WBW-AP in general (Fig. 6), respondents from all the regions claimed that its implementation took more time than expected and that they did not really have enough time to work with it. Most of them believed that they had enough data to work with the WBW-AP; however, in most of the regions there was too little money for some conservation measures and not enough staff to work with the WBW-AP. On average, respondents from Nedre Dalälven were most satisfied with the WBW-AP’s implementation, while the respondents from Kalmar were least satisfied.

3.3. Relationships between achievement of AP’s targets and perceived implementation issues

We examined the relationship between the degree of achieving targets for particular conservation measures in different regions, and claims of the respondents from those regions on what would be needed to implement the WBW-AP fully. How-

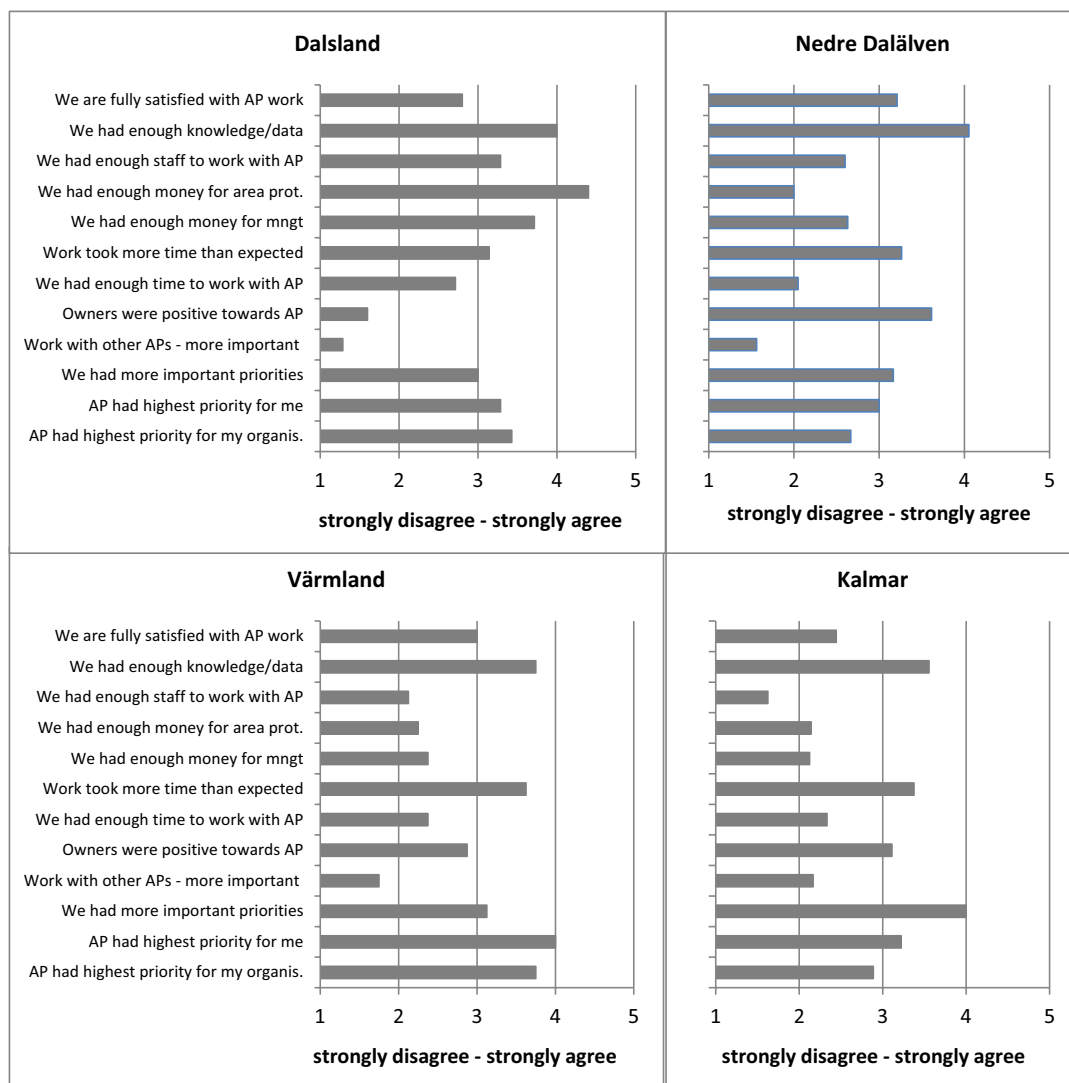


Fig. 6. Opinion of the respondents about the WBW-AP in general.

ever, small sample sizes ($n = 3$ or 4 regions) preclude meaningful statistical analysis, and only some indication of these relationships could be identified. For example, low overall average achievement of conservation measures may be associated with a perceived need for more knowledge/data and more experienced workers, while high average achievement seemed to be associated with a perceived need for more full-time staff.

We also did not find any significant correlation between target achievement and the particular issues relevant for specific management activities. In case of spruce removal, the correlation was

close to significant ($p = 0.051$) in relation to difficulties to get appropriate workers: the easier it was to get suitable workers, the higher the plan achievement was. In the case of spruce removal, there was little difference between regions.

4. Discussion

4.1. Action Plan as a tool to protect White-backed Woodpecker

While conservation is typically a long-term endeavour, like in the case of WBW in Sweden, there

is also a need to follow up shorter-term progress in implementation of conservation measures. The conservation measures in the WBW-AP in Sweden attempt to address the problems of lack of foraging substrate and habitats suitable for this species mostly by promotion of deciduous species and creation of dead wood. Since the species requires entire regions to be managed for its successful recovery, the WBW-AP engages many people and organisations operating at different spatial scales and employs many different conservation measures. However, as we described in our analysis, the implementation of the first phase of this very ambitious plan has not been very successful in terms of fulfilment of the planned targets. The breeding population of WBW in Sweden has been extremely low since the late 1990s, and the fact that species have not disappeared from Sweden completely may be attributed to continuous supply of birds through the relocation, release and artificial breeding programme (Andrén *et al.