

Strasbourg, 3 November 2011
[files13e_11.doc]

T-PVS/Files (2011) 13

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

31st meeting
Strasbourg, 29 November – 2 December 2011

**Follow-up of Recommendation No. 120 (2006)
On the European strategy for the Conservation
of Invertebrates**

REPORT BY THE GOVERNMENTS

*Document prepared by
the Directorate of Culture and Cultural and Natural Heritage*

CONTENTS / SOMMAIRE

1. Austria / Autriche
2. Croatia / Croatie
3. Czech Republic / République tchèque
4. Estonia / Estonie
5. European Commission / Commission européenne
6. France / France
7. Georgia / Géorgie
8. Hungary / Hongrie
9. Latvia / Lettonie
10. Malta / Malte
11. Norway / Norvège
12. Serbia / Serbie
13. The Netherlands / Pays-Bas

AUSTRIA / AUTRICHE

Follow-up of Recommendation No. 120 (2006) on the European Strategy for the Conservation of Invertebrates

Austrian Red Lists are published for: Mollusca, Scorpiones, Opiliones, Decapoda, Saltatoria, Auchenorrhyncha, Plannipenia, Mecoptera, Trichoptera and Lepidoptera.

More will follow.

Some Länder of Austria have published their own Red Lists, some also for additional invertebrate groups. For example:

Lower Austria: Heteroptera, Formicidae, Saltatoria, Mantodea, Rhopalocera, Hesperidae, Odonata, Branchiopoda, Decapoda, Mysidacea

Carinthia: Lepidoptera, Apoidea, Coleoptera (Cerambycidae, Staphylinidae, Ptiliidae, Argyritidae, Leiodidae, Scydmaenidae, Silphidae, Carabidae), Auchenorrhyncha, Orthoptera, Odonata

Vorarlberg: Saltatoria, Ephemeroptera, Formicidae

An atlas of distribution in Austria for Odonata is published, one for Orthoptera is in preparation.

A net of special protected areas in forests was established. In this so called „Naturwaldreservate“ no forestry using is allowed.

<http://bfw.ac.at/100/1135.html>

A lot of programmes were established to enhance extensive farming. Contracts are closed with farmers, they get fees for cultivating their farms ecologically compatible.

Wildlife protection programmes were established for a lot of species. For example only the programmes in Vienna: Coleoptera (Cerambyx cerdo, Osmoderma eremita), Lepidoptera (Scoliantides orion, Lycaena dispar, Nymphalis polychloris, Zerynthia polyxena, Apatura ilia, Iphiclides podalirius, Neptis rivularis, Minois dryas, Brintesia circe, Saturnia pyri), Saltatoria (Platycleis veyseli, Gryllus campestris, Polysarcus denticauda, Decticus verrucivorus, Arcyptera fusca, Sphingonotus caeruleus, Aiolopus thalassinus, Stenobothrus crassipes), Odonata (Gomphus vulgatissimus, Ophiogomphus caecilia, Leucorrhinia pectoralis, Calopteryx virgo, Epithea bimaculata), Decapoda (Austropotamobius torrentium), Mollusca (Cepea vindobonnensis, Zebrina detrita, Unio tumidus)

CROATIA / CROATIE**Report
on implementation of the Recommendation No. 120 (2006)
on the European Strategy for the Conservation of Invertebrates**

According to the Report on the State of the Natural Environment and Nature Protection (State Institute for Nature Protection, 2008) the invertebrates are still not inventoried in a satisfactory way, because there is too many species to deal with. However, more than 15.200 species of terrestrial invertebrates, more than 1800 freshwater invertebrates and more than 5.600 invertebrates of the Adriatic Sea have been recorded in Croatia until now.

For the moment the priority in inventory and research is given to several groups including butterflies, dragonflies, stoneflies, ground beetles, sea anemones and underground vertebrates, of which more than 700 species are included in the *Red list of endangered fauna and flora of Croatia*. The Red List can be found and searched on the web site of the State Institute for Nature Protection (SINP): www.dzzp.hr. Two read books directly related to invertebrates have also been published, the *Red Book of Dragonflies of Croatia* (Ministry of Culture and SINP, 2008) and the *Red Book of cave fauna of Croatia* (Ministry of Culture and SINP, 2011).

Strategy and Action Plan for the Protection of Biological and Landscape Diversity of the Republic of Croatia (OG 143/08) that is currently in force, does not envisage action plans directly connected to conservation of invertebrates. However, there are some action plans related to inventory, research and compilation of red lists/red books of unprocessed groups of wild fauna, flora a fungi, which are applicable also to invertebrate species.

Legal protection of endangered invertebrates is ensured through the provisions of the Nature Protection Act (OG 70/05, 139/08 and 57/11) and related subordinated regulations. According to the Nature Protection Act and relevant Ordinance on proclamation of wild fauna as protected and strictly protected (OG 99/09), significant number of endangered and vulnerable invertebrate species enjoy “*strict protection*” (Annex I of the Ordinance) while some species are considered to be “*protected*” (Annex III of the Ordinance) meaning that they can be taken from the wild in a controlled way prescribed by the law.

Most of the *strictly protected* invertebrate species belong to insects (*Coleoptera*, *Lepidoptera*, *Plecoptera*, *Odonata*, etc.), crustaceans (for example *Astacus astacus*, *Austropotamobius pallipes*, *A. torrentium*, etc.) and molluscs (for example *Lithophaga lithophaga*), but there are also several strictly protected arachnids, cnidarians, sponges etc. In this context it is important to notice that specific emphasis is given to protection of underground (cave) fauna in general, including also underground invertebrates. In this context and according to article 97, paragraph 4 of the Nature Protection Act all cave fauna, including underground invertebrates, even where not protected as individual species are considered to be strictly protected. According to the article 97, paragraph 3 of the Nature Protection Act it is forbidden to deliberately capture, keep and/or kill strictly protected wild animals, deliberately harm them and their evolution forms or destroy their breeding sites, deliberately disturb them, particularly during the time of breeding, rearing young, should such disturbance prove significant with regard to the objectives of protection, or to deliberately destroy, hide, keep, breed, trade in, import, export, transport and alienate or acquire in any other way strictly protected animal. Such activities can exceptionally be authorised by the Ministry of Culture in the case of non-existence of other feasible options and provided that derogation will not be harmful for the survival of a particular population, for the sake of:

- protection of plants, fungi and animals as well as protection of natural habitats,
- preventing severe damage to crops, livestock, forests, fishponds, water and other forms of property,
- protection of public health and safety, air safety or other overriding public interests, and,

- research and education, repopulation, reintroduction and necessary reproduction,

Also, as the exception, the Ministry of Culture may authorise, on a selective basis and to a limited extent, the taking, holding and other reasonable use of certain strictly protected wild species in small quantities under strict control in order to maintain the favourable status of the species.

Protected species can be taken from the wild for commercial purposes under conditions prescribed by the Nature Protection Act or other sectorial legislation (for example Marine Fishery Act). The list of *protected* invertebrate species includes for example terrestrial snails (like *Helix pomatia* and *Cornu aspersum aspersum* (*H. aspersa*)), decapod crabs (like *Maja squinado*, *Homarus gammarus* and *Palinurus elephas*) and various species of *Anthozoa* (including *Corralium rubrum*). Taking from the wild of terrestrial snails is regulated by the Nature Protection Act and Ordinance on Protection of Terrestrial Snails (*Gastropoda Terrestria*) (OG 29/99) which regulates in details the gathering of *protected species* of snails for the purpose of processing, trade and other businesses. Taking from the wild of mentioned decapod crabs and red coral is regulated with the Marine Fishery Act (OG 56/10) and related subordinated regulations.

Beside the protection regime based on the strict protection or regulation of taking from the wild it is important to notice that protection of invertebrate species is also made through the procedure of appropriate assessment of the impact of plans, programmes and projects on the national ecological network (NEN). The national ecological network was proclaimed in October 2007 by adoption of the Regulation on proclamation of the ecological network (OG 109/07). Several invertebrate species (butterflies, dragonflies, crustaceans, etc.) are included as conservation objectives for relevant NEN sites. Also, all speleological objects are included in the NEN. The NEN sites with Habitats Directive Annex II invertebrate species naturally occurring on the territory of Croatia are marked as potential Natura 2000 sites. According to the article 36 of the Nature Protection Act and Ordinance on the appropriate assessment of the impact of plans, programmes and projects on the ecological network (OG 118/09), appropriate assessment is obligatory for every plan, programme or project that alone or in combination with other plans, programmes and projects, could have a significant impact on the conservation objectives and on the integrity of the NEN.

CZECH REPUBLIC / RÉPUBLIQUE TCHÈQUE

Conservation of Invertebrates in the Czech Republic (2008-2011)

By Mr Karel Chobot

Agency of Nature Conservation and Landscape Protection of the Czech Republic (ANCLP),
Nuselská 34, Praha 4, 140 00, Czech Republic

e-mail: karel.chobot@nature.cz

The progress in the invertebrate conservation should be mentioned in four separate branches.

1. Red List

There is still valid the first complete-ever published Red List of Invertebrates (Farkač, Král & Škorpík, 2005). This is the first Czech Red List of all the invertebrate groups, following the IUCN categories (criteria partly) and very important data source to the future. The details and sum of assessment were presented in the last progress report.

2. Grid Atlases

From the area of the Czech Republic there have been published distributional (based on central European grid system) atlases of butterflies (Beneš & Konvička, 2002), earthworms (Pižl, 2002), water molluscs (Beran, 2002), spiders (Buchar & Růžička, 2002), cerambycid beetles (Sláma, 1998), carabid beetles (partial atlas based on the collection of carabidologist J. Pulpán, Skoupý (2004). Beside the grid atlases was also published distributional study based on river system mapping, devoted to mayflies and stoneflies (Soldán et al., 1998). The invasive and alien invertebrate species distribution was published in a monograph by Mlíkovský & Stýblo (2006) all works were mentioned in the last progress reports. The distributional atlas of elateroid beetles (Elateridae, Throscidae, Melasidae, Lissomidae, Cerophytidae) is in on-line form and permanently actualized (Mertlik, 2011).

New atlas has been published as a representative monograph of dragonflies (Dolný, Bárta and al., 2008). Distributional data were summarized on Czech species of crayfish (Štambergová and al. 2009).

Grid maps of particular species of invertebrates are also published in scientific papers. In preparation are still atlases of moths ("Macrolepidoptera") (Konvička, pers. comm.), terrestrial molluscs (Juříčková, pers. comm.), meloid beetles and branchiopod crustaceans.

The on-line mapping project of grid mapping of selected species of invertebrates at the www.biolib.cz is still continuing. Through this project, designed for the public recording, is surveyed (and immediately published) distribution (on the basis of grid mapping) of beetles (e.g. *Lucanus cervus*, *Cucujus cinnaberinus*, *Oryctes nasicornis*, *Polyphylla fullo*, *Gnorimus* spp., *Oxythyrea funesta*, *Protaetia aeruginosa*, *Calosoma* spp., *Chalcophora mariana*), orthopteroid insects (*Psophus stridulus*, *Gryllotalpa gryllotalpa*, *Mantis religiosa*), dragonflies, crayfish species and medicinal leech (*Hirudo medicinalis*).

Also among the distribution studies (grid mapping projects) should be included the completing of reports under Article 17 of the Habitats Directive, covering also the Bern Convention invertebrate species (see below).

3. Legal framework

The Czech Republic implemented the requirements of the Habitat Directive, resp. Convention on the Conservation of European Wildlife and Natural Habitats and concerned recommendations, by issuing the Ministerial Decree No. 175/2006 which is completing the list of legally protected species by adding the IV-annex species into. Widened, actualized and expert based list of protected species is still in the state of proposal.

The Natura 2000 sites designation process is in the phase of finalizing after the bilateral seminar in May 2011. The II and IV annex species are subject of complex surveillance monitoring following standard methods aiming to the FCS statements. The year 2007 was the first reporting year under the Article 17 of the Habitats Directive, the next term is in 2013. The reports present very detailed survey of the knowledge of annexed species. The status is assessed after the agreed methodology, using evaluation matrix. All the reports are downloadable on www.biomonitoring.cz. Short conclusion of the conservation status of the invertebrate groups (insects and “non-insects”) was part of previous report.

