Helping biodiversity adapt to climate change – implications for nature conservation law in Finland

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Abstract

Biological diversity is expected to come under increasing stress, and a number of species are to become threatened with extinction on account of climate change. As it is inevitable that climate will change in future decades, regardless of mitigation actions to reduce greenhouse gas emissions, there is a growing need to increase the adaptive capacity of the species and habitats. Several policy documents and literature on conservation biology have proposed a number of proactive measures that seem to be required in order for species and habitats to adapt to climate change. These measures include protecting and restoring large robust natural areas, ensuring connectivity between those areas, increasing the resilience of the species and ecosystems to changing conditions, and in some cases undertaking active translocation of populations in climatically more suitable areas. Even though the Habitats Directive was not created the climate change in mind, it provides a legal basis for these adaptation measures. This article aims at analyzing how Finland has implemented the provisions of the Habitats Directive that are relevant for climate change adaptation. The aim is to assess to what extent the Finnish nature conservation legislation is able to answer the challenges that climate change poses for species and habitats.

1 Introduction

Several scientific articles have been devoted to assessing the current capacity of international and European nature conservation regimes to facilitate the adaptation of species and ecosystems to climate change. Those assessments have revealed weaknesses in contemporary regimes regarding the adaptation.[2] In the case of nature conservation in the European Union, it has been argued that there are needs for minor or major amendments to the Birds[3] and/or Habitats Directive[4], or for complementing or replacing them with a new EU legislation in order to facilitate the adaptation of species and habitats to climate

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[2] See among others *Wheeler, Kim*: Bird protection and climate changes: A challenge for Natura 2000? Tillburg Foreign Law Review 13/2006, 283–299. *Cliquet, An. – Harris, Jim. Backes, Chris – Howsam, Peter*.: Adaptation to climate change. Legal Challenges for protected areas. Utrecht law review 5/2009, 158–175, *Trouwborst, Arie*: Conserving European biodiversity in a changing climate: the Bern Convention, The European Union's Birds and habitats directives and the adaptation of nature to climate change. Review of European Community and International Environmental Law 20/2011, 32–77, 62. *Trouwborst, Arie*: International nature conservation law and the adaptation of biodiversity to climate change: A mismatch? Journal of Environmental Law 21:3/2009, 419–442, *Verschuuren, Jonathan:* Climate change: Rethinking restoration in the European Union's Birds and Habitats directives. Ecological restoration Vol 28. No 4/2010, 431–439.

[3] Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive).

[4] Council Directive of the 21 May 92/43/EC on the Conservation of the Natural Habitats of Wild Fauna and Flora [1992] (Habitats Directive)

change.[5] However, other authors have argued that the Directives already pose legal obligations for member states to take adaptation measures.[6] The argument goes, that without taking adequate action to facilitate the adaptation of species and habitats to climate change, the aims of the Birds and Habitats Directives cannot be achieved, and EU member states cannot meet their obligations under the Directives.[7]

It is indeed evident that the Directives do contain provisions that at least enable member states to take measures to help the species to adapt to climate change and, of course, member states can do more than is required. However, most of the provisions that are relevant for adaptation measures are formulated in a way that seems to lack legal teeth,[8] and as *Verschuuren* has pointed out, there are not many indications that member states are willing to go much further than what is legally required.[9]

Given the lack of political will to reform the European Union nature conservation legislation in the foreseeable future, the pressure for taking adaptive action will be on member states.[10] Thus, it is important to examine the legal implications of climate change adaptation on national level. This article aims at analyzing how Finland has implemented the provisions of the Habitats Directive that are relevant for climate change adaptation. The idea is to explore the implications of climate change for Finnish nature conservation law by using three adaptation measures as a reference point; restoration, assisted migration, and increasing the connectivity between protected areas. The analysis also serves the purpose of assessing the extent to which measures should be taken at the EU level and which measures could rather be taken at the national level.

The article is structured as follows: Second chapter shortly introduces the effects of climate change on biodiversity and the measures that appear to be required to warrant the adaptation of species and habitats to climate change. Then, the provisions of the Habitats Directive relevant to these measures and their implementation in Finland as well as the need for legal reform will be assessed in chapter 3. Chapter 4 presents the concluding remarks.