* 2011). This is in strong contrast to the development of Finnish populations of the species that started from the similar critical level in the mid-1980s but recovered, with many dozens of breeding pairs at present (Lehikoinen *et al.* 2011). However Finland, in comparison to Sweden, has generally higher proportions of deciduous forest at the landscape scale (Mikusiński, unpublished) and is located closer to the source population in the East. Predictive modelling, based on a modified version of the WBW-AP that is currently used by the authorities as guidance for the recovery work, suggests that the achievement of the long-term quantitative targets is possible with currently employed conservation measures (Baxter *et al.* unpublished), but at very high costs (see also Gren *et al.* 2014). However, the achievement of the short-term goal of a substantial population increase within 15 years seems unlikely due to the fact that large-scale habitat restoration of intensively managed forests currently focused on production of coniferous timber and pulp will simply take more time. The fact that planned conservation measures in the Swedish WBW-AP were not achieved will probably further delay the accomplishment of the overarching goal of the plan i.e., the re-establishment of a favourable conservation status of the species in the country.

In this paper, we largely limit our analysis to

the implementation aspect of the initial phase of the plan, as perceived by the people working with the WBW-AP. Although there was broad agreement among our respondents that active management aiming at creation of suitable habitat (i.e., removal of spruce and creation of dead wood) was the most important and effective conservation measure, in reality active management was highly limited by resources, as the majority of money was allocated to area protection measures, such as creation of reserves and habitat protection. These traditional conservation measures (i.e., area protection) appear to be less useful in dealing with species linked with succession (Bengtsson *et al.* 2003, Hayward 2011), as is the case with the White-backed Woodpecker in the northern part of its distribution. In the absence of fire as the main agent supporting a dynamic network of deciduous succession in boreal landscapes, active management must be employed to mimic the effects of fire (Fries *et al.* 1997, Mikusiński *et al.* 2007). The question of financial resources distribution was, according to the interviewees, a crucial one because, due to the non-compulsory character of the plan, there was considerable competition with other regional conservation activities for human and financial resources, which resulted in lower financing for the WBW-AP than intended.