References:

- Beneš J., Konvička M. & al. (2002). Butterflies of the Czech Republic. Distribution and conservation. SOM, Praha.
- Beran L. (2002) Aquatic molluscs of the Czech Republic. Distribution and its changes, habitats, dispersal, threat nad protection, Red List. Sborník Přírodovědného klubu v Uherském Hradišti, Suppl 10.
- Buchar J. & Růžička V. (2002) Catalogue of spiders of the Czech Republic. Peres, Praha.
- Dolný A., Bárta D. and al. (2008) Vážky České republiky/Dragonflies of the Czech republic. Český svaz ochránců přírody, Vlašim.
- Mertlik J. (2011): Elateridae – Rozšíření v České a Slovenské republice. [<http://www.elateridae.com/faunistics.php>]
- Farkač J., Král D. & Škorpík M. [eds.] (2005). Red List of Threatened Species in the Czech Republic. Invertebrates. – AOPK ČR, Praha.
- Mlíkovský F. & Stýblo P. [eds.], 2006. Nepůvodní druhy fauny a flóry České republiky. ČSOP, Praha.
- Pižl V. (2002). Earthworms of the Czech Republic. Sborník Přírodovědného klubu v Uherském Hradišti, Suppl 9.
- Skoupý V. (2004) Střevlíkovití brouci (Coleoptera: Carabidae) České a Slovenské republiky ve sbírce Jana Pulpána. Public History, Praha.
- Sláma, M.E.F. (1998) Tesaříkovití – Cerambycidae České republiky a Slovenské republiky. VI. nákl., Krhanice
- Soldán T. Zahradková S., Helešic J., Dušek L. and Landa V. (1998): Distributional and quantitative patterns of Ephemeroptera and Plecoptera in the Czech Republic: A possibility of detection of long-term environmental changes of aquatic biotopes. - Folia Fac.sci .nat. Univ. Masaryk. Brunensis, Biol., 98: 1-305.
- Štambergová M. and al. (2009) Raci v České republice. AOPK ČR, Praha

4. Action plans and recovery programs

4.1 Conservation of the Freshwater Pearl Mussel in the Czech Republic (2000 - 2011)

Jan Švanyga

Agency for Nature Conservation and Landscape Protection of the Czech Republic, Nuselská 34, Praha 4, 140 00, Czech Republic

e-mail: jan.svanyga@nature.cz

Freshwater pearl mussel (*Margaritifera margaritifera*) is a rare mollusc of oligotrophic waters. It was decimated in the past by freshwater pearl hunt and in the 20th century – although strictly protected – is quickly becoming extinct as a result of eutrophication and land use changes.

Freshwater pearl mussel is a critically endangered species under the Czech and European law.

Czech Action Plan

The freshwater pearl mussel is an animal closely bound to other animal and plant species composing biological communities in oligotrophic waters - without their presence the species is not able to reproduce successfully. Therefore, in order to strengthen the populations of this critically endangered animal species, an active approach in form of regulated management is necessary in order to optimize relevant natural biological communities of certain watershed ecosystems. This species of bivalve is especially sensitive to heterogeneous water pollution and its development is also dependent on favourable soil and vegetation conditions, as well as ways of watershed management. Gradual influence of the watershed directed towards natural or nature-close ways of management is therefore required for success. It is possible to actively support sustainable landscape development and to protect a broader gene pool of selected watersheds by conservation or restoration of natural biotopes of the freshwater pearl mussel

The Action Plan for the freshwater pearl mussel in the Czech Republic was approved by the Ministry of the Environment of the Czech Republic in 2000 and currently is being updated. A new Action Plan is being prepared by The Agency for Nature Conservation and Landscape Protection of the Czech Republic (ANCLP).

The Action Plan is implemented at six sites of the freshwater pearl mussel occurrence in the Czech Republic, including the Blanice (River) National Natural Monument (NNM) as a pilot area with the most significant surviving Central European population of the species. The watershed covers about 56 km² with a minimum human population. In this pilot area, different methods of biotope and species management are being tested, in their broader relation to plant and animal communities and to the natural annual cycle of the ecosystem. An isolated semi-natural breeding of juvenile freshwater pearl mussels is going on in an allocated part of the pilot area.

The Action Plan should apply gained knowledge in areas of occurrence that are divided into several categories with top priority given to category I sites (Blanice NNM, Zlatý potok NNM) and category II sites (Teplá Vltava, Horní Malše, Lužní potok NNM and Bystřina Natural Monument). It also entails cooperation on preparing special revitalization adjustments of river systems in these areas and their implementation.

Active management of the species and habitats

According to the Action Plan, three special semi-natural breeding units were set up in three watersheds. These sites are used as a refuge for juvenile and subadult pearl mussels, where a yearlong care is implemented. A special meadow management, which consists of grass mowing and composting with added calcite, is carried out for nutriment quality improvement. Composted grass is applied back to the sites to help increase amount of good detritus, which young mussels eat. Survival of very young pearl mussels depends among others also on food quality and quantity. This special management helps with it.

In the past, current overmature populations were rejuvenated by thousands of young mussels coming from semi-natural breeding. The possibility of repatriation of the freshwater pearl mussel back to sites with already extinct populations and to other suitable habitats after revitalization of their water systems, respectively, will be evaluated on the basis of knowledge of adaptation capabilities of juvenile pearl mussels considering genetic differences between Czech populations.

Monitoring

The ANCLP is in charge of monitoring the status, changes and trends in selected habitats and their types and populations of specially protected wildlife species in the Czech Republic (including the Article 17 of Habitats Directive report of the state of annexed phenomena). Monitoring of the freshwater pearl mussel populations includes regular counting of adult individuals in pearl mussels' watersheds in a four-year period and gathering of all available data on occurrence. Several permanent sites are checked annually too.

Monitoring of water quality is being done in pearl mussel watersheds as well. As part of this type of monitoring, T.G.M. Water Research Institute provides regular measurements of selected physical and chemical water quality parameters (temperature, conductivity, nitrates, total phosphorus etc.).

Quality of pearl mussels' habitat and survival of very young individuals is tested by bioindication with one-year old juvenile pearl mussels kept in special boxes in the river. A three-month test shows growth rate and mortality ratio.

Public relations and cross-border cooperation

The freshwater pearl mussel is a critically endangered species inhabiting several last localities in South and West Bohemia. A German experience with this species' protection in the past showed that the propagation of pearl mussels in the place of occurrence may not be a good approach. One of the last localities was destroyed by undisciplined visitors.

As part of its PR activities, ANCLP manages an official web site of action plans for endangered species (www.zachranneprogramy.cz) and a facebook profile, an alternative web page to popularize problems regarding action plans and state species protection in the Czech Republic (<http://www.facebook.com/zachranneprogramy>). An information leaflet about the freshwater pearl mussel and other large mussels was published last year by T.G.M. Water Research Institute.

Experts from the Czech Republic, Saxony and Bavaria are members of an action group for protection of the freshwater pearl mussel on the Czech-German border. Last native localities are situated close to cities of Hof (Germany) and Aš (CZ). Bilateral projects for pearl mussel watershed conservation are implemented within this cross-border cooperation.

In 2010, international cooperation with Norwegian colleagues from North Trondelag was arranged as well. Two one-week exchange stays of Czech and Norwegian experts was realised as means of sharing experience with Action Plans for pearl mussels and their implementation in both countries.

4.2 Conservation of the Scarce Fritillary (*Euphydryas maturna*) in the Czech Republic

Pavel Bína

Agency for Nature Conservation and Landscape Protection of the Czech Republic, Nuselská 34, Praha 4, 140 00, Czech Republic

e-mail: pavel.bina@nature.cz

The Scarce Fritillary (*Hypodryas maturna*) survives today in its last two localities in the Czech Republic: in the Dománovický and Žiželický Forest, which are separated by only a few kilometres. Both localities are part of Natura 2000 network as Site of Community Importance Dománovický les (code CZ0214010).

Progress in the conservation of the Scarce Fritillary can be divided into four areas:

1. Action plan

In 2011, after several years of revision, the action plan for Scarce Fritillary was approved by the Ministry of the Environment of the Czech Republic. This document summarizes existing knowledge on occurrence, biology, threats and measures to protect the species. It proposes both short-term actions and a long-term plan to save the species in the Czech Republic. The plan involves primarily management measures at both sites (Domanovický Forest and Žiželický Forest) represented mainly by specific activities related to forest management.

The recommended forest habitat is the form of coppice forest or a richly structured natural forest with a high irradiance in the herb layer. The Scarce Fritillary originally occurred in this type of forest, as well as other endangered plants and animals. The Action plan has created a framework for this form of management, which will also be determined and updated by an implementation team participating in the practical implementation of the Action plan.

2. Emergency interventions and medium-term management

Emergency interventions have been performed in areas with occurrence of caterpillars and in areas with occurrence of host plant - spruce ash (*Fraxinus excelsior*). These consist mainly of illumination of overgrown vegetation and support of young ash trees with branches to a height of 4-5 meters. Backlighting is done by thinning. In addition, young ash trees are planted in the form of saplings.

Arrangements of medium-term management are planned with the forest owners. In the areas surrounding the actual occurrence of caterpillars, interventions are performed to transfer the forest into the form of richly structured forest. The emerging areas are then excavated and planted to ensure a share of at least 10% ash, again by saplings.

3. Monitoring

Annual monitoring is also realized and the continuity of data collecting is secured. In 2011, the mark capture/recapture method has not been used because of the current state of the population and its vulnerability due to small number of individuals. Adults are visually observed in transects and places of sucking nectar. A detailed monitoring of clutches and caterpillars is, however, carried out. This is crucial for the evaluation of mortality in larvae. The clutches, caterpillars and caterpillar nests are counted and monitored regularly.

4. Repatriation to the historic site NPR Libický luh

In the long run, it is necessary to provide suitable habitat to allow the species to create meta-populations. The size of current localities is too small to ensure long-term survival of the species. Under this strategy, the population in the Dománovický and Žiželický Forest should be stabilized and habitat suitable for repatriation of the species should be created. Libický luh National Nature Reserve was chosen as a suitable site for the repatriation. This locality is a historical site of the Scarce Fritillary (the latest findings of specimens come from the end of last century) and is situated only 15 km away from existing sites. It is necessary to begin with planning of the forest management and preparation of habitat in Libický luh. In order to select a specific area and procedure for conversion of the forest to richly structured natural forest, the above mentioned implementation team will be created.

References:

1. Ministry of the Environment <http://www.mzp.cz>
2. ANCLP <http://www.nature.cz>
3. Management Plan for LC in the Czech Republic <http://www.zachranneprogramy.cz>

ESTONIA / ESTONIE

National report of Estonia on the Bern Convention Standing Committee Recommendation No. 120 (2006) on the European Strategy for the Conservation of Invertebrates

Authority concerned:

Ministry of the Environment
Nature Conservation Department
Narva mnt 7a
Tallinn
Estonia

Report to recommendation n° 1

Estonia has 52 species of protected invertebrates, which are divided to 3 protection categories' (1 in first category, 6 in second category and 45 in third category). According to the Nature Conservation Act for all species in first protection category action plans shall be compiled by species experts and established by the regulation of Ministry of Environment. For species in second and third category action plans are compiled when needed. For the species *Hirudo medicinalis* action plan has been established and updated action plan for period 2011-2015 is being compiled. At the moment action plans for 1 species (*Margaritifera margaritifera*) in I protection category, 5 species in II category (not including previously mentioned *H. medicinalis*) and 20 species in III category are being compiled by scientists. Besides that there are being compiled bigger action plans for 7 ant species in genus *Formica* and for 18 bumblebee species from genus *Bombus*.

Invertebrate species are protected on protected areas where appropriate and additionally at the moment there are 7 species protection sites designated for 8 protected invertebrate species in Estonia (2 sites target 4 invertebrate species).

Protected invertebrates are surveyed and monitored. The occurrence of threatened insects are one of several criteria (habitat structure, stand history, occurrence of other indicator species) used to identify Woodland Key Habitats in Estonia.

The red lists are periodically updated and invertebrates are one of the largest groups assessed in that process.

The threat of habitat destruction and fragmentation has been addressed through planning and environmental impact assessment. In areas which are Special Protection Areas (SPAs) or Special Areas of Conservation (SACs) all proposed activities which alone or in conjunction with other activities may potentially significantly affect the Natura 2000 site environmental impact assessment is mandatory. Also outside of Nature 2000 network environmental impact shall be assessed upon application for a development consent if the proposed activity which is the basis for application for development consent which potentially results in significant environmental impact.

The main threats to invertebrates which are being addressed are from agriculture (though compared to Central-Europe it is still extensive), forestry (changes in species composition, loss of old forest and limited amounts deadwood) and for aquatic species the loss of suitable water bodies.

Report to recommendation no 2:

There is scientific co-operation between Estonian and neighbouring countries scientists involving work on studying and protecting the invertebrates. Specialists are brought in to Estonia for the species surveys from different countries and they pass on their best knowledge to local conservation scientists.

The largest and the most recent co-operation project in invertebrate conservation is the LIFE+ Nature project DRAGONLIFE which is run in co-operation with Denmark and targets dragonfly *Leucorrhinia pectoralis* (and one amphibian) but in monitoring also other aquatic invertebrates are noted (including threatened aquatic beetles, dragonflies and damselflies) and the conservation actions carried out in both countries are beneficial for large range of aquatic or semi-aquatic species.

Report to recommendation no 3:

See previous paragraphs.

Person compiling the report:

Merike Linnamägi
Nature Conservation Department
Ministry of the Environment
Tel: +372 6262900
Fax: +372 6262901
E-mail: merike.linnamagi@envir.ee

EUROPEAN COMMISSION / COMMISSION EUROPEENNE

A report on the implementation of Recommendation No. 120 (2006)¹ on the European Strategy for the Conservation of Invertebrates *DG ENV, Brussels, 7 June 2011*

Regarding an implementation of Recommendation No. 120 (2006), it was agreed to:

"1. draw up and implement national strategies on invertebrate species, or other relevant measures, as appropriate, taking into account the European Strategy for the Conservation of Invertebrate Animals mentioned above;

2. co-operate, as appropriate, with other Contracting Parties and observer States in the conservation of invertebrate species;

3. keep the Standing Committee informed of the measures taken to implement this recommendation."