2 Measures needed for biodiversity adaptation and relevant provisions of the Habitats Directive

Biological diversity is expected to come under increasing stress, and a number of species are to become threatened with extinction on account of climate change. Organisms are affected by modifications in temperature, humidity and weather patterns as well as more frequently occurring extreme weather events associated with climate change.[11] Many effects of climate change on species and ecosystems have already been documented, and in the future, climate change is expected to have increasingly serious consequences. Many species and ecosystems are expected to shift their distributions to higher latitudes and altitudes.[12]

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[5] See among others *Verschuuren* 2010 (n 1), 431–439. Verschuuren has suggested making the wording of the Article 10 of the Habitats directive more compulsory. About the new EU-level legislation on adaptation to climate change see *Cliquet* et al (n. 1) 2009.

[6] *Trouwborst,* 2011 (n 1).

[7] *Trouwborst*, 2011 (n 1), 62.

[8] For example the Article 10 of the Habitats Directive proclaims in vary general terms that Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 -network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora.

[9] See *Verschuuren* 2010 (n 1), 437.

[10] *Trouwborst* 2011 (n 1), 71.

[11] See *Willis, Kathy J. – Bhagwat, Shonil A.*: Biodiversity and climate change. Science. 326/2009, 806–807.

[12] Secretariat of the Convention on Biological Diversity, Interlinkages between biological diversity and climate

In Finland, the predictions suggest that temperatures could increase by 2.4 to 7.4°C by the year 2080 compared to the conditions of the late 1990s. Such rapid and significant warming would seriously challenge the ability of Finland's native species to adapt to changes in their environment. In addition to increased temperature, changes in precipitation levels represent another significant factor affecting species. It has been forecast that annual precipitation levels in Finland could increase by 6 to 37 per cent by 2080.[13]

Natural ranges of some species are already evidently changing in Finland. Changes in the climate most clearly affect the distributions of species that are highly mobile, such as birds and butterflies. For instance, many new butterfly and moth species have spread into southern Finland from the south and the southwest since the second half of the 20th century. Meanwhile, many species whose ranges were previously limited to southern Finland have been spreading to the north and the northeast. If temperatures continue to rise, some species found today in northern Finland will inevitably decline in number as their habitats shrink. Some species could even disappear from Finland altogether.[14]

As it is inevitable that climate will change in the future decades, regardless of mitigation actions to reduce the greenhouse gas emissions, there is a growing need to increase the adaptive capacity of the species and habitats.[15] Several policy documents and literature on conservation biology have proposed a number of measures needed to increase the resilience and adaptive capacity of species and ecosystems. These measures include protecting and restoring large robust natural areas, ensuring connectivity between those areas, increasing the resilience of species and ecosystems to changing conditions, and in some cases, undertaking active translocation of populations to climatically more suitable areas.[16]

To some extent, the Habitats Directive contains provisions relevant to all of these measures.[17] This article concentrates on those provisions of the Habitats Directive that are relevant for increasing the connectivity between protected areas, ecosystem restoration and assisted migration. These measures have been chosen because in previous publications those issues have been assessed to be the most controversial under the Habitats Directive. As there are a number of scientific articles devoted to assessing the provisions of the Habitats Directive in the light of climate change,[18] here the focus is more on national level implementation.

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change. Advice on the integration of biodiversity considerations into the implementation of the United Nations Framework Convention on Climate Change and its Kyoto protocol.Montreal, SCBD, 154. (CBD Technical Series no. 10) 2003.

[13] See *Carter, Timothy – Kankaanpää, Susanna:* A preliminary examination of adaptation to climate change in Finland. Finnish environment publications series 640. Finnish Environment Institute, Helsinki. 2003. *Carter, Timothy*(eds.): Suomen kyky sopeutua ilmastonmuutokseen: FINADAPT. Yhteenveto päättäjille. Suomen ympäristö 1/2007, 11 *Ympäristöministeriö*: Ilmastonmuutokseen sopeutuminen ympäristöhallinnon toimialalla. Toimintaohjelma ilmaston muutoksen kansallisen sopeutumisstrategian toteuttamiseksi. Ympäristöministeriön raportteja 20/2008.

[14] See *Carter – Kankaanpää* 2003 (n 12).

[15] See *Bertzky, M., B. Dickson, R. Galt, E. Glen, M. Harley, N. Hodgson, G. Keder, I. Lysenko, M. Pooley, C. Ravilious, T. Sajwaj, R. Schiopu, Y. de Soye & G. Tucker*: Impacts of climate change and selected renewable energy infrastructures on EU biodiversity and the Natura 2000 network: Summary Report. European Commission and International Union for Conservation of Nature, Brussel 2010.

[16] See e.g. Commission communication of 1 April 2009 on Adapting to climate change: Towards a European Framework for Action, Communication (COM) 2009, Convention on Biological Diversity (Rio de Janeiro, 5 June 1992) COP decision IX/16 on Biodiversity and climate change (30.5.2008), COP decision VII/28 on Protected areas (20.8.2004), COP Decision X/2 The Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Target.