The WBW-AP as a whole is an impressive attempt to use existing knowledge to cope with a threat of regional species extinction that according to international treaty and national regulations should be strictly counteracted. It is however striking that the WBW-AP lacked analyses concerning the cost-effectiveness of particular conservation measures in relation to the plan's objectives, necessary for operational implementation of such a plan (Chauvenet *et al.* 2010). Moreover, it did not use any established conservation planning software (e.g., Marxan or Zonation) to derive the optimal set of conservation areas for its implementation. Instead, it was largely based on expert information and personal engagement of non-scientists interested in the conservation of the species. Still, having clear quantitative targets concerning the expected population growth present in the WBW-AP provides a clear set of management objectives: an essential ingredient for optimising the conservation strategy and thus increasing cost-effectiveness in the future.

When setting conservation goals and planning cost-effective conservation activities for supporting the WBW, one should also keep in mind its role as an umbrella species. Prior to the creation of the WBW-AP, a list of over 200 species that could potentially benefit from this action plan was produced (Mild & Stighäll 2005). A study conducted by Västra Götaland County Board between 2007 and 2010 (Sjöberg 2012) also showed the supportive role of WBW-oriented management activities for numerous insect species, including many threatened species. On the other hand, as indicated by the results of our study, a large and complex AP like the WBW's can be in conflict with other conservation activities and priorities, which can undermine its implementation. One problem pointed out by our interviewees is linked to the removal of spruce being one of the main conservation measures of the WBW-AP. Old spruce trees, dead wood originating from this species and old spruce-dominated stands are habitats of many threatened and specialized species belonging to different taxonomic groups (Gärdenfors 2010). In many cases this incompatibility leads to clear conservation conflicts without any obvious solutions. In order to avoid these and similar controversies, careful large-scale (both in terms of space and time) planning based on best available knowledge and possibly modelling is required to facilitate potential synergy effects, instead of conflicts.

4.2. Planned versus implemented actions – possible reasons for disparities

Our study shows that the Action Plan for the White-backed Woodpecker in Sweden has thus far not been implemented as planned. Nevertheless, the implementation levels up to 2011 showed further progress resulting in some components far exceeding the planned targets. It may be viewed as the result of the WBW-AP going through an implicit process of adaptive management, i.e., systematic acquisition and application of reliable information to improve management over time (Wilhere 2002). Lundquist *et al.* (2002), who found an average implementation level of 70.3% of recovery tasks implemented from 176 recovery plans analysed in the United States, discovered also that plans that were revised (once or several

times) attained higher implementation. Unfortunately, the explicit use of an adaptive management approach in recovery plans appears so far to be largely elusive (Fontaine 2011). Nevertheless, in the case of the WBW-AP, the people and organizations involved in this work have been attempting to make necessary improvements, even in the face of changing economic support to this work and organizational changes (Ulrika Sjöberg, pers. comm).

The results of our analysis do not give a straightforward answer on the reasons for the low achievement of the WBW-AP's goals. Although more money and full-time workers have been indicated by many respondents (as well as the interviewees) as the main factors necessary to improve the plan's implementation, the perception of these needs was not correlated with the level of targets achieved in particular regions. Some of our results also seem to be counter-intuitive. For example, respondents from regions with highest achievement of targets indicated the need for full-time staff for better implementation of the plan. Without deeper investigation of this issue, we can merely speculate that in reality full-time staffing was less important for implementing the targets than engaged and motivated implementing actors in particular high-performing regions. This was also suggested by the interviewed co-ordinating group.