The European Commission contributed to the implementation of the Recommendation in a few ways.

Some insects benefit from strict protection under the Habitats² Directive which includes 154 invertebrates, though the number of insect species in Europe is estimated to be around hundred thousand (gathering information on all these species would require enormous efforts, but significant work is done for many such species). Among protected invertebrates, 30% are Lepidoptera, and 23% are Coleoptera. The conservation status of insect species targeted by the Habitats Directive and listed in Annexes II, IV and V is reported by Member States in the framework of its Article 17 every six years. Assessments on the conservation status of the habitat types and species of Community interest have been carried out in EU 25 for the period 2001-2006, compiled as part of the Habitats Directive - Article 17 reporting process. The data summary sheet for species conservation status provides an overview per biogeographical region³.

Since these protected species do not necessarily cover all species most at risk of extinction currently, the Commission is also supporting the development of EU Red Lists on key species groups to complement the assessment of progress toward halting the loss of biodiversity in Europe. EU Red lists of butterflies, dragonflies and saproxylic beetles have been published in 2009. An EU Red List on Pollinators will be prepared and published by 2014 at the latest.

Within the EU initiative on Streamlining of European Biodiversity Indicators (SEBI), common species groups such as grassland butterflies are being used as indicators of the impact of the changes in rural land use through intensification and abandonment.

Finally, the Fauna Europaea database lists all the endemic and non-endemic species in Europe including insects; it represents a wealth of information to support policy-making.

Even in well-studied areas such as Europe however, a lot of data on taxa is still lacking, mainly because of a lack of knowledge and monitoring of these taxa.

To support the effective implementation, monitoring, and assessment of the EU Biodiversity Strategy 2011-2020, the Commission is addressing knowledge and data gaps, for example through current and future research and innovation projects on biodiversity and ecosystems. The Commission believes that these steps will enable it to assess trends in biodiversity in Europe, including for many insects, and also allow conclusions about the effectiveness of policy instruments employed for halting the loss of biodiversity and ecosystem services in the EU by 2020.

¹ <https://wcd.coe.int/wcd/ViewDoc.jsp?id=1486897&Site=DG4-Nature&BackColorInternet=DBDCF2&BackColorIntranet=FDC864&BackColorLogged=FDC864>

² Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, J. L 206 of 22.07.1992.

³ See Art. 17 technical report: <http://bd.eionet.europa.eu/article17>

FRANCE / FRANCE**Suivi de la Recommandation n° 120 (2006) sur la Stratégie européenne de conservation des invertébrés**

La France a promulgué en 1976 la loi relative à la protection de la nature; ses décrets d'application datent de 1977 et leurs premiers arrêtés de 1978. Parallèlement à la mise en place, puis à l'amélioration progressive, de cette réglementation visant la protection juridique d'espèces, dont bénéficient notamment les invertébrés, des politiques volontaristes ont été décidées en faveur d'un nombre important d'espèces fragiles ou menacées.

Dans ce cadre, deux plans nationaux d'action, respectivement en faveur des Odonates et des papillons du genre *Maculinea* ont été mis en place.

Par ailleurs, deux autres plans nationaux d'action sont dans un état d'avancement tel qu'il est prévu de les présenter d'ici peu à la Commission faune du Conseil national de la protection de la nature. Ils concernent 2 espèces de naïades : la grande mulette, *Margaritifera auricularia*, redécouverte après avoir été supposée disparue, et la mulette perlière, *Margaritifera margaritifera*.

Le soutien européen d'un programme Life + / Nature et Biodiversité a été obtenu pour aider à financer les actions de conservation de la mulette perlière.

GEORGIA / GÉORGIE

Conservation of Invertebrates in Georgia

The Caucasus has been recognized as holding an important reservoir of biodiversity, and is indeed considered a globally significant 'biodiversity hotspot' based on the richness of species and level of endemism recorded. The reason for the area's diversity may be explained by its location (at the juncture of two major biogeographic regions), the land form (the peninsula between the Black and Caspian Seas provides an important migration route and fly way), the topography of the landscape (with great variations in altitudes, and opportunities for isolation) and the climate (which varies significantly across the country, resulting in various habitats – from sub-tropical drylands and dry forests, to mountain tundra).

The study of animal population in Georgia has a long history. Regular studies of Georgian fauna began after the establishment of Caucasus Museum in 19th century. Subsequently, the studies on species diversity of animal world were carried out by the scientific research staff of Tbilisi state University and Institute of Zoology Georgian Academy of Sciences and by the representatives of different higher education institutions.

At present it is difficult to evaluate the knowledge on invertebrate animals, but it is possible to make a rough estimate of their great taxonomic diversity. The ratio of known and assumed is 13553/26312. Including almost 13,252 arthropods (and of these over 11,471 insect species) A relatively complete study has been conducted on nematodes, annelid worms, several taxa of beetles (Coleoptera), Hymenoptera (wasps and bees), butterflies (Lepidoptera) and Diptera (flies) show high species richness among the groups studied to date. At this stage little information is available on the status of individual species and about the composition of many invertebrate groups in Georgia, however, some have been widely researched.

The first annex contains the list of various invertebrate groups that have been studied in Georgia, categorized according to their taxonomic levels. Where species numbers are known these are presented.

It should be mentioned that mainly endemics to Caucasus are found in Georgia, though endemics in Georgia are numerous among invertebrates: in some groups number of endemics exceed 25%. For example, seven species of the family Papilionidae (swallowtails) occur in the country, including 2 endemics.

43 Invertebrate species are included in the Red list of Georgia (2003). According to the IUCN category among them 2 species are critically endangered, 8 species are – endangered and 32 – vulnerable (see annex 2). 6 species are included in IUCN Red list as VU or higher category.

Georgian law on the Red List and the red Book was adopted in 2003 and formed a legislative basis for the protection of endangered species. According to this law the removal of species on the Red List from their natural environment is permitted only in special cases with the aim of their saving, medicinal treatment, reproduction and scientific study. These species cannot be harvested for commercial purposes. The administrative and criminal codes define responsibilities for the illegal harvesting or destruction of habitats of the species on the Red List of Georgia.

Annex 1. Invertebrate diversity of Georgia according to main taxon

Protozoa	[293]
Metazoa	[15761]
Phylum Spongia	[1]
Phylum Coelenterata	[5]
Phylum Plathelminthes	[470]
Class Turbellaria	5
Class Trematoda	170
Class Monogenoidea	103
Class Cestoda	192
Phylum Nematelminthes	[1151]
Class Nematoda	1148
Class Nematomorpha	3
Phylum Acanthocephales	[39]
Phylum Annelida	[201]
Class Polychaeta	66
Class Oligochaeta	118
Class Hirudinea	17
Phylum Mollusca	[283]
Class Bivalvia	45
Class Gastropoda	238
Phylum Arthropoda	[13252]
Class Crustacea	138
Class Arachnida	1591
Class Myriopoda	52
Class Insecta	11471
Subclass Entognata	51
Subclass Ectognata	11420
Order Orthoptera	184
Order Homoptera	862
Order Hemiptera	600
Order Lepidoptera	1635
Order Coleoptera	4600
Order Hymenoptera	1680
Order Diptera	900

Annex 2. Invertebrate species included in the Red List of Georgia

1	<i>Phassus shamil</i> Christoph, 1888	EN
2	<i>Brahmaea ledereri</i> Rogenhofer, 1873	RE
3	<i>Eudia pavonia</i> Linnaeus, 1758	VU
4	<i>Perisomena coecigena</i> Kupido, 1825	VU
5	<i>Manduca atropos</i> Linnaeus, 1758	EN
6	<i>Rethera komarovi</i> Christoph 1885	VU
7	<i>Deilephila nerii</i> Linnaeus, 1758	EN
8	<i>Pterogon gorgoniades</i> Hb., 1819	VU
9	<i>Pachypasa otus</i> Drury, 1773	VU
10	<i>Lemonia balcanica</i> Herrich-Schäffer, 1843	VU
11	<i>Callimorpha dominula</i> Linnaeus, 1758	VU
12	<i>Axiopoena maura</i> Eichwald, 1830	EN
13	<i>Parnassius apollo</i> Linnaeus, 1758	VU
14	<i>Parnassius nordmanni</i> Ménétrières, 1849	EN
15	<i>Allancastris caucasica</i> Lederer, 1864	VU

16	<i>Antocharis gruneri</i> Herrich-Schaeffer, 1851	VU
17	<i>Anthocharis damone</i> Boisduval, 1836	VU
18	<i>Erebia hewistonii</i> Lederer, 1854	VU
19	<i>Erebia iranica</i> Grum-Grshimailo, 1895	VU
20	<i>Tomares romanovi</i> Christoph, 1881	VU
21	<i>Polyommates daphnis</i> Denis & Schiffermüller, 1775	VU
22	<i>Apocolotois smornovi</i> Romanoff, 1884	VU
23	<i>Zygaena fraxini</i> Ménétriès, 1832	VU
24	<i>Bombus fragrans</i> Pallas, 1771	VU
25	<i>Bombus eriophorus</i> Klug, 1807	VU
26	<i>Bombus alpigenus</i> Morawitz, 1873	VU
27	<i>Bombus persicus</i> Radoszkowsky, 1881	VU
28	<i>Xylocopa violacea</i> Linnaeus, 1758	VU
29	<i>Inotrechus kurnakovi</i> Dolranski&Ljovuschkin, 1989	CR
30	<i>Inotrechusinjaevae</i> Dolranski&Ljovuschkin, 1989	CR
31	<i>Omophron limbatum</i> Fabricius, 1777	EN
32	<i>Rosalia alpina</i> Linnaeus, 1758	EN
33	<i>Cordulegaster mzymtae</i> Barteneff, 1929	VU
34	<i>Onychogomphus assimilis</i> Schneider, 1845	VU
35	<i>Calopteryx mingrelica</i> Selys 1869	VU
36	<i>Astacus colchicus</i> Kessler, 1876	VU
37	<i>Pontastacus pylzowi</i> Skorikov, 1911	VU
38	<i>Dolomedes plantarius</i> Clerck, 1757	VU
39	<i>Eisenia transcaucasica</i> Perel, 1967	VU
40	<i>Eisenia lagodechiensis</i> Michaelson, 1910	VU
41	<i>Dendrobaena faucium</i> Michaelson, 1910	VU
42	<i>Allobophora kintrishiana</i> Kvavadze, 1987	EN
43	<i>Helix buchi</i> Dubois&Montpèreux,1839	VU

HUNGARY / HONGRIE

CONSERVATION OF INVERTEBRATES

CONSERVATION PLANS OF 12 PROTECTED AND ENDANGERED INVERTEBRATE SPECIES (8 BUTTERFLIES AND MOTHS, 2 BEETLES AND 2 SNAILS) WERE ADOPTED BY 2006.

The Ministerial Decree on protected and strictly protected plant and animal species was modified in 2008. The list of protected animal species was enlarged with 34 invertebrate species (1 snail, 2 crayfish, 1 spider, 2 orthopterans, 9 beetles, 7 butterflies, 1 fly and 11 bumbles).

Two remarkable projects were implemented in the past few years, which provided significant and new information about the genetic variation and origin, distribution and ecology of many invertebrate species. This information serves as a ground for the effective conservation of affected species.

One was implemented between 2005-2007 in the frame of “Zoological values of Carpathian basin, focus areas and genesis of its fauna” project. The main objectives of this project focusing on insects and other invertebrate groups were to examine with molecular biological method the less studied endemic taxonomic groups, to assess population biology of selected species of community importance, to study the fauna of some characteristic habitats in the Carpathian basin and to work out habitat conservation methods and action plans.

The project carried out in the frame of Transition Facility, titled “Steps towards the monitoring and management in line with the Birds (79/409/EEC) and the Habitats (92/43/EEC) Directives” aimed the elaboration of monitoring protocols for selected data deficient species based on field survey and tested methods. As a result of this project 23 invertebrate species (5 molluscs, 1 crayfish, 4 dragonflies, 7 beetles and 6 butterflies) were surveyed in selected localities and for each sampling methodologies were developed, which are suitable to fulfill the reporting obligations under Article 17 of the Habitats Directive. Natura 2000 management plans for 20 sites were also prepared, which determine land use prescriptions that could contribute to the long-term conservation of invertebrate species for which the sites have been designated.

Conservation objectives and measures were identified for each Natura 2000 site, containing some specific measures and objectives for the invertebrates of community importance.

The list of invasive alien species, which are dangerous to nature conservation interests (having a negative effect on natural habitats and native species), was prepared. It contains 16 invertebrate species. (<http://www.termeszetvedelem.hu/ozonfajok-magyarorszagon>).

In the frame of the Hungarian Biodiversity Monitoring System the monitoring of invertebrate species was developed in connection with EU reporting obligations. The number of studied species and the number of sampling sites were significantly increased. As a result of this improvement we now have a better picture about the conservation status of targeted species.