[17] For comprehensive analysis of the relevant provisions see *Trouwborst* 2010 (n 1)

[18] See e.g. *Cliguet* et al 2009 (n 1), *Verschuuren* 2009 (n 1), *Trouwborst* 2011 (n 1).

3 Implementation of the Habitats Directive in Finland

3.1 Restoration of habitats and populations

One of the key strategies that have been suggested in enhancing the adaptive capacity of species and habitats is the restoration of degraded ecosystems and ecosystem functions.[19] The most widely accepted definition of ecological restoration at present is the following: Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.[20] Thus, the word restoration can be used to cover all activities aimed at restoring habitats (including the reintroduction of species) as well as active nature conservation measures, mitigation, and compensation.

As *Verschuuren* has pointed out, the demerit of the Habitats Directive is the lack of specificity regarding restoration.[21] However, it can be argued that in general terms the conservation, and if needed, also the restoration of climate change resilient habitat and populations must already be considered compulsory under the directive.[22] *Trouwborst* sees that the obligation for restoration of ecosystems can be derived from Articles 6(1) and 6(2) of the Habitats Directive that require member states to establish the necessary conservation measures which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites. The same Articles also require the member states to take appropriate steps to avoid the deterioration of natural habitats and the habitats of species in the special areas of conservation. *Trouwborst* argues that these provisions must be deemed to require conservation and/or restoration measures aimed at securing the resilience of species and habitats to climate change impacts.[23] As *Verschuuren* and *Trouwborst* have previously concluded, restoration is evidently one of the targets of the Habitats Directive, yet the provisions refer only vaguely to restoration measures.[24] To compare, in the field of water protection, which is clearly also relevant for biodiversity adaptation to climate change, the obligation for restoration has been formulated in a legally binding way in Water Framework Directive[25].

Also in Finland the regulation on restoration of the ecosystems is mostly developed in the field of water management, whereas in nature conservation, the restoration of protected areas is well established, yet, largely unregulated conservation practice. In Finnish Nature Conservation Act (1096/1996) there are no provisions regarding the restoration of habitats or ecosystems. Only the section 69 which implements the Habitats Directive Article 6 (4) and requires compensatory measures if the ecological value of Natura 2000 site is deteriorated, could be regarded as restoration provision. According to the Commission guidance document, the compensatory measures appropriate to adverse effects on Natura 2000 sites consists of restoring the habitat to ensure the maintenance of its conservation value and compliance with the conservation objectives of the site; creating a new habitat on a new site or

[19] COP Decision X/33 on Biodiversity and Climate Change (29 October 2010), para. 8(c)–(e).

[20] Generally about the restoration as climate change adaptation measure see *James A. Harris – Hobbs, Richard J. – Higgs, Eric – Aronson, James*: Ecological restoration and Global Climate Change. Restoration Ecology 14/2006, 170–176.

[21] *Verschuuren* 2010 (n 1), 436.

[22] *Trouwborst* 2011 (n 1), 17.

[23] *Trouwborst* 2011 (n 1), 17–18.

[24] See *Verschuuren* 2010 (n 1), 437 and *Trouwborst* 2011 (n 1), 17–18.

[25] Directive of the European Parliament and of the Council (EC) 60/2000 Establishing a framework for community action in the field of water policy. The obligation for restoration can be found already in the objectives of the Water Framework Directive, where it is stated that Member States shall protect, enhance and restore all bodies of surface water (Article 4 1 (a) (ii)), and Member States shall protect, enhance and restore all bodies of groundwater (Article 4 1 (b) (ii)).

through the enlargement of the existing site or creation of new habitats; improving the remaining habitat proportional to that which is lost due to the project or plan; or measures to prevent further erosion of the coherence of the Natura 2000 network.[26] The problem in implementation of the Article 6 (4) in Finland, however, is that the responsibility for compensatory measures is left for the state authorities (Ministry of Environment), which contradicts the polluter pays-principle.[27] It should also be noticed that this provision has not been applied in Finland as of yet, and thus the effect of this provision in regards of climate change adaptation is not likely to be significant.

Regardless of the lack of restoration provisions in Nature conservation act, ecological restoration is a commonly used nature conservation practice in state-owned protected areas. Metsähallitus (Finnish Forest and Park Service) is responsible for the management of the state-owned protected areas, and restoration work in protected areas has been carried out for about a decade,[28] on the contrary to private lands, where the restoration has not been as systematic. The Forest Biodiversity Programme for Southern Finland (METSO)[29] has improved the situation to some degree, as it has made financing available for private land owners to carry out restoration practices in forest habitats (Act on the Financing of Sustainable Forestry 1094/1996).