4.3. "Implementation" and "success" of the WBW-AP

Studying implementation of plans or programmes is often about studying failures (DeLeon & DeLeon 2002), as Lin (1996) has observed "the implementation literature shows that faulty implementation is commonplace, non-random, and patterned". However, according to DeLeon & DeLeon (2002) there are many cases of implementation that are successful or at least partly successful, but both our negative perception of the implementation and the actual attainment of the planned targets are influenced by overly optimistic expectations placed on the plan or programme. In many cases the central problem of the implementation of plans or programmes is the high complexity of administrative responsibility, which is not taken into account by the policy makers.

In the case of the WBW-AP, on-the-ground practitioners who actually worked with its implementation were not consulted before its launch, which could have caused the expectations related to the WBW-AP to not “match the reality” of implementation, as the policy makers did not have insight into the practical work of the implementing actors. On-the-ground practitioners are often seen as the key to successful implementation of policies, plans or programmes (“street-level bureaucrats”; Lipsky 1980, Hjern 1982) for two reasons. First, they possess local know-how on how things work in practice; second, their engagement, interest and attitudes to a large extent influence the implementation process. According to De Leon and De Leon (2002), “implementation occurred only when those who were primarily affected were actively involved in the planning and execution of these programs”. In other words, for successful implementation, positive attitudes and engagement of the implementing actors are necessary, even if not sufficient on their own (Blicharska *et al.* 2011b).

In the light of our results, in which the availability of resources or perceived obstacles did not predetermine the outcome of the WBW-AP, the reasons for low plan fulfilment need to be sought elsewhere. The interviewed representatives of the national coordinating group suggested that a key factor influencing the practical outcome of the plan was the engagement of particular actors. Certainly, based on our results we can only speculate on the role of increasing people’s engagement. In addition, this engagement could also be influenced by different external factors that we have not tested.

Nonetheless, our results do suggest some key issues that need to be considered when creating and implementing recovery plans. First, recovery plans, even if aimed at a single species, are most often very complex and involve actors at different governance levels. Thus, communication between the different actors is crucial. Second, recovery plans do not exist in a vacuum, but there are many possible conflicts (but also synergies) with other plans, programmes and conservation strategies. Careful investigation of these interdependencies is necessary prior to launching any recovery plan. Finally, the role of implementing actors is of great importance, thus they should be from the very be-

ginning involved in the creation and implementation of the recovery plans.

The implementation of the AP for White-backed Woodpecker in Sweden is still at a very initial phase and at present the “real” success of it (i.e., recovery of the species’ population in Sweden) cannot be assessed. The success of conservation plans depends on both biological constraints and operational/practical factors and as we often cannot control the former, there is a need to focus on the latter and optimise them when designing conservation plans (Laycock *et al.* 2013). The WBW-AP is a very ambitious and long-term endeavour based on many uncertain premises concerning both the usefulness of conservation measures for the recovery of the species and socio-economic and practical issues difficult to predict. Therefore an adaptive approach that regularly reviews the conservation process and allows practitioners to learn from the ongoing developments (Brunner & Clark 1997) seems to be necessary, particularly in case of complex action plans (Clark & Harvey 2002).

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Praktisk implementering av arters återhämtningsplaner – har vi lärt oss en läxa från vitryggiga hackspetten i Sverige?

Framgångsrikt bevarande av den biologiska mångfalden kräver att man skyddar arters livskraftiga populationer. Inför denna utmaning har Sverige infört ett koncept som kallas ”åtgärdsprogram”, vars fokus är att samtidigt rädda en eller flera hotade arter och skydda de viktigaste biotoperna där dessa arter lever. I denna studie undersöker vi genomförandet av ett åtgärdsprogram för en paraplyart, den vitryggiga hackspetten. Vi beskriver programmets mål, hur det är organiserat och genomfört.