Hungarian experts contributed to the preparation of the European action plan of *Colias myrmidone*. They shared their experiences about the habitat selection and use, and added information about the ecology of this species based on study trips to Transylvania.

During the development of different grant schemes, for example Environment and Energy Operative Programme and Swiss Contribution, the habitat restoration and management including measures targeting the conservation of invertebrate species were taken into consideration, and large-scale habitat restoration projects have been implemented.

In 2010, new sites were added to the Hungarian Natura 2000 network, following the requirements of the European Commission to complete the network for certain habitats and species listed on Annex I and II of the Habitats Directive. The species for which new sites were designated included *Carabus hungaricus*, *Carabus zawadzskii*, *Dioszeghyana schmidtii* and *Gortyna borelii lunata*. On 5 October

2011, the European Commission declared sufficiency of the Hungarian Natura 2000 network for all features listed on Annex I and II of the Habitats Directive, including invertebrate species.

LATVIA LETTONIE

Recommendation No. 120 (2006) on the European Strategy for the Conservation of Invertebrates.

Recommends that Contracting Parties:

- 1. draw up and implement national strategies on invertebrate species, or other relevant measures, as appropriate, taking into account the European Strategy for the Conservation of Invertebrate Animals mentioned above;*
- 2. co-operate, as appropriate, with other Contracting Parties and observer States in the conservation of invertebrate species;*
- 3. keep the Standing Committee informed of the measures taken to implement this recommendation,*

104 invertebrate species are included in the list of strictly protected species adopted by Cabinet of Ministers Regulations No 396 "Regulations on strictly protected species list and list of protected species with exploitation limitations"

For 4 invertebrate species management plans adopted by Minister Order:

Margaritifera margaritifera

Unio crassus

Osmoderma eremite

Hirudo medicinalis

Book "A Guide to the Mollusks of Latvia" was published by Molacological Society of Latvia in 2010

MALTA / MALTE

MALTA'S NATIONAL REPORT ON THE IMPLEMENTATION OF RECOMMENDATION NO. 120 (2006) ON THE EUROPEAN STRATEGY FOR THE CONSERVATION OF INVERTEBRATES

Endangered invertebrates are afforded strict legal protection by the “Flora, Fauna and Natural Habitats Regulations, 2006” (Legal Notice 311 of 2006, as amended), which transpose the requirements of the Bern Convention and also extends protection to other endangered European species. Habitats important for the survival of endangered invertebrates are included in the national ecological network of protected areas.

A draft Dossier on wild fauna in the Maltese islands was uploaded on MEPA's website for public consultation in October 2011 (available at: <http://www.mepa.org.mt/public-consultation>). This document addresses species of fauna that are, or are likely to be, threatened by deliberate and/or incidental capture and killing, as well as animal species whose exploitation should be managed. The Dossier ultimately responds to mandates of biodiversity related multilateral environmental agreements, including the Bern Convention, as well as related EU policy. It aims at assisting Malta in building a strict protection regime, by devising strategic recovery plans for each species or group of species addressed in the Dossier. It also makes a direct cross-reference to the European Strategy for the Conservation of Invertebrates. Hence the Dossier, which integrates a proposed strategy to conserve terrestrial invertebrates (insects, arachnids and molluscs), will be a key policy tool for strengthening the implementation of Recommendation No. 120 (2006) on the European Strategy for the Conservation of Invertebrates at a national level.

NORWAY / NORVEGE

Report from Norway on Rec. No. 120 (2006) of the Standing Committee of the Bern Convention on the conservation of invertebrates in Europe, adopted by the standing Committee on 30 November 2006.

Referring to the follow-up of Recommendation no 120 (2006) to the Contracting Parties of the Bern Convention, to:

1. draw up and implement national strategies on invertebrate species, or other relevant measures, as appropriate, taking into account the European Strategy for the Conservation of Invertebrate Animals mentioned above;
2. co-operate, as appropriate, with other Contracting Parties and observer States in the conservation of invertebrate species;
3. keep the Standing Committee informed of the measures taken to implement this recommendation,

We will give some information related to this theme in the following:

Norway passed a new general legislation on biodiversity in 2009, - Act of 19 June 2009 No. 100 relating to the management of biological, geological and landscape diversity (Nature Diversity Act). Some of the main sections which impact the management of invertebrates in Norway include: Section 4 gives the management objectives for habitat types and ecosystems, while section 5 gives management objectives for species. Section 9 gives provisions for the precautionary principle, while section 10 describes the ecosystem approach and cumulative environmental effects. Section 13 gives quality norms for biological, geological and landscape diversity. Section 15 gives principles for species management, and sections 21 gives details for regulating removal of plants and fungi. Section 23 gives provisions for designating “priority species” (see below). Section 33 gives objectives relating to protected areas, and section 47 describes the management of protected areas. Section 52 gives provisions for “selected habitat types”.

The first “priority species” under the Nature Diversity Act where approved by the Government 20 May 2011. Tree of eight priority species are invertebrates; *Cicindela maritima*, *Osmoderma eremita* and *Scolitantides orion*.

The aim is to protect several other species as *priority species* in the near future.

Since 2003 the Norwegian Directorate for Nature Management has worked out and implemented a number of Action Plans related to individual species, groups of species or habitats. Typically, these Action Plans last for five years, after which an evaluation if the Action Plan has reached its goals is being made. Relating to invertebrates, the following Action Plans are relevant:

Published action plans, invertebrates:

Insecta:

Parnassius Mnemosyne

Cicindela maritima

Cucujus cinnabarinus

Mollusca:

Margaritifera margaritifera

Action plans in process, invertebrates:

Insecta:

Coenonympha hero,

Chalcophora mariana

Digitivalva arnicella (together with its host-plant *Arnica Montana*)

Plebejus argyrognomon

Andrena hattorfiana and *Andrena marginata*

Myrmeleon bore

Osmoderma eremita

Scolitantides orion

Arachnida:

Arctosa cinerea

Malacostraca:

Astacus Astacus

Several other Action plans on invertebrates will be started up this year.

The Action Plan on Old, hollow oaks, has insects as a major, or at least significant, reason for being selected:

This nature type passed as one of five “selected habitat types” under the Nature Diversity Act in Norway, in May 2011.

We believe the general Norwegian system of regulation and management plans for various types of protected areas (ranging from National Parks to Nature Reserves) are adequately well known to the Bern Convention. In addition to the tree *priority species* under the Nature Diversity Act mention above, eleven invertebrates are protected by the former Nature Protection Act.

Establishing of the Norwegian Biodiversity Information Centre (NBIC)

NBIC is a national source of information on biodiversity. The organizations main function is to supply the public with updated and accessible information on Norwegian species and ecosystems. NBIC became operational in January 2005.

As a national source of information the goal of NBIC is to make currently available information on biodiversity accessible to everyone who has access to the Internet (www.biodiversity.no).

NBIC is also making an effort to increase the focus on biodiversity and raise public awareness about it. The objective is to provide the public debate with up-to-date, correct information. This will help to make the issue of biodiversity an important factor in decision-making processes.

Valuable information and data related to biodiversity are found in museums of natural history, research institutions, nature management institutions and societies run by professional and amateur biologists. NBIC is cooperating with such organizations to assemble and coordinate this material so that it can become available to everyone.

Project information

The Norwegian Biodiversity Information Centre has many projects. Some of these are of great importance for the organizations ability to reach its goals, include invertebrates.

- The Norwegian Red List – the Norwegian Biodiversity Information Centre is assembling red lists of threatened and vulnerable species in Norway. The last national Red List was released in 2010, where over 21 000 species were evaluated, including ca. 13 000 invertebrates. Of a total number of 4.599 redlisted species 3.600 are invertebrates.

- Species Name database – the Centre is assembling an inventory of Norwegian species, which will be a national standard for nomenclature and taxonomic hierarchy. It will also be used as a standard key to obtain additional information available on individual species.
- Coordination and flow of data – the Centre is assembling information on biodiversity from those acquiring the primary knowledge to make it readily accessible through their Internet portal. Today 11 million objects are searchable at the database Species Maps, whereas ca. one million of these are invertebrates. Totally 19.226 different species are yet included. The Species Map is not yet available in English.
- The Norwegian Species Project.

The project started in 2009. The aim for the project is to enhance knowledge of poorly known species in Norway. Since 2009, 11 different insects-projects for over 13 million NOK have been founded by the project. In addition, also other invertebrates-projects have been founded. Several species of invertebrates new for Norway has been found, some of them also new for the science.

Trondheim, July, 2011.

SERBIA / SERBIE

Report on the implementation of the Recommendation No 120 (2006) on the European Strategy for the Conservation of Invertebrates in Serbia

Regarding the Recommendation No 120 (2006) on the Standing Committee on the European Strategy for the Conservation of Invertebrates, adopted by the Standing Committee on 30 November 2006, as well as the implementation this issue into national strategies on invertebrate species, or other relevant measures, several important projects, strategies and policies have been started and are established or they are in progress and implementation as appropriate, making efforts to develop the monitoring and research on invertebrates in Serbia.

1. The Current Legal Framework have been provided national strategic and policy base for conservation of invertebrate species and some measures taken to implement this recommendation, as following:

- The National Spatial Plan of the Republic of Serbia (2010-2010)
- The National Environmental Protection Programme (2010-2019)
- The National Strategy on Biological Diversity (2011-2018)
- The Law on Nature Protection (Off Jour of RS, No 36/09 , 88/2010 and 91/2010-corr)
- The Law on Forest (Off Jour of RS No 30//10)
- The Animal Welfare Law (Off Jour of RS, No 41/09)
- The Rulebook on criteria for selecting of habitat types including lists of priority natural habitat types and measures for their conservation (Off Jour of RS No 35/10)
- Regulation on Ecological Network(Off Jour of the RS No 102/2010),
- Rulebook on proclamation and protection of strict protected and protected wild flora and fauna and fungi (Off. Jour of RS No 5/10),
- The Rulebook on particular technical and technological solutions which facilitate undisturbed and safe communication of wild animals (Off. Jour of RS No 72/10)

2. Major projects for protection of invertebrates of Vojvodina, where the Provincial Institute for Nature Protection is the participant

2.1 The Emerald Network

During the realization of the Project o "Development Emerald Network in Serbia" ((Lakusic, 2006; Sekulic i sar., 2006a,b and Prokic), endangered insects from the following protected areas in Vojvodina were analyzed: NP „Fruška gora“, SRP (Special Nature Resrve) „Gornje Podunavlje“, „Stari Begej – Carska bara“, „Koviljsko – Petrovaradinski rit“, „Ludasko jezero“, „Selevenjske pustare“, „Obedska bara“, „Zasavica“, „Karadjordjevo“, „Pasnjaci velike droplje“, PIO(Landscape of Outstanding Features) „Suboticka pescara“, „Vrsačke planine“, NP „Palic“,and two areas in the process of valorization for protection: Morovicke sume and Pancevacke ade.

2.2 Establishment of ecological network

By writing a study "The Establishment of Ecological Network in AP Vojvodina – overview of the situation, analyses and possibilities" (Sabados at al., 2009), an emphasis has been put, among other things, on the main disturbance factors to various invertebrate groups inhabiting aquatic, wetland and prairie habitats of Vojvodina, as well as on important habitats in the form of spatially distributed ecological corridors between protected areas. This was resulted in adopting the Regulation on Ecological Network (Official Gazette RS, No. 102/2010).

As a follow-up of the previous project, in 2011 the Project entitled “Application of the Principles of Sustainable Use of Important Areas for Biodiversity Conservation within the Ecological Network in AP Vojvodina” (Sabados et al., 2011) was initiated in which, among other things, the issues of habitat mosaics, eco-corridors for insects and their ecosystem roles are elaborated.

2.3 *Biomonitoring of rare and endangered species*

Under this project, since 2006 to date, the monitoring has been carried out of the rare and endangered species of longhorn beetle (Coleoptera, Cerambycidae) in Fruska Gora (6 Balkan endemites and 20 species/sub-species have been identified for the first time in our country). Since 2011, the Tisa flower (*Palingenia longicauda*) and rare species of longhorn beetle of dry habitats (*Theophilea subcylindricollis*) have also been monitored.

2.4 *Main disturbance factors to invertebrate fauna have been recognized*

As in other parts of Europe, there are many disturbing factors here that are fairly similar. The main disturbance factors of great impact are: agricultural intensification, deforestation, abandonment of agricultural land, isolation of natural habitats, clear cutting, tourism and recreation, drainage, urbanization, waste collection, chemical pollution.

Survival of the saproxylic fauna (organisms dependent in some of the stages of development on dead wood, more or less decayed) has been reduced owing exclusively to modern forestry practices, such as clearing the forest of old, decayed and dead trees. At the initiative of the IUCN at the European level, a team of experts has been formed in order to create the European Red List of Saproxylic Beetles (Nieto et Alexander, 2010) that would allow protection of saproxylic species. The longhorn beetle fauna of Fruska Gora, compounded with the data on species registration in the entire territory of Serbia, has served to set up a domestic database. The solution for survival of the populations of saproxylic insects is to form artificial habitats (if the natural ones are missing) for egg laying (parts of old tree trunks) along the eco-corridors, with nodes on every 2 km. Conditions for development of forest ground, issued by the Institute, also provide for the measure of leaving a number of old and decayed trees per ha.