In order to contribute to biodiversity adaptation to climate change by enhancing the restoration of the ecosystems in privately owned protected areas and outside the protected areas, a stronger emphasis on obligations for active conservation measures or financial incentives for restoration practice should be established into the legislation. Climate change adaptation seems to challenge the current nature conservation regimes, which are still mainly based on passive restrictions and classical legal bans. The problem is that traditionally it has not been considered feasible to place active legal obligations for land owners to take nature conservation measures.[30] Nonetheless, there are some legal norms that already require the active use of the private property. A good example is the obligation to regenerate forest after felling under the Finnish Forest Act (1093/1996). One way forward could be the introduction of the general requirement for ecological compensation into the Nature Conservation Act, which would apply also in those cases where the Article 6 (4) of the Habitats Directive doesn't apply. Additional conservation actions, which could consist of both on-site and off-site measures, would be required when a project negatively affects the protected natural values.[31] The required conservation measures could be targeted for climatically sensitive areas to promote the biodiversity adaptation to climate change.

Finland is not alone in its way of implementing the Habitats Directive provisions regarding restoration. As *Verschuuren* has pointed out, there is no indication that any of the EU member states have adopted a robust restoration policy when implementing the Habitats Directive.[32] As restoration is seen as a key measure in biodiver-

[26] Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission 2001.

[27] *Suvantola, Leila – Similä, Jukka*: Luonnonsuojeluoikeus. 2011, 276.

[28] http://www.metsa.fi/sivustot/metsa/en/NaturalHeritage/SpeciesandHabitats/HabitatRestoration/Sivut/HabitatRestorationWorkatMetsahallitus.aspx (21.1.2012)

[29] See more about the Metso-programme section 3.2 of this article, and *Hiedanpää, Juha:* The edges of conflict and consensus: A case for creativity in regional forest policy in Southwest Finland. Ecological Economics 55/2005.

[30] *Suvantola* ja *Similä* 2011 (n 26), 359.

[31] The introduction of the requirement for the ecological compensation has been suggested several times before. See e.g. *Suvantola and Similä* 2011 (n 26), 259.

[32] *Verschuuren* 2010 (n 1), 437.

sity adaptation to climate change, it would deserve a more central place in the European and national environmental law. Thus, it would be reasonable to make amendments to the Natura 2000 scheme that would require member states to develop robust restoration plans that will help nature adapt to a changing climate. This would also be in line with the requirements under the Water Framework Directive.

Regardless, the implications of climate change for the broader practice of ecological restoration should be considered before making any amendments to the Directive. As *Harris* et al. have pointed out, in particular, the usefulness of historical ecosystem conditions as targets and references must be set against the likelihood that restoring the historic ecosystems is unlikely to be easy, or even possible, in the changed biophysical conditions of the future.[33] Thus, more consideration and debate needs to be directed at the implications of climate change for restoration practice before any legislation is prepared. *Josefsson* and *Baaner* have also suggested in their analysis of the Water Framework Directive[34] that the whole concept of restoration would be replaced by the idea of rehabilitation.[35] As they point out, the ambition of establishing the reference conditions based on pristine states is controversial because many variables of the ecosystem conditions have fundamentally changed, owing to climate change, invasive alien species and changed landscape, when compared to historic states.[36]

The issue of ecological restoration thus reveals a fundamental problem in the nature conservation regimes in the era of climate change: the reference point for conservation measures needs to be redefined, so that instead of looking to the past, we must start looking toward the transition to the future.[37] The challenge for legal regimes is not to lack behind the development in scientific understanding and changes in natural systems.

3.2 Promoting the dispersal of species – Connectivity between protected areas

The provisions regarding the Natura 2000 network are probably the most significant in climate change adaptation, as there appears to be substantial agreement in the scientific literature that successful adaptation of biodiversity to climate change requires the establishment and management of protected area networks at the largest possible scale with extensive core areas and adequate connectivity.[38]

The Habitats Directive obligates member states to create a coherent ecological network, Natura 2000 (Article 3 (a)). The network has a key role in halting biodiversity loss due to climate change, as large and robust protected areas enhance the resilience of species and habitats.[39] However, in order to help species adapt to climate change by promoting their dispersal (i.e. facilitating their movement between current and

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[33] *Harris* et al 2006 (n 19), 170–176.