Studien baserar sig på intervjuer och enkäter

riktade till programmets huvudaktörer. Målen för 2005–2008 uppnåddes i genomsnitt mycket sämre än planerat, vilket åtminstone delvis förklarades av bristande kunskap/data, brist på erfarna arbetstagare, samt administrativ inflexibilitet. Förvänsvärt nog, kunde inte uppnåendet av programmets mål förklaras med den upplevda betydelsen av särskilda bevarandeåtgärder, upplevda prioriteringen, mängden tillgängliga pengar, eller olika praktiska hinder.

Däremot påvisade kvalitativ analys av intervjuerna och enkäterna två viktiga hinder för genomförandet: 1) konkurrerande intressen med andra bevarandeåtgärder och 2) graden av bundenhet hos specifika aktörer. För ett framgångsrikt genomförande av de komplexa åtgärdsprogrammen rekommenderas grundläggande granskning, där inte bara frågor som ekologisk kunskap och praktiska resurser beaktas, utan även eventuella konflikter och synergier med andra bevarandeåtgärder.

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Appendix

Table A. Number of respondents by organisation and region. Note: Nedre Dalälven is the largest region, where the area of conservation concern overflows to three neighbouring counties. Moreover it is divided into two sub-regions and thus the number of surveys sent and answered was largest in this region.

Organisation	Surveys by region (received/sent)				Total
	Dalsland	Nedre Dalälven	Värmland	Kalmar	
Forest Agency	3/3	4/5	5/5	3/3	15/16
County Administrative Board	2/4	11/13	3/3	3/3	19/23
Sveaskog*	–	3/3	–	3/3	6/6
Stora Enso*	2/2	1/1	0/1	–	3/4
Korsnäs*	–	0/1	–	–	0/1
Upplandsstiftelsen**	–	1/1	–	–	1/1
Total	7/9	20/24	8/9	9/9	44/5

* Questions as those for Forest Agency. ** Questions as those for county boards.

The survey questions

- County boards: What activities for WBW-AP did you focus on during the AP between 2005 and 2008? Please, rank from 5 – most important to 1 – least important
 - Nature reserve
 - Removal of spruce
 - Nature conservation burning
 - Broadleaves fencing
 - Girdling or creation of high stems (needle or broadleaves)
- FA: What activities for WBW-AP did you focus on during the AP between 2005 and 2008)? Please, rank from 6 – most important to 1 – least important.
- Habitat protection
 - Nature conservation agreement
 - Removal of spruce
 - Nature conservation burning
 - Broadleaves fencing
 - Girdling or creation of high stems (needle or broadleaves)
- What were the main reasons for choosing the most important activity (rank 5 or 6) in question 1? (You may choose up to 3 answers)?
 - This is the most important activity for the species conservation
 - We have people who know how to do it well
 - This is the cheapest activity from the WBW-AP
 - This is the activity from the WBW-AP that is easiest to conduct
 - Because the forest- and land owners like best this activity or because this activity does not influence the owners' activities negatively
 - It was planned in the AP that we should focus on this activity
 - There is no special reason for that
 - Other reasons, please, specify

3. What were the main reasons for choosing the least important activity (rank 1) in question 1? (You may choose up to 3 answers)?
 - a. This activity does not help the WBW much
 - b. This activity is difficult to conduct/organise
 - c. This activity is too expensive
 - d. This activity is most expensive activity out of all activities within the WBW-AP
 - e. The forest- and land owners do not like this activity, or this activity is disturbing for the owners
 - f. This activity was not planned in AP for my region/county
 - g. There are no good/proper natural/geographical conditions in my region/county to conduct this activity
 - h. Other, please, specify ...

4. Comments to questions 1–3:

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5. What activities for WBW-AP do you consider the most important for WBW maintenance? Please, rank from 7 – most important to 1 – least important.
 - a. Nature reserve
 - b. Habitat protection
 - c. Nature conservation agreement
 - d. Removal of spruce
 - e. Nature conservation burning
 - f. Broadleaves fencing
 - g. Girdling or creation of high stems (needle or broadleaves)

Comments to question 5:

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6. FA: Think about the work with nature conservation agreements in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).
 - a. We fulfilled the goal set in the plan
 - b. Forest/land owners were positive towards this form of protection
 - c. It was very time-consuming
 - d. The authorities' own administrative routines were considerable obstacle
 - e. It cost more than expected
 - f. Not relevant

County boards: Think about the work with nature reserves creation in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).