Burning of meadow vegetation is an important disturbing factor to the insect population in Vojvodina, whose larvae develop inside the herbaceous vegetation, or on it. Burning, particularly if undertaken between October-June, destroys the laid eggs and larvae of various orthoptera, bedbugs, longhorn bugs, butterflies, etc. Mowing of vegetation is allowed as stipulated in the conditions laid down/issued by the Institute in the period after June.

Another big issue is the use of chemical pesticides (insecticides, acaricides, fungicides, even herbicides) for suppression of harmful organisms in forestry and agriculture. These preparations are usually broad-spectrum (herbicides and fungicides also affect insect species), as they all act on physiological processes in all living organisms (mainly at the cellular level, transport of Na^+ , K^+ , Ca^{2+} ...). In protected areas, advantage is always given to bio-insecticides over the chemical ones (suppression of webworm in SRP “Stari Begej – Carska bara”, gypsy moth in PIO “Vrsacke planine”, mosquitoes in the protected areas in Vojvodina). Additionally, in developing the measures for protection and conservation of areas whose integral part is the agricultural land, the use of pesticides is prohibited at 30-50 m distance from watercourse in order to conserve the aquatic invertebrates.

By regulation of waterways, many natural habitats are destroyed and lost, or uniformed; at the same time, due to the numerous forms of pollution, the insect communities of aquatic ecosystems are rapidly disappearing and their composition varies greatly. In preparation of conditions for marine nature conservation, care is taken to reduce the concrete-paved surfaces along the riverside and ensure proper conservation of the green belt as an eco-corridor. Also, with regard to the maintenance of channels in protected areas, there is a prescription for protection of floating and submerged vegetation, as well as of littoral area, in order to preserve the vertebrate species that need this type of vegetation for development of larval forms, egg laying, etc.

By construction of highways, migratory paths of a large number of invertebrates have been disrupted. Moreover, the effect of exhaust gases alters the natural ecological conditions at a distance of 200 m from highway. In the process of drawing up the conditions for construction of highways and

railroads (by-pass road around Petrovaradin, main artery road Vizic-Erdevik, double-track railway Stara Pazova – Novi Sad, etc.), the following measures are provided for: greening, passages for amphibians and reptiles, which are also used by terrestrial insects and other invertebrates; lighting, acting as the light trap for nocturnal species, is also provided for in the design. Tracing of highway is done in such a way as to reduce the damage and disturbance of the natural habitats as much as possible, and avoid their fragmentation.

References:

- Report on implementation of recommendations on the European strategy for conservation of invertebrates by the Provincial Institute for Nature Protection;
- National Strategy on Biological Diversity of the Republic of Serbia;
- Publication of the Emerald ecological network in Serbia (N. Sekulic and J. Shinzar-Sekulic);
- Monograph on Prime Butterfly Areas in Serbia (Jaksic,P-2008)

Coordinated by Snezana Prokic,
Focal Point for Bern Convention

Belgrade, 7th July 2011.

THE NETHERLANDS / PAYS-BAS

**REPORT OF THE NETHERLANDS ON THE FOLLOW-UP
OF RECOMMENDATION NO. 120 (2006) ON THE
EUROPEAN STRATEGY FOR THE CONSERVATION OF INVERTEBRATES**

**By the Ministry of Economic Affairs, Agriculture and Innovation
Department of Nature, Landscape and Rural Affairs**

August 2011

Contracting party	The Netherlands
Institution	Ministry of Economic Affairs, Agriculture and Innovation
	Department of Nature, Landscape and Rural Affairs
Focal point	Gerard van Dijk
Mailing address	P.O. Box 20401
	2500 EK DEN HAAG
Telephone	+ 31 70 3785009
Email	g.van.dijk@minlnv.nl
Contact officer for the current report	Edo Knegtering
Mailing address	P.O. Box 20401
	2500 EK DEN HAAG
	The Netherlands
Telephone	+ 31 70 3785695
Email	e.knegtering@minlnv.nl

Contents

1.	Introduction and acknowledgements	7
2.	Implementation by the Netherlands of the key actions of the European Strategy for the Conservation of Invertebrate Animals (Document T-PVS/Inf (2006) 1 revised)	9
	Key actions regarding:	
	- inventorying, mapping and understanding invertebrate diversity	9
	- preventing habitat destruction and ensuring appropriate management	12
	- indicators and monitoring	16
	- invasive alien species	18
	- reversing the effects of intensive agriculture and forestry, and of industry and urbanisation	19
	- sustainable use	24
	- scientific capacity building	25
	- education and public awareness	29
	- co-operation and implementation	32
	References	34

1. INTRODUCTION AND ACKNOWLEDGEMENTS

In a letter of 11 May 2011, the secretary of the Bern Convention asked contracting parties to send a complete although concise report on the implementation of each of the three paragraphs of Recommendation No. 120 (2006) on the European Strategy for the Conservation of Invertebrates. The three paragraphs are the following:

- (1) draw up and implement national strategies on invertebrate species, or other relevant measures, as appropriate, taking into account the European Strategy for the Conservation of Invertebrate Animals [mentioned above];
- (2) co-operate, as appropriate, with other Contracting Parties and observer States in the conservation of invertebrate species;
- (3) keep the Standing Committee informed of the measures taken to implement this recommendation.

Since a both complete and concise report was asked for and since the European Strategy for the Conservation of Invertebrate Animals is actually the basis of all three paragraphs in Recommendation No. 120 (2006), we decided to straightforwardly take all key actions from the European Strategy (Document T-PVS/Inf (2006) 1 revised). Subsequently we asked several colleagues and specialists from relevant NGOs and institutions to provide us with available information on to what extent corresponding efforts in the Netherlands regarding the key actions are of have been made. We hereafter present the results in Chapter 2.

Acknowledgements

We greatly acknowledge the following persons for providing us with available relevant information: Camiel Aggenbach, Dick Bal, Joop van Bodegraven, Monique Brobbel, Jan Busstra, Ate Cohen, Marcel Dicke, Gerard van Dijk, Gert Eshuis, Folkert Folkertsma, Berry van der Hoorn, Roy Kleukers, Sylvia van Leeuwen, Peter Paul Mertens, Marcel van Nijnatten, Jinze Noordijk, Gerrit van Ommering, Sabine Pronk, Roel van Raaij, Stefanie Rog, Sander Smolders, Arco van Strien, Michelle Talsma, Theo Verstrael, Anrold van Vliet, Claire Vos, José Vos and Sander Wijdeven.

**2. IMPLEMENTATION BY THE NETHERLANDS OF THE EUROPEAN STRATEGY FOR THE CONSERVATION OF INVERTEBRATE ANIMALS
(DOCUMENT T-PVS/INF (2006) 1 REVISED)**

Key actions ▼	Corresponding efforts in the Netherlands ▼
2. INVENTORYING, MAPPING AND UNDERSTANDING INVERTEBRATE DIVERSITY	
Recovering threatened species and maintaining red lists	
2.1 Compile National red lists of threatened species of the relevant main groups of invertebrates, including those rich in sub-species or of high genetic diversity.	In the Netherlands, national red lists of threatened species are produced periodically for the following invertebrate groups: - terrestrial and freshwater molluscs; - mayflies, caddisflies, flatworms and stoneflies; - dragonflies; - butterflies; - wild bees. In compiling the lists, no special attention is paid to groups that are rich in subspecies or that may have a high genetic diversity.
2.2 Advance progress in creating European red lists of invertebrates by:	–
(a) Promoting a European synthesis of existing red lists and the (regular) updating and further elaboration of national and sub-national lists of threatened invertebrates.	Specialists of Dutch species survey organizations have substantially contributed to the European red lists for dragonflies and butterflies; see: < http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_dragonflies.pdf > and < http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_butterflies.pdf > Dutch national red lists for nine invertebrate groups have been updated periodically (see 2.1).
(b) Encouraging standardisation of the application of the relevant criteria.	Since 1994, Dutch national red lists have been compiled according to the same standardized criteria. In addition, the lists of some groups have simultaneously also been produced following standardized IUCN criteria for regional red lists.
(c) Gaining information of European status of threatened species within each state in order to determine international responsibilities to take action under National Biodiversity Strategies and Action Plans (NBSAP).	Dutch species survey organizations or specialists are involved in compiling European red lists (see also 2.2.a). Further, except for species of the EU Birds Directive and Habitats Directive, Dutch policy does not explicitly take the international conservation status of species into account in setting conservation priorities for indigenous species.
(d) Prioritising invertebrate groups (taxonomic, functional, service-providing or other) for action on red listing and collate information available (data sheets).	Research is currently running on to what extent (Dutch) red list status of certain species or species groups may also predict trends of species groups for which no red lists have been compiled. The results might also be helpful for prioritising the species groups for which red lists should be compiled.
(e) Updating information and including further	In addition to red lists, the online Dutch Species Catalogue (see:

<p>species in the Bern Convention Invertebrates.</p>	<p><http://www.nederlandsesoorten.nl/nlsr/nlsr/english.html >) continuously updates the presence or absence of all species recorded for the Netherlands, including invertebrates. Furthermore, as an EU member state, the Netherlands cannot propose changes to the annexes of Multilateral Environmental Agreements individually, however, member states can do so in an EU context, if the EU as a whole supports such proposals.</p>
<p>2.3 Increase awareness of protected area managers that they are responsible for many populations of rare and declining invertebrate species.</p>	<p>Dutch species survey or conservation NGOs such as <i>De Vlinderstichting</i> (Dutch Butterfly Conservation), European Invertebrate Survey – the Netherlands and <i>Stichting ANEMOON</i> (the ANEMOON Foundation; a survey organization regarding mollusc and marine animal species), do promote awareness among nature area managers of the conservation status of invertebrates. Examples of their efforts include the following:</p> <ul style="list-style-type: none"> - advocating the inclusion of invertebrates in the so-called <i>Leefgebiedenbenadering</i> ('Habitats approach' policy; a proactive species policy on a local scale, supplementing the Dutch National Ecological Network (EHS) and Natura 2000); - the project '<i>een ruggengraat voor ongewervelden</i>' ('a backbone for invertebrates') that informs nature managers on invertebrates that are subject to nature policy; - the development of management plans for locust species and stag beetles <i>Lucanus cervus</i>; <p>See also: < http://www.eis-nederland.nl/vliegendhertrapporten.html >;</p> <ul style="list-style-type: none"> - a book on the management of heath lands that also addresses specific species of threatened or vulnerable invertebrates (in preparation); - informing nature area managers on mollusc species found present in their areas, including during surveys; - advices or information on the management or conservation of species of the Habitats Directive (e.g., narrow-mouthed whorl snail <i>Vertigo angustior</i> and ramshorn snail <i>Anisus vorticulus</i>); - the production of multi-purpose educational materials regarding molluscs.
<p>Threats to widespread and abundant species</p>	
<p>2.4 Use existing mechanisms to promote the importance of conservation effort for widespread and abundant species.</p>	<p>In their various communication efforts, Dutch NGOs such as Dutch Butterfly Conservation and the ANEMOON Foundation (see above) also address widespread and abundant species of insects, marine invertebrates and terrestrial molluscs. Examples of such efforts include: press releases; courses and 'master classes'; atlases; books.</p> <p>Further, within the frame-work of Dutch agricultural and environmental policy, projects on so-called 'functional agricultural biodiversity' have been launched to promote the presence and 'use' of natural invertebrates by farmers (e.g., soil organisms and predators of pest organisms). The projects include (practical) research, implementation, promotion of pilots, and incentives. In addition, agricultural policy in the period 2008-2011 has partly also aimed at strengthening organic farming, including by promoting the importance of processes such as soil fertility and nutrient cycles and addressing the role of natural organisms which usually also include widespread and abundant invertebrates.</p>
<p>2.5 Establish a pan-European monitoring programme on some widespread (but specialist) invertebrate species. These species should be associated with specific habitat types (wetlands, dead wood, agriculture abandonment, etc).</p>	<p>Statistics Netherlands (CBS) and the NGO Dutch Butterfly Conservation are developing new protocols aiming at a more efficient monitoring of butterflies and dragonflies at a European scale. This includes widespread (but specialist) species. Due to the application of advanced statistical methods, the protocols don't require comprehensive and standardized monitoring in the field. Consequently, European trends of various species may be assessed much easier in the future, including for red lists.</p>
<p>2.6 Collate existing information and undertake focussed new research on the provision of</p>	<p>In general, various available information on the usefulness of specific species or species groups present in the Netherlands, including invertebrates, has been included in a comprehensive survey of the species diversity of the</p>