[34] Directive of the European Parliament and of the Council (EC) 60/2000 establishing a framework for community action in the field of water policy.

[35] *Josefsson, Henrik – Baaner, Lasse:* The Water Framework Directive – A Directive for Twenty-First Century? Journal of environmental law 23 /2011, 436, 486.

[36] *Joseffson – Baaner* 2011 (n 34), 467.

[37] See also *Ruhl. J.B.*: Climate change adaptation and structural transformation of environmental law. Environmental law 23/2010, 393.

[38] *Bennett, Graham*: Integrating Biodiversity Conservation and Sustainable Use: Lessons Learned From Ecological Networks, IUCN 2004; *Bennett, Graham – Mulongoy,K.J*: Review of Experience with Ecological Networks, Corridors and Buffer Zones, CBD Technical Series no 23 (Secretariat of the CBD 2006); and *Kettunen, Marianne – Terry, Andrew – Tucker, Graham – Jones, Andrew*: Guidance on the Maintenance of Landscape Connectivity Features of Major Importance for Wild Flora and Fauna: Guidance on the Implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC) Institute for European Environmental Policy, Brussels 2007.

[39] *Cliquet* et al. 2009 (n 1), 162.

future habitats), measures are needed outside the protected areas. The key issue in facilitating the movement is to increase the connectivity between protected areas. Connectivity can be increased in number of ways, including the creation of wildlife-friendly corridors or stepping stones.[40]

The requirements for the connectivity of the Natura 2000 are addressed in Article 3 (3) and Article 10 of the Habitats Directive. Article 10 states that member states shall endeavor, where they consider it necessary, in their land-use planning and development policies to encourage the management of features of the landscape which are of major importance for wild fauna and flora with a view to improving the ecological coherence of the Natura 2000 network. The Article continues that such features are those essential for the migration, dispersal and genetic exchange of wild species by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods). Even though the provisions are put rather weakly using impressions like "shall endeavor" and "where they consider necessary",[41] it is evident that the Directive provides a legal basis for connectivity, and if well implemented Natura 2000 provisions provide good bases for climate change adaptation measures.

In Finland, however, there are number of problems related to the implementation of the Natura 2000 network. First, Article 6 (2) of the habitats directive has not been implemented adequately.[42] Sections 65–66 of the Finnish Nature Conservation Act implements the Article 6 of the habitats directive, but those provisions don't contain either an explicit ban for deterioration of the natural values, or an obligation to conduct positive conservation measures in Natura -2000 sites. Instead, section 65 only refers to the obligation to assess a project or a plan, which is likely to have significant adverse effect on the ecological value of a site included in, or proposed by the Government for inclusion in, the Natura 2000 network. Section 65 then continues, that no authority is empowered to grant a permit for the implementation of a project, or to adopt or ratify a plan, if the assessment procedure or the requested opinion referred to in section 65, paragraphs 1 and 2, indicates that the project or plan would have a significant adverse impact on the particular ecological value for the protection of which the site has been included in, or is intended for inclusion in, the Natura 2000 network. The problem is that the control mechanism is based on the authority decisions, even though the obligation to conduct an assessment is general. This means that a plan or a project, which doesn't require an authority decision, can be conducted even if it deteriorates the natural values of the Natura 2000 site.[43]

Secondly the issue of connectivity has not been explicitly addressed in the Nature conservation Act. Only the section 69 that implements Article 6 (4) of the Habitats Directive refers to the overall coherence of the network. Also the recently published evaluation report on the Finnish nature conservation legislation stated that the obvious demerit of the Finnish nature conserva-

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[40] *Trouwborst* 2009 (n 1) 428–429.

[41] *Cliguet* et al 2009 (n 1), *Verschuuren* 2010 (n 1), *Trouwborst* 2011 (n 1).

[42] *Similä, Jukka – Raunio, Anne – Hilden, Mikael – Anttila, Susanna*: Luonnonsuojelulainsäädännön arviointi – Lain toimivuus ja kehittämistarpeet. Suomen Ympäristö 27/2010, 36. See more on issues regarding the implementation of the Natura 2000 provisions in Finland in *Leila Suvantola*: Kun Maailma ei riitä – Luonnon monimuotoisuudelle aiheutettavien haittojen kompensointi. Ympäristöjuridiikka 3-4/2005, 46–53, *Kallio, Pasi:* Suotuisa suojelun taso luonnonsuojeluoikeudessa. Helsinki 2001, 176.