- a. We fulfilled the goal set in the plan
- b. Forest/land owners were positive towards this form of protection
- c. It was very time-consuming
- d. The authorities' own administrative routines were considerable obstacle
- e. It cost more than expected
- f. Not relevant

7. FA: Think about the work with habitat protection in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).
 - a. We fulfilled the goal set in the plan
 - b. Forest/land owners were positive towards this form of protection
 - c. It was very time-consuming
 - d. The authorities' own administrative routines were considerable obstacle

- e. It cost more than expected
- f. Not relevant

Comments to questions 6 and 7:

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8. (County boards 7) Think about the work with removal of spruce in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).

- a. We fulfilled the goal set in the plan
- b. Forest/land owners were positive towards this form of protection
- c. It was very time-consuming
- d. It cost more than expected
- e. Difficult to get appropriate workers
- f. Not relevant

9. (County boards 8) Think about the work with nature conservation burning in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).

- a. We fulfilled the goal set in the plan
- b. Forest/land owners were positive towards this form of protection
- c. It was very time-consuming
- d. It cost more than expected
- e. Difficult to get permission from Rescue Services
- f. Not relevant

10. (County boards 9) Think about the work with broadleaves fencing in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).

- a. We fulfilled the goal set in the plan
- b. Forest/land owners were positive towards this form of protection
- c. It was very time-consuming
- d. It cost more than expected
- e. Maintenance of the fence is too labour-intensive
- f. Not relevant

11. (County boards 10) Think about work with creation of dead wood in the frame of WBW-AP. To what extent do you agree with the statements below. Rank alternatives from 5 (I strongly agree) to 1 (I absolutely do not agree).

- a. We fulfilled the goal set in the plan
- b. Forest/land owners were positive towards this form of protection
- c. It was very time-consuming
- d. It cost more than expected
- e. Problem with bark beetles constitute a considerable obstacle
- f. Not relevant

Comments to questions 8–11:

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12. (County boards 11) Were there any problems because of conflicting interests/competing activities of WBW-AP and other APs or strategies implemented in your organisation?

- a. Yes
- b. No

If Yes, please, write which APs or strategies it was about

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- 13. (County boards 12) Were there any problems because of conflicting interests/competing activities of WBW-AP and other conservation actions?
 - a. Yes
 - b. No

If Yes, please, write which conservation actions it was about:

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- 14. (County boards 13) Think about the work with WBW-AP. To what extent do you agree with the statements below in a scale from 5 (I strongly agree) to 1 (I absolutely do not agree).
 - a. Work with WBW-AP had the highest priority in my organisation
 - b. Work with WBW-AP had the highest priority for me
 - c. We had other, more important priorities
 - d. Work with other APs was more important than work with WBW-AP
 - e. Forest- and land-owners were positive towards this AP
 - f. I had enough time to work with this AP
 - g. The work with this AP took more time than it was expected
 - h. We had enough money to conduct management activities for this AP
 - i. We had enough money to create new reserves or habitat protection, or to organise nature conservation agreements within this AP
 - j. We had enough staff to work with this AP
 - k. We had enough knowledge/data to work with this AP
 - l. We are fully satisfied with our work with this AP

- 15. (County boards 14) What would be needed to improve the implementation of WBW-AP? More than one option can be marked:
 - a. We would need more full-time staff to work with this AP
 - b. We would need own staff to conduct management
 - c. We would need more money
 - d. We would need more knowledge/data
 - e. We would need more experienced workers
 - f.. Other needs, please specify

Comments to questions 14 and 15:

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