<p>ecological services by invertebrates and the economic values of those services.</p>	<p>Netherlands (see Noordijk <i>et al.</i> 2010b).</p> <p>New research includes that by Alterra Wageningen UR and European Invertebrate Survey – the Netherlands on the importance for Dutch agriculture of wild bee species (i.e., <i>not</i> honeybees) in pollination of crops.</p>
<p>3. PREVENTING HABITAT DESTRUCTION AND ENSURING APPROPRIATE MANAGEMENT</p>	
<p>3.1 Promote enhancement of existing important area schemes by taking greater notice of invertebrates and their functional roles in different habitats and ecosystems.</p>	<p>Examples of initiatives in the Netherlands agreeing with this key action, include the following:</p> <ul style="list-style-type: none"> - One of the three objectives of the ‘Habitats approach’ policy (see above) is broadening management aims for existing nature areas in order to enhance the opportunities for other species or species groups to benefit from conservation efforts. Species subject to the ‘Habitats approach’ policy include invertebrates; - Within the framework of the Dutch programme <i>Ontwikkeling en beheer natuurkwaliteit</i> (Development and management of nature quality; OB+N), the NGO European Invertebrate Survey – the Netherlands has contributed to the development of research questions for the management of river systems; the questions also address the occurrence and characteristics of invertebrate species being typical for river systems; - The NGO Dutch Butterfly Conservation has launched a ten-year strategy for the conservation of twelve butterfly species in the Netherlands aiming at integrated management approaches that involve both other species and the butterfly species in question; - The NGO ANEMOON Foundation has, partly successfully, advocated the extension of Natura 2000 areas in the Netherlands for the sake of some mollusc species and has also provided advices on considering species of terrestrial and freshwater molluscs in management activities such as dredging; - In the projects <i>Diversiteit mariene schelpdieren van Nederland</i> (Diversity of marine shellfish of the Netherlands) and <i>Atlas mariene schelpdieren</i> (the Atlas of marine shellfish species), the ANEMOON Foundation also addresses the role of shellfish species in marine ecosystems and provides knowledge on these species.
<p>3.2 Promote identification of important invertebrate sites and hotspots in Europe.</p>	<p>In 2002, with financial support from the Council of Europe and the Dutch government, all Prime Butterfly Areas (PBAs) in Europe have been identified using the Red Data Book on European butterflies as a guideline. In Serbia, Bulgaria and Turkey, the PBA concept has been further implemented on a national scale.</p> <p>For the Netherlands, stacked species distribution maps indicating numbers of different species recorded per grid cell for specific species groups, and thus, at the same time, national hotspots for these groups, have been published for the following invertebrate groups (page numbers refer to pages in Noordijk <i>et al.</i> 2010b):</p> <ul style="list-style-type: none"> - bivalves and gastropods (Bivalvia, Gastropoda) of fresh and brackish waters (p. 141); - terrestrial gastropods (Gastropoda): p. 141; - water mites (Hydrachnidia): p. 167; - centipedes (Chilopoda): p. 174; - millipedes (Diplopoda): p. 175; - branchiopods (Branchiopoda) of fresh and brackish water: p. 180; - woodlice (Isopoda): p. 191; - freshwater lobsters (Decapoda): p. 195;

	<ul style="list-style-type: none"> - jumping bristletails (Archaeognatha): p. 201; - dragonflies (Odonata): p. 204; - grasshoppers/ crickets (Orthoptera): p. 206; - cockroaches (Blattodea): p. 207; - stoneflies (Plecoptera): p. 209; - terrestrial bugs (Heteroptera): p. 220; - freshwater bugs (Heteroptera): p. 220; - strepsipterans (Strepsiptera): p. 224; - ground beetles (Carabidae): p. 232; - weevils (Curculionoidea): p. 237; - caddisflies (Trichoptera): p. 241; - butterflies and moths (Lepidoptera): p. 246; - pigmy moths (Nepticulidae): p. 248; - plume moths (Pterophoridae): p. 250; - true butterflies and skippers (Papilionoidea, Hesperioidea): p. 252; - owlet moths (Noctuidae): p. 254; - hoverflies (Syrphidae): p. 267; - chrysoideans (Chrysoidea): p. 271; - mutilloideans (Mutillioidea): p. 271; - spider wasps (Pompilidae): p. 271; - wasps (Vespidae): p. 271; - apoïd wasps (Apoidea: Ampulicidae, Crabronidae, Sphecidae): p. 273; - ants (Formicidae): p. 278; - wild bees (Apidae): p. 279; <p>In addition, the NGO ANEMOON Foundation is preparing an atlas of marine shellfish of the Netherlands which will also indicate shellfish hotspots for marine waters.</p> <p>Further, the ANEMOON Foundation also generates and discloses distribution data of terrestrial and freshwater mollusc species by means of the project <i>Habslak</i> and has produced lists of mollusc species present in Dutch marine areas. The data have been used to advocate the designation of Natura 2000 areas.</p>
<p>3.3 Promote the establishment of small scale protected area schemes, including micro-reserves, to aid conservation of the many rare and threatened invertebrates and invertebrate habitats that are confined to extremely small areas.</p>	<p>Several arthropod species are specifically subject to the 'Habitats approach' policy (see 2.3), including species of the following groups:</p> <ul style="list-style-type: none"> - spiders; - mayflies; - dragonflies; - grasshoppers/ crickets; - stoneflies; - beetles;

	<ul style="list-style-type: none"> - butterflies; - ants; - wild bees. <p>In addition, in some provinces, terrestrial gastropod species are subject to small-scaled nature conservation projects. Further, the Netherlands Entomological Society has produced some publications on microhabitats and <i>Staatsbosbeheer</i> ('National Forest Service') and the NGO European Invertebrate Survey – the Netherlands are preparing a book with guidelines for heath land management which also addresses the management of micro habitats for invertebrates.</p>
<p>3.4 Improve understanding and improve the efficiency of ecological corridors for invertebrates across Europe's protected areas.</p>	<p>For the Netherlands, Alterra-Wageningen UR has considered a number of butterfly species when using a so-called LARCH model for investigating the sustainability of ecological networks for species. In addition, a manual by Broekmeyer and Steingröver (2001) for designing so-called <i>robuuste verbindingen</i> (robust ecological corridors) in the Netherlands also includes some butterfly species.</p> <p>Further, a pilot study on nature values and restoration options of linear elements in landscapes in the Dutch province of Limburg (Wallis de Vries <i>et al.</i> 2008) has explicitly considered a number of invertebrate species of the following groups:</p> <ul style="list-style-type: none"> - gastropods; - grasshoppers/ crickets; - beetles; - butterflies; - wasps and wild bees.
<p>3.5 Evaluate and build upon the existing framework of Prime Butterfly Areas in Europe to maximise their relevance to the protection of other invertebrate groups.</p>	<p>Butterfly Conservation Europe advocates the value of butterflies as indicators for the presence or population trends of species of other groups and thus also the value of PBAs for such other species groups, including invertebrates.</p>
<p>3.6 Promote restoration and management programmes for fresh water and wetland habitats to benefit the invertebrate faunas, paying particular attention to counter-acting the effects of (1) physical destruction of and alterations to the habitats, such as channelling waterways and drainage, (2) changes to water flow and discharge rates (3) pollution, including heat pollution.</p>	<p>In general, plans for implementation of the EU Water Framework Directive should lead to the improvement of the chemical, hydromorphological and ecological quality of inland waters and thus, implicitly, of the conditions for various invertebrates of these waters. In the Netherlands, such plans include River Basin Management Plans and the individual water management plans of 26 district water boards. Some researchers state that improving the quality of fresh waters in the Netherlands (i.e., including the chemical and biological quality) rather than improving their morphology, will be important in actually improving conditions. They also underline that they are not aware of measures mitigating thermal pollution, whereas regulations regarding discharges of warm water have been liberalized since 2005 and potential thermal effects on brooks of effluent from sewage works are to a large extent still unknown.</p>
<p>3.7 Promote best practices for the sustainable use of all water resources, including underground aquifers, while taking the interests of the invertebrate fauna into account.</p>	<p>The sustainable use of water resources in the Netherlands is promoted or regulated, however the interests of the invertebrate fauna are often not explicitly addressed. Dutch district water boards have set targets by means of a so-called <i>Gewenst grond- en oppervlaktewaterregime</i> (Desired groundwater and surface water regime; GGOR) in relation to area functions, including pertaining to nature areas. The regimes may also be a tool for reducing the desiccation of nature areas. In addition, the Foundation for applied water research (STOWA) shares various relevant knowledge regarding sustainable water use with managers of surface water and shallow groundwater, including the district water boards. Likewise, 'SKB', an independent Dutch organisation regarding knowledge of soils, partly also addresses the sustainable use of subsoil water. Further, the Association of Dutch Water Companies (VEWIN) has published a brochure on water</p>

	collection, including from subsoil water, and biodiversity, with various examples of practices for a more sustainable use of water resources for the sake of biodiversity (VEWIN 2010). Finally, invertebrates may explicitly be subject of Environmental Impact Statements regarding water-related projects (see also 6.18).
4. INDICATORS AND MONITORING	
Indicators	
4.1 Identify and establish a palette of 'indicator groups' of invertebrates that reflect the biodiversity and the full range of ecological functions of the existing faunas of different habitat types. To do this will require clear definition of criteria for selection such that indicator groups will usefully supplement existing 'rare' species indicators already in use.	The Institute of Environmental Sciences (CML) of Leiden University is investigating correlations between traits of species and their red list status in the Netherlands for a variety of species groups including invertebrates (see also 2.1). The study may provide insights in to what extent population trends of certain species may be predictive for species trends of other species with similar traits.
4.2 Test the efficacy of different indicator groups for different habitat types and situations.	-
4.3 Promote the use of invertebrate indicator groups and ensure that they are correctly engaged in biodiversity and habitat conservation issues throughout Europe.	In the Netherlands, several advices and nature management plans promote the use of the stag beetle <i>Lucanus cervus</i> for invertebrates of dead wood.
4.4 Undertake focussed research to establish the degree of correlation between invertebrate protection using invertebrate indicator groups and established important area schemes for other organisms.	Although this specific action point is or has not been subject of research in the Netherlands, several studies have been published on the spatial distribution in the Netherlands of relative richness of species of certain groups ('hotspots'), including of invertebrate groups, compared to that of other groups. The studies implicitly indicate extents to which species richness of invertebrate groups may be indicative for species richness of other groups and include the following (invertebrate groups analyzed are indicated): - Jagers op Akkerhuis <i>et al.</i> (2007): dragonflies, hoverflies, wild bees; - Noordijk <i>et al.</i> (2010b): see 3.2; - Schouten (2007): dragonflies, grasshoppers & crickets, hoverflies; - Veling (1997): dragonflies, butterflies; - Vereijken <i>et al.</i> (2005): butterflies.
Monitoring	
4.5 Ensure that the invertebrate species on international red lists and in international treaties such as those in the Appendices of the Bern Convention and the EU Habitats Directive are the subjects of efficient, co-ordinated and standardised monitoring across Europe.	Aquatic macrofauna is being monitored following the requirements of the EU Water Framework (see also 4.6). This also yields information on the presences of threatened invertebrates.

<p>4.6 Set up standardised monitoring schemes for selected widespread and abundant species across Europe (see widespread species section of this Strategy)).</p>	<p>The Dutch <i>Gegevensautoriteit natuur</i> (National authority for data concerning nature) has approved a substantial number of standard instructions for performing individual species records or systematic species surveys, including of widespread or abundant species of the following invertebrate groups:</p> <ul style="list-style-type: none"> - various invertebrates; - marine and terrestrial molluscs; - dragonflies; - beetles; - butterflies and moths. <p>See < http://www.gegevensautoriteitnatuur.nl/pages/overzicht-vastgestelde-protocollen.aspx > (in Dutch). Some of the instructions pertain to monitoring for the Network Ecological Monitoring (NEM), notably of dragonfly and butterfly species; see:</p> <p>< http://www.netwerkecologischemonitoring.nl/meetnetten/libellen > (in Dutch);</p> <p>< http://www.netwerkecologischemonitoring.nl/meetnetten/dagvlinders > (in Dutch).</p> <p>Further, within the framework of the <i>Monitoring waterstaatkundige toestand des lands</i> (a monitoring programme for national waters) standardised monitoring is performed of macrozoobenthos (macrofauna) of fresh and water, mussels of fresh and marine waters and marine gastropods (Bogaart-Scholte <i>et al.</i> 2011). See also: < http://www.monitoringportaal.nl/index/1044/Resultaat.html > (in Dutch).</p>
<p>4.7 Review availability of electronic databases of species distributions in general at national and international scales, and establish a means of integrating the information.</p>	<p>In the Netherlands, electronic data on species distributions on a national scale are assessable for a variety of species groups (including invertebrate groups) in the <i>Nationale databank flora en fauna</i> (National database flora and fauna; NDFP).</p>
<p>5. INVASIVE ALIEN SPECIES</p>	
<p>5.1 Provide active support for the implementation of the European Strategy on Invasive Alien Species on all issues directly concerning invertebrates. This will involve identifying how invertebrates are affected by invasive species of any type and how invertebrates themselves contribute to the problem.</p>	<p>In the Netherlands, the <i>Beleidsnota invasieve exoten</i> (2007; Policy document on invasive alien species) aims at the prevention of the introduction of invasive alien species as well as on the isolation and/or eradication and the management of invasive alien species. The focus is on the conservation of native biodiversity, which consists of around 58 percent of invertebrates. The policy cycle includes an early warning system of experts, risk analysis of invasive alien species (including invertebrates), management advise, risk communication and management evaluation. Dutch experts participate in the EU working groups on Invasive Alien Species and in the European network on invasive species NOBANIS.</p>
<p>5.2 Compile a register of invasive species that have already significantly negatively affected invertebrate biodiversity and conservation.</p>	<p>In general, invasive species in the Netherlands are included in the online Dutch Species Catalogue (see above) and in the online species list of the Dutch working group on alien species (<i>Werkgroep exoten</i>; see: < http://www.werkgroepexoten.nl > (in Dutch)). There is no specific list available of alien species in the Netherlands that have particularly affected indigenous invertebrates.</p>
<p>5.3 Undertake risk analyses in situations of new threats to invertebrates from invasive species.</p>	<p>In the Netherlands, several risk analyses related to invasive alien species have been carried out. The analyses also involved species that threaten invertebrates, including marine sea squirts <i>Didemnum vexillum</i> (threatening native marine</p>