[43] *Similä* et al. 2010 (n 41), 36. For instance the silvicultural activities don't require authority decisions in Finland.

tion act is the lack of effective means to enhance the connectivity between the protected areas.[44]

It has already been suggested that the connectivity between protected areas should be added to the aims of the Act in Section 1.[45] However, it is questionable whether that would be sufficient, as often the target provisions are considered not to be legally binding in a same way as other provisions.[46] In addition, it is evident that the issue of connectivity cannot be addressed just by nature conservation legislation. This means that the land use planning is likely to play a key role in future nature conservation. Also the regulation on agricultural and forest activities should take into account the need to increase the connectivity. For example, the agricultural subsidy-schemes should include the criteria for the connectivity, and financial incentives to create ecological corridors or stepping stones in agricultural and forestry lands should be established.

The lack of effective implementation of Articles 3 (3) and 10 of the Habitats Directive in Finland, as well as in other member states,[47] indicates that changes in the language of the Directive, as Verschuuren had suggested,[48] or at least guidance by the Commission on the implementation of those provisions is needed in order for member states to take adequate measures to increase the connectivity. The issue should not be left for member states to voluntarily conduct, as coordination between the member states is presumably necessary in order to create a coherent green infrastructure in Europe to help species and habitats adapt to climate change.

In addition, the problem is the rather static character of the Habitats Directive. For instance, the criteria on which areas are designated as Special Areas of Conservation (SACs), which are laid down in Annex III of the Directive, are mainly linked to the existing values (habitats and species) at the moment of designation. When designated, 'deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated' must not occur (Article 6(2) Habitats Directive).[49] Apparently, these provisions do not take into account the possible need for species to migrate into climatically more suitable areas.

Problematic is also the process of designation of the sites which is usually time-consuming.[50] In the light of climate change adaptation, a more flexible approach for designation and management of the protected areas is needed. For instance, in order to ensure the species' ability to migrate to climatically more suitable areas, the use of short-term contracts for protecting privately owned areas could be used as a cost-effective and less time-consuming instrument for promoting the dispersal of species. Once the migration is over, the agreements could be revoked.[51]

One example of the regulatory instrument that could be useful in helping nature to adapt to climate change could be the natural values trad-

[44] *Similä,et al* 2010 (n 41), 65.
[45] *Suvantola and Similä* 2011 (n 26), 136–137.
[46] *Määttä, Tapio*: Lainsäätäjän kunnioittamisasenne, tavoitteellinen laintulkinta ja lakien tavoitesäännökset vallitsevassa tuomarinideologiassa. In *Pakarinen, Airi* et al. (eds.): Lainvalmistelu, tutkimus, Yhteiskunta. Jyrki Talan Juhlakirja. 2011, 208.
[47] *Cliquet* et al 2009 (n 1), 171.
[48] *Verschuuren* 2010 (n 1).
[49] *Cliguet* et al 2009 (n 1), 163.
[50] For instance in Finland the designation of the protected sites has been severely congested since 1990's. In Finland the protected areas are established in different way depending whether the area is state-owned or privately owned. The recently published report on the Nature Conservation Act showed that on one hand there is very long time gap between the land acquisition and the establishment of the protected areas in state-owned lands. On the other hand the protected areas in privately owned land were seen as an unsatisfactory compromise of the protection provisions between the land-owner and the officials. *Similä et al* 2010 (n 41), 48.
[51] *Cliguet* et al. 2009 (n 1), 163.

ing scheme that was successfully tested under the METSO I programme in Southern Finland during 2003–2007. Since then the scheme has been revised, but the core elements of the scheme remained the same.[52] Natural values' trading means that, in certain ecologically valuable areas, forest owners have the choice between producing natural values or timber. The core of the approach is that this choice by forest owners is a voluntary one. Conservation under the scheme is based on forest owners' competitive tendering. Authorities compare tenders and choose the most suitable sites that meet the biological criteria and negotiate conservation agreements with the forest owners. Once the site is approved as a conservation site, the forest owner will be compensated for the costs of nature management on the site and for loss of income.[53]

Forest owners have valued the voluntary approach to nature conservation and appreciated the independent decision-making and the chance to retain their property rights. Conservation agreements can be either permanent or they can be made for a specific time period according to the forest owner's preference. At the moment the natural values trading scheme applies only to wooded habitats, however, as it has proved to be successful,[54] it could be used as a model for regulatory design in conservation of other habitats as well.