	shellfish), various species of non-native freshwater crayfish (threatening European crayfish), and the terrestrial slug <i>Arion lusitanicus</i> (potentially also threatening indigenous slugs).
5.4 Promote the screening of organisms intended for biological control introductions for their effects on non-target invertebrates.	In the Netherlands, the <i>nieuwe Voedsel- en Warenautoriteit</i> (Food and Consumer Product Safety Authority) and the <i>Team invasieve exoten</i> (Invasive Species Team) provide advices in the process of granting permits for the use of species in biological control. The advices take the potential risks of the species for biodiversity into account, including for non-target invertebrates.
6. REVERSING THE EFFECTS OF INTENSIVE AGRICULTURE AND FORESTRY, AND OF INDUSTRY AND URBANISATION	
Agricultural policy	
6.1 Actively support initiatives directed at farmers, foresters and gardeners to use less pesticides and herbicides and add invertebrates to the botanical arguments to reduce use of herbicides.	Implicitly, due to the activities mentioned under 6.2.
6.2 Promote integrated pest management and organic farming methods to reduce use of pesticides by farmers and gardeners.	In general, Dutch agricultural and environmental policy support projects aiming at the use of ‘functional agricultural biodiversity’, including attracting natural enemies as biological control. Projects include activities such as research, ‘knowledge tests’ involving farmers, knowledge sharing and the EU Learning Network on Functional AgroBiodiversity. Dutch agricultural policy also supports the <i>Programma precisielandbouw</i> (Programme for precision farming), which should lead to a more sustainable farming including a reduced use of pesticides and herbicides. In addition, the policy has also promoted organic farming, which avoids the use of pesticides and herbicides.
6.3 Provide data on the decline of invertebrate species in farmland.	The <i>Centraal Bureau voor de Statistiek</i> (Statistics Netherlands; CBS) and the NGO Dutch Butterfly Conservation have developed an indicator for butterfly species of grassland both for the Netherlands and for all European countries together (see Van Swaay <i>et al.</i> 2011).
6.4 Actively support the conservation networks working for agricultural change.	In cooperation with Butterfly Conservation Europe, BirdLife International and the European Forum on Nature Conservation and Pastoralism, the NGO Dutch Butterfly Conservation has advocated a more sustainable European agricultural policy, including within the framework of the European Habitats Forum.
6.5 Support the work of relevant agencies (e.g. farming and wildlife advisory groups) to help them reduce the damage to invertebrate communities on agricultural land.	Within the framework of the EU Learning Network on Functional AgroBiodiversity, a platform also addressing a positive involvement of functional wild organisms in farming, including invertebrates, has been initiated in the Netherlands.
6.6 Engage the public and organisations to promote environmentally friendly farming, including the continuous support of set-aside conservation land.	In the Netherlands, current nature policy has strongly reduced the level of purchasing agricultural land for the sake of realising permanent building blocks for the National Ecological Network. Instead, there is now a strong emphasis on subsidising farmers and other private initiatives for managing their lands for the sake of certain nature values, that is, for as long as these actors prefer to use such subsidies. The promotion of this ‘agricultural nature management’ is allocated to intermediate organisations. Further, a growing number of Dutch farmers (currently approximately 10 % of the farms / 55 % of the agricultural area) participate in agricultural nature organisations or cooperations which contribute to the promotion of the conservation of wild species in agricultural areas or other biodiversity-oriented activities of the farmers. In addition, actions within the framework of ‘functional agricultural biodiversity’ (see 6.2) include various

	communication efforts. Further, agricultural policy has recently supported activities of Bionext, a national platform for organic farming, and of the <i>Taskforce marktontwikkeling biologische landbouw</i> (a taskforce on market development of organic farming). The activities include promotion of organic farming and products.
6.7 Take appropriate action to improve the temporal stability of national and European policy regarding the designation and management of set-aside land.	See also 6.6. In addition, a small portion of former set-aside land (i.e., temporary forest) is or may be transformed in permanent forests. In some designated areas (i.e., the National Ecological Network) management of these forests may be subsidised.
Forestry	
6.8 Promote management to maintain a dynamic, heterogeneous mosaic structure of European forests, that also includes open areas, for maintaining the diversity of invertebrates and other organisms, including:	-
6.8.1 Increasing the diversity of species and age structure of native species of trees in forests	Within the Netherlands, sustainable, multifunctional or integrated management of mixed (species and ages) forests is promoted in which activities or values related to nature, recreation, landscape, cultural history and wood production are combined. Former and coming subsidy programmes aim at promoting (financially or by means of quality evaluations) mixed species/age classes with a substantial share of native species and with standing and fallen dead wood (in different decay stages). This is done in both 'nature-oriented forest' and 'multifunctional forest', however, the targeted levels may vary.
6.8.2 Maintaining a complex vertical structure of forests by keeping native shrub and ground level Vegetation	See 6.8.1.
6.8.3 Leaving fallen and standing dead wood in place	See 6.8.1.
6.8.4 Revising mowing regimes of woodland tracks and borders to ensure that invertebrates can complete their life cycles	In the Netherlands, open corridors and gradual forest edges are promoted through supporting extension education and advising forest managers.
6.8.5 Avoiding application of chemicals in forests, both as biocides or fertilizers	In the Netherlands, chemicals are only sporadically used in forests and various quality programmes (including FSC) discourage the use.
6.9 Encourage forest managers to adopt more multiple use policies in all forestry operations, remembering that invertebrate requirements do not always co-incide with those of other organisms.	See 6.8.1. With the exception of requirements of stag beetles <i>Lucanus cervus</i> (see 2.3), requirements of forest invertebrates are not specifically addressed in the Netherlands. However, it is assumed that most species will benefit from forest management aiming at mixed and varied forests (and edges) with dead wood (see also 6.8.1).
6.10 promote the maintenance of flood plain woodlands and other wet forest types that may be at risk from drainage.	In the Netherlands, desiccation has also negatively affected wet forests. However, in general, attention for the desiccation problem is increasing (see also 3.7). Further, 'nature development' has lead to new swamp forests in the Netherlands.

6.11 Co-operate with other organisations to promote sustainable forest practices.	In the Netherlands, various organisations related to forest management cooperate in promoting sustainable forest management.
6.12 Encourage forest managers to ensure that new afforestation does not occur on non-wooded land of high value for invertebrates and that native tree species are not replaced by other species.	This is hardly an issue in the Netherlands; new forests have mainly arisen on former agricultural land with low nature values.
6.13 Adapt policies in Mediterranean forests to the fact that fires will occur.	N/A
6.14 Take initiatives to direct attention to the importance of saproxylic invertebrates in the forestry agenda by highlighting the Council of Europe's report (Speight, 1989).	In the Netherlands, there are no initiatives that specifically promote the importance of saproxylic invertebrates in forestry (however, see also 6.9).
6.15 Promote awareness among forest managers as to the importance of micro-habitats for forest invertebrates, particularly saproxylic species	See 2.3, 6.9, 6.14 and Veling <i>et al.</i> (2004).
Town and country planning, industry, transport	
6.16 promote biodiversity-friendly engineering practices such that habitats, including micro-habitats, are created rather than destroyed.	Within the framework of the 'Habitats approach' policy in the Netherlands (see also 2.3), advices aiming at a more sustainable and 'ecological' management of the countryside, including regarding invertebrates, are provided to local authorities and companies. Further, Wageningen University and the NGOs Dutch Butterfly Conservation and European Invertebrate Survey – the Netherlands have submitted a research proposal on biodiversity of fringes of cities.
6.17 Influence town and country planning processes by ensuring that government agencies aid interpretation of legislation and influence wording of ministry guidelines.	In the Netherlands, aid in the interpretation of legislation and particularly, the use of necessary species distribution data for getting permits, has been facilitated by founding the National authority for data concerning nature and the National database flora and fauna (see also 4.6 and 4.7). See: < http://www.gegevensautoriteitnatuur.nl/pages/english.aspx > (in English) and < https://ndff-ecogrid.nl/ > (in Dutch).
6.18 Promote and develop the inclusion of invertebrates in ecological and environmental impact assessments.	The inclusion of fauna data (including of invertebrates) in Dutch Environmental Impact Assessments has usually been prompted by EIA working groups of independent experts as well as by NGOs (Knegtering <i>et al.</i> 2005). Further, the Netherlands Commission for Environmental Assessment has recently published a brochure as assistance for those considering to address flora and fauna (including invertebrates) in Environmental Impact Statements (Commissie voor de milieueffectrapportage 2011).
6.19 Support and use existing mechanisms for highlighting red-listed species and species listed in international treaties to ensure that key invertebrate sites are safeguarded from damaging planning decisions.	In the Netherlands, a number of species of national red lists, of the EU Habitats Directive and of some treaties, including several invertebrate species, have been included in regulations under the Flora and Fauna Act (1998) and in species lists for the 'Habitats approach' policy (see also 2.3 and 6.17) in order to consider or to avoid possible negative effects on their habitats or populations due to spatial activities or to restore or strengthen their populations by purposeful management of their habitats (and that of other species). In addition, red list species, including invertebrates, are often also included in Environmental Impact Assessments (see also 6.18).
6.20 Draw attention to the problems of light	In 2010, the Nature Conservation and Plant Ecology Group of Wageningen University has started a four-year research

pollution, at night and underground, by undertaking appropriate case studies and engaging astronomers as an ally.	project entitled 'impact of artificial light on flora and fauna in the Netherlands' which will investigate impacts of light pollution on ground beetles and moths. See: < http://www.narcis.nl/research/RecordID/OND1342803/Language/en >.
6.21 Halt the threats resulting from the development of ski facilities in European mountains including the Mediterranean countries using government tourism ministries and tour companies to alter public perception.	N/A
6.22 Obtain further facts on the threats posed by transport by undertaking case studies involving key invertebrate sites, and use the information obtained as the basis for further lobbying.	-
6.23 Undertake studies to determine how significant is the cull of flying insects that occurs as a result of collisions with car windscreens and radiator grills etc in areas of known importance to invertebrate conservation.	In May 2011, Wageningen University has launched the website <i>Splash-teller</i> (Splash counter; see: < http://www.splashteller.nl >; in Dutch). The main objective of the site is to create an overview of the variation in space and time of the density of flying insects in the Netherlands. The public is asked to count the number of dead insects on their car licence plate after every drive and to submit the information via the website. In principle, the data also allow for determining the impact of traffic on flying insects.
7. SUSTAINABLE USE	
7.1 Develop national programmes to monitor and where necessary regulate the collection and trade in wild-collected invertebrate animals with the objective of achieving sustainability of the populations concerned and the ecosystems of which they are a part.	The Netherlands have implemented and institutionalised the CITES treaty and the EU CITES regulations which also apply to invertebrates. We are not aware of programmes in the Netherlands aiming at dealing with collection or trade of invertebrates in particular.
8. SCIENTIFIC CAPACITY BUILDING	
8.1 Make efforts to initiate a revival of invertebrate taxonomy to make the subject more attractive again, to both students and funding agencies.	The foundation of NCB Naturalis is to some extent expected to lead to a revival of invertebrate taxonomy in the Netherlands, due to merging and digitalizing a number of separate collections and due to new research and educational programmes. See also: < http://science.naturalis.nl/ >. An example regarding a specific invertebrate group is current taxonomic research by NCB Naturalis on gastropods <i>Euconulus</i> spec..
8.2 Undertake field work and other research necessary to improve the conservation status of invertebrates in Europe by:	
8.2.1 Improving efficiency of field surveys.	Within the framework of the Dutch National database flora and fauna (see also 6.17), increasing the quantity and quality of volunteers performing field surveys is aimed at. Activities include the development of digital determination keys, also for invertebrates. Further, within the framework of the Dutch Network Ecological Monitoring (see also 4.6), Statistics