The problem of the voluntary schemes is how to make sure that the most suitable areas for climate change adaptation are protected. However, while nothing guarantees that landowners are willing to participate or that the ecologically most valuable areas are offered for conservation, there are encouraging studies conducted, which indicate the potential effectiveness of voluntary conservation schemes.[55]

3.3 Assisted migration

The most controversial strategy that has been suggested by scientists to help nature adapt to the effects of climate change is "assisted migration", alternatively called as "assisted colonization" or "managed relocation".[56] Assisted migration is defined as the intentional transfer of flora or fauna to a new region in response to climatic change.[57] In other words, assisted migration involves the deliberate movement of species to new, climatically more suitable areas where they have not existed before. This new form of translocation of species implicates the fundamental effects that climate change might have on nature conservation.[58] So far the active translocations have been carried out to introduce species to their historical ranges. Now the idea is to introduce species to areas where they have not lived before. However, the use of assisted migration seems to be in conflict with the prevention of the spread of invasive alien species, on the contrary to the

[52] See *Similä, Jukka – Kokko, Kai*: Oikeudellinen sääntely ja metsäluonnon monimuotoisuus. Ympäristöpolitiikan ja – oikeuden vuosikirja 2009, 73–129.

[53] See *Hiedanpää* 2005 (n 25). Basically the scheme is more comparable to traditional state aid than actual market based instrument. See *Similä – Kokko* 2009 (n 51), 103. EU commission has stated that the trading scheme should be according state aid regulations of the Treaty on the Functioning of the European Union. This is problematic in a sense that state cannot offer any more than full compensation even for those sites which would be highly valuable for nature conservation purposes. European Commission C(2008)460/2, Brussels, 13 II 2008.

[54] See *Hiedanpää* 2005 (n 28).

[55] See *Fromond* et al: Regulatory innovations for biodiversity protection in private forests – towards flexibility. Journal of environmental law 21/2009, 20. with references.

[56] See e.g. *Hoegh-Guldberg, O – Hughes, L – McIntyre, S – Lindenmayer, D.B. – Parmesan, C – Possingham, H.P. – Thomas, C.D.*: Assisted Colonization and Rapid Climate Change, Science 345/2008

[57] See *Hoegh-Guldberg* et al. 2008 (n 55), 345.

[58] See *Alejandro E. Camacho*: Assisted migration: Redefining Nature and Natural recourse law under climate change. University of California, Irvine Law School. Legal studies research paper series No 2009-37.

protection of native species which has traditionally been the central issue in nature conservation.

In scientific literature a number of arguments have been presented for and against the use of assisted migration.[59] On one hand, it has been argued that under some circumstances assisted migration would be viable and more appropriate than conventional or passive conservation methods (such as establishing migration corridors). A group of scientists asserted in an article in *Science* that the use of assisted migration could be a viable conservation tool in situations where: (1) there is a high risk of extinction to a particular species; (2) it is technically feasible for scientists or managers to translocate and successfully establish a population of such species; and (3) there is a sufficiently low risk of adverse outcomes to the location (and to the ecosystem and constituent species therein) targeted to receive the newly introduced organisms.[60] The scientists claimed that these situations could presumably be identified, and they proposed a decision framework flow chart to determine whether assisted migration would be viable.[61] The proponents of assisted migration also referred to the successful experiments where species have been translocated into areas where they have not existed before.[62]

On the other hand, skeptics have presented a number of uncertainties that might prevent assisted migration from being a scientifically viable conservation strategy. The concerns are economic, ecological, ethical and legal. Firstly, it has been assessed that the administrative costs are likely to be quite high (the costs include planning, implementation, and long-term monitoring). Secondly, there is a concern of a possible harm to the rare species itself that is translocated; as such a species is likely to be less able to endure the loss of even a few members to a failed introduction effort. Moreover, there are serious concerns about the risks of harm to the ecosystems to which species are introduced. Thirdly, the ethical issues relate to long-term human manipulation and the control over nature, which can run counter to traditional conservation ideals that aim to allow natural systems to function apart from human interference.[63] Finally, there is a question concerning the legal feasibility of the use of assisted migration.

In legal perspective, the use of assisted migration is relatively complex as in some cases it might contradict the provisions for prevention of the spread of non-native species. The Habitats Directive requires member states to 'ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction' (Article 22 (b). As such, the directive does not appear to be standing in the way of assisted migration, yet it requires that the potential consequences are carefully assessed in advance on a case-by-case basis.[64] The problem is to find a balance between the protection of the endangered species that cannot migrate on their own, and the protection of the native species in ecosystems the endangered ones could be translocated into. In the case

[59] See summary of arguments for and against the use of assisted migration in *Camacho* 2009 (n 57), 183–185.
[60] See *Hoegh-Guldberg* et al 2008 (n 55).
[61] *Hoegh-Guldberg* et al. 2008 (n 55), 345.
[62] See e.g. *Willis, Stephen G. – Hill, Jane, K. – Thomas, Chris D.ks – Roy, David B. – Richard Fox, Richard –Blakeley, David S – Huntley, Brian:* Assisted Colonization in a Changing Climate: A Test Study Using Two U.K. Butterflies, 2 conservation Letters 45/2009, where experiment with the assisted migration of marbled white and small skipper butterfly populations was successful.
[63] More about the controversies on assisted migration see *Camacho* 2009 (n 57).
[64] *Trouwborst* 2011 (n 1), 19.

of species listed in appendix IV (a) and (b) of the Directive, Articles 12 and 13 are relevant as they prohibit all forms of deliberate capture or killing of specimens of these species in the wild (Article 12 1 (a)), and as they forbid the keeping, transport and sale or exchange and offering for sale or the exchange of specimens of such species taken in the wild (Article 13 1 (b). Thus, the conditions under Article 16 of the Directive need to be met before those species can be translocated.

In Finland, the Nature Conservation Act seems to be stricter than the wording of the Habitats Directive in terms of translocations. According to the Section 43 of the Nature conservation Act, non-native species are not to be released into the wild if there is cause to suspect that the species may become established permanently. In addition, non-native plant species without an established range in the Finnish wild are not to be planted or sown outside a garden, a field or another site designated for special purposes, nor in natural waters, in so far as there is cause to suspect that the species may become established permanently. The recent case in Turku administrative court indicates the potential conflict between the current conservation legislation and the conservation measures needed for climate change adaptation. The court ruled that the assessment whether the species is native or not needs to be based on its biological range. Thus, the barnacle goose (Branta leucopsis), while being native in Finnish nature, was not to be translocated into areas outside its natural range in northern Finland.[65]

This case indicates well the incongruity between assisted migration and the conventional nature conservation law. As climate change proceeds, the whole framework and the objectives of nature conservation need to be transformed to better manage dynamic and uncertain natural world. As *Camacho* has pointed out, arguments based on a normative commitment to keeping natural systems wild and uncontrolled lack persuasive power, particularly in the era of climate change.[66]

As the Habitats Directive seems to allow the use of assisted migration, under certain circumstances, it can be argued that the further regulation of assisted migration could be left for the member states, if they see it normatively desirable. Nonetheless, as the case may well be that translocations need to cross the borders of the member states; there might be need for EU level regulations on assisted migration. If it turns out that a comprehensive use of translocations are needed in order to protect the species, then the regulation should be coordinated at the EU level. At the moment the case could be that member states might prevent the use of assisted migration by appealing to the Habitats Directive. Furthermore, as was already pointed out, the issue of assisted migration also reveals the more fundamental problems in the nature conservation regimes, and it would be advisable to solve the problems at the EU level to make sure that we will have a comprehensive, coherent and effective nature conservation regime to facilitate the adaptation of species to climate change.

4 Conclusions

In this article, the implementation of the Habitats Directive in Finland has been analyzed from the perspectives of three climate change adaptation measures (restoration of ecosystems and habitats, increasing the connectivity between protected areas and assisted migration) that have been suggested in several scientific texts and political

[65] Judgement 7.1.2011(Record number 02309/09/5402).

[66] *Camacho* (n 57), 225.

documents. In previous scientific articles it has been argued that the Habitats Directive provides a basis for these adaptation measures.[67] Clearly the Habitats Directive enables member states to conduct these measures. However, this analysis indicates that those provisions which are relevant for adaptation measures have not been effectively implemented at the member state level, at least not in the case of Finland. In addition, there are indications of incongruence between the needed adaptation measures and the current regulation. Thus, at the minimum, guidance by the commission and jurisprudence by the European Court of Justice are needed in order for member states to adequately address the issue of adaptation, as *Trouwborst* has previously concluded.[68]

This analysis also revealed the more fundamental problems in current nature conservation regimes in the European Union and in Finland. Both the objectives and the whole framework of the nature conservation should be adjusted to better manage the dynamic and uncertain natural systems. The current regimes, that rely on passive restrictions and legal bans and that aim at preserving the historical and native nature, should be replaced by flexible, dynamic, and more active conservation management that takes into account the future transition. Thus, it is reasonable to ask whether this more fundamental transformation that seems to be needed as climate change proceeds would be better addressed at the EU level.

[67] See e.g. *Verschuuren* 2009 (n 1), *Trouwborst* 2010 (n 1).
[68] *Trouwborst* 2010 (n 1).