	<p>Netherlands is involved in developing state-of-the-art survey methods on the basis of so-called site occupancy models. The methods are expected to lead to considerably more efficient surveys.</p> <p>Further, NCB Naturalis and the NGOs European Invertebrate Survey – the Netherlands and <i>Nederlandse Entomologische Vereniging</i> (Netherlands Entomological Society) are publishing the <i>Entomologische tabellen</i>, a new series of determination keys for the Netherlands, which have included the following entomological groups to date:</p> <ul style="list-style-type: none"> - harvestmen (Opiliones); - stoneflies (Plecoptera); - jewel beetles (Buprestidae); - longhorn beetles (Cerambycidae); - large fruit flies (Tephritidae). <p>For marine invertebrates, the Atlas of marine shellfish species (in preparation; see also 3.1) will combine survey data from various sources and the data will also be disclosed digitally. Combined with the coming advices by an informal Dutch taskforce for the monitoring of zoobenthos, these initiatives may contribute to a more efficient monitoring of invertebrates of Dutch marine waters in the future.</p>
<p>8.2.2 Undertaking inventories of Natura 2000 and Emerald Network sites.</p>	<p>For all species for which EU Natura 2000 areas in the Netherlands have to be designated, including invertebrate species, comprehensive field surveys have been performed. The surveys are a basis for finally designating the areas and for formulating accompanying management plans. In addition, for national reporting related to Article 17 of the EU Habitats Directive populations of the species concerned are often also being monitored.</p>
<p>8.2.3 Selecting permanent sites for long term monitoring</p>	<p>The Dutch Network Ecological Monitoring uses fixed routes for monitoring the trends of populations of dragonflies and butterflies (see also the links in 4.6). In addition, monitoring of invertebrates on wrecks of ships in the North Sea (i.e., inherently permanent sites) will be performed from 2011. Further, see also 4.6.</p>
<p>8.2.4 Obtaining and collating autecological, behavioural and other biological information on known rare or threatened species</p>	<p>Various obtained and collated biological information on invertebrates in the Netherlands, including on rare or threatened species, has been published, including online, notably:</p> <ul style="list-style-type: none"> - the journal <i>Nederlandse Faunistische Mededelingen</i> (Dutch Faunistic News) on invertebrates in the Netherlands; see: < http://science.naturalis.nl/nfm > (in Dutch) and < http://science.naturalis.nl/research/publications/nederlandse-faunistische-mededelingen/inhoudbeknopt > (in Dutch); - various publications by the Netherlands Entomological Society, including the bi-monthly journal <i>Entomologische Berichten</i> (Entomological Reports) (see: < http://www.nev.nl/lnvphp/lnvframelarge.php?fnn=english >) - a series of books on Dutch fauna (<i>Nederlandse fauna</i>); volumes have been published for the following invertebrate groups to date: <ul style="list-style-type: none"> - molluscs of freshwater (Volume 2); - dragonflies (Volume 4); - grasshoppers/ crickets (Volume 1); - ground beetles (Volume 3); - butterflies (Volume 7); - hoverflies (Volume 8); - wasps and ants (Volume 6). - the online comprehensive database Dutch Species Catalogue (see also 2.2.e).

8.2.5 Obtaining and collating new taxonomical information	The obtaining and collating of new taxonomical information, including by DNA barcoding of all indigenous species of the Netherlands, and thus, also of all indigenous invertebrate species, will be a main activity of NCB Naturalis (see also 8.1). Further, species information collated by means of the online Dutch Species Catalogue follows the latest taxonomies (i.e., according to the Dutch specialists concerned with the various species groups).
8.2.6 Strengthening the capacity to identify invertebrates, including the development of new methods that facilitate and speed identification of species	The founding of NCB Naturalis (see also 8.1) also implies capacity building for taxonomic research in the Netherlands, including for invertebrates (see also 8.1 and 8.2.5.). In addition, within the framework of the former national Dutch programme <i>Versterking infrastructuur plantgezondheid</i> ('strengthening the infrastructure for plant health'), the <i>Uitvoeringsconsortium insecten</i> ('Insect consortium': Food and Consumer Product Safety Authority, NCB Naturalis, Zoological Museum Amsterdam of the University of Amsterdam, Laboratory of Entomology of the Wageningen University) also implied capacity building related to identifying invertebrates and the approach has yielded successful results.
8.2.7 Promoting easy access to taxonomic information held in scientific collections and databases	At the pan-European level, the Pan-European Species directories Infrastructure (< http://www.eu-nomen.eu/portal/ >), which includes Fauna Europaea (< http://www.faunaeur.org/ >), provides taxonomic data of many invertebrate groups. In turn, Fauna Europaea also contains links to other relevant databases regarding invertebrate groups, for example, CLEMAM and CLECOM for molluscs. At the national level, the online Dutch Species catalogue (see also 2.2.e) contains taxonomic information of all invertebrates recorded in the Netherlands. In addition, NCB Naturalis leads a large-scaled operation of digitalising invertebrate specimens in Dutch national museum collections. The digital information will be disclosed (online).
8.3 Select an organisation for invertebrate conservation in each country as a cost-effective mechanism to deliver government-funded conservation work and/or as a campaigning force.	<p>The <i>Stichting VeldOnderzoek Flora en Fauna</i> (Netherlands Society for Research on Flora and Fauna; VOFF; see: < http://www.voff.nl/ > (in Dutch)) is the umbrella organisation of several species <i>survey</i> NGOs, including for NGOs particularly concerned with the following invertebrate groups (numbers of members/ volunteers according to Berg & Van Nieuwerkerken (2010)):</p> <ul style="list-style-type: none"> - invertebrates (in general): European Invertebrate Survey – the Netherlands (approx. 1300 members/ volunteers); - molluscs and marine invertebrates: the ANEMOON Foundation (approx. 600 members/ volunteers); - insects and spiders: Netherlands Entomological Society; - dragonflies, butterflies and moths: Dutch Butterfly Conservation (approx. 5800 members/ volunteers); - microlepidopterans: the <i>Stichting TINEA</i> (TINEA Foundation) (approx. 150 members/ volunteers). <p>In addition, <i>Soortenbescherming Nederland</i> (Wildlife Conservation Netherlands; see: < http://www.soortenbescherming.nl/ > (in Dutch)) is an umbrella organisation of a number of Dutch species conservation NGOs, including the following already mentioned NGOs European Invertebrate Survey – the Netherlands and Dutch Butterfly Conservation.</p> <p>The Dutch government cooperates with both these umbrella organisations and individual member NGOs.</p>
8.4 Increase expertise and involvement of official conservation agencies in each country to make sure invertebrates receive the attention they deserve. This should include proper training for decisionmakers within 'all purpose' agencies.	<p>A number of activities/products in the Netherlands may contribute to the aim of this key action, for example, the following:</p> <ul style="list-style-type: none"> - the programme Development and management of nature quality (see 3.1); - the project <i>Praktijkgericht natuurbeheer</i> ('Practically-oriented nature management') in which a number of species survey NGOs collaborate, including NGOs concerned with invertebrate groups;

	<ul style="list-style-type: none"> - research on the management of invertebrates in roadside verges and other linear elements financed by the Ministry of Transport, Public Works and Water Management (Noordijk 2009); - the project Diversity of marine shellfish of the Netherlands (see 3.1); - a book on the management of heathlands (see 2.3).
8.5 Support the creation and implementation at the relevant levels of 'Codes of Conduct' for researchers in invertebrates to avoid conflicts with conservation policy.	Some of the standard instructions for performing individual species records or for systematic species surveys that have been approved by the Dutch National authority for data concerning nature (see 4.6) have addressed the avoidance of negative effects resulting from surveys of invertebrate species.
8.6 Determine the level of invertebrate conservation expertise across the region, as a sort of capacity audit.	In the Netherlands, there are no actions aiming at assessing the level of invertebrate conservation expertise. However, the Dutch Species Catalogue (see also 2.2.e) also functions as a network that unifies and makes visible the Dutch key specialists involved for the different indigenous species groups, including invertebrate groups and that simultaneously indicates the available capacity of (see for a list of specialists: < http://www.nederlandsesoorten.nl/nlsr/nlsr/i000330.html >; in Dutch). Further, most of the various member organisations of the Netherlands Society for Research on Flora and Fauna have a known capacity of members or volunteers involved in species surveys in the Netherlands for different groups (see 8.3). This also pertains to the 2 organisations concerned with invertebrates that are members of Wildlife Conservation Netherlands (see 8.3).
8.7 Implement a standardised approach to invertebrate taxonomy across Europe.	Dutch organizations or specialists are involved in several (pan-)European projects regarding invertebrate taxonomy, including: <ul style="list-style-type: none"> - the Pan-European Species directories Infrastructure; - Fauna Europaea (and related initiatives regarding specific groups, such as CLEMAM and CLECOM); - the BioFresh Programme.
8.8 Call upon European and other international funding bodies to look upon the needs of invertebrate conservation more favourably.	In 2010, Butterfly Conservation Europe has received a EU Core Funding grant.
9. EDUCATION AND PUBLIC AWARENESS	
9.1 Pursue and encourage public acceptance of the importance of invertebrate animals to the wellbeing of the world and ourselves by:	-
9.1.1 Drawing public attention to the functional importance of invertebrate species, and that even these are also at long term risk of becoming threatened.	In the Netherlands, there is a multitude of environmental educational activities, including regarding invertebrates and their functional importance. Examples are: <ul style="list-style-type: none"> - zoos and aquariums displaying invertebrates; - exhibitions or activities in centres for visitors of nature areas and centres for environmental education; - butterfly gardens (for indigenous species) and greenhouses for butterflies (tropical species); - exhibitions in natural history museums; - campaigns and field excursions by educational or survey/conservation organisations; - festivals on insects initiated by the Laboratory of Entomology of the Wageningen University (2006: City of Insects; 2007: <i>Zuigers en prikkers</i> (Suckers and stingers); 2011: <i>Insecten-experience</i> (Insect experience) (see: <

	<p>http://www.insectenexperience.nl >);</p> <ul style="list-style-type: none"> - a biennial series of lectures as well as individual lectures on insects and society organised by the Laboratory of Entomology of the Wageningen University or its staff members (see: < http://www.ent.wur.nl/NL/Insecten+en+Maatschappij/ >; in Dutch); - the project <i>Klein en fijn</i> (Small and great) which will make invertebrates that are both small and useful visible to the public and which will inform the public on the usefulness of these invertebrates (in centres for visitors of nature areas); - educational materials on butterflies by the Dutch Butterfly Conservation (see: < http://www.vlinderstichting.nl/onderwijs.php >); - the Dutch Species Catalogue (see 2.2.e); - various publications on invertebrates by European Invertebrate Survey – the Netherlands and NCB Naturalis, including the book edited by Noordijk <i>et al.</i> (2010a); - educational materials produced by the Laboratory of Entomology of the Wageningen University or its staff members, including a book edited by Huigens & de Jong (2006) (see also < http://www.ent.wur.nl/NL/Webshop >); - communication activities and publications related to projects on functional agricultural biodiversity (see also 2.4, 6.2, 6.5, 6.6). <p>See further also 9.1.3.</p>
<p>9.1.2 Providing guidelines to influence school curricula.</p>	<p>In general, national Dutch policy on environmental education has served as a framework or has influenced new national guidelines for reforming the curriculum in favour of knowledge regarding sustainability and the environment (see Verheijen <i>et al.</i> 2010) and the new programme for biology exams in secondary education (see Commissie Vernieuwing Biologieonderwijs 2010). In the guidelines and programme, vertebrates are only implicitly addressed (in terms of ‘plants and animals’ and ‘biodiversity’).</p> <p>Further, the Laboratory of Entomology of Wageningen University is developing educational materials for practicals with insects in Dutch schools.</p>
<p>9.1.3 Making invertebrates more interesting in the media and the internet by accentuating their functional roles and their importance to our own quality of life.</p>	<p>In the Netherlands, a number of activities and publications have contributed to the aim of this action, including:</p> <ul style="list-style-type: none"> - promotion of the book edited by Noordijk <i>et al.</i> 2010a (this book also addresses the usefulness of specific species or species groups; see 2.6); - press releases and websites of NCB Naturalis, species survey NGOs and species conservation NGOs; - the online <i>Natuurwidget</i> (‘biodiversity widget’; see: < http://www.nederlandsesoorten.nl/natuurwidget >; Dutch); daily presenting pictures and information on another indigenous species (to a substantial extent addressing invertebrates); - the project <i>Natuur om de hoek</i> (Nature in the neighbourhood): digital determination keys for 400 indigenous species that occur in environments of children and a series of 12 television programmes (to a substantial extent addressing invertebrates); <p>See further also 9.1.1.</p>
<p>9.2 Identify appropriate internet websites for providing comprehensive information about invertebrates, in which key regional and global institutions contribute and then promote invertebrate conservation, emphasising topics</p>	<p>Information on all indigenous vertebrate species in the Netherlands has been included in the online Dutch Species Catalogue, varying from only species names, the specialists involved and the status of occurrence in the Netherlands, to also pictures, sounds, distribution maps, or information on their legal and red list status (see also 2.2.e). For dragonflies, butterflies and moths, in particular, organisations concerned have launched the following websites, including the promotion of conservation of species of these groups:</p>

<p>prioritised by the present Strategy.</p>	<p>- dragonflies: <i>libellenet</i> < http://www.libellenet.nl/ > (some parts also in English) - butterflies: <i>vlindernet</i> < http://www.vlindernet.nl/ > (some parts also in English) - moths: < http://www.microlepidoptera.nl/ > ,</p>
<p>9.3 Support education and awareness programmes in zoological institutions on invertebrate conservation issues (e.g. the programmes of natural history museums).</p>	<p>In general, most Dutch natural history museums are supported by national, provincial or local authorities. Several museums have included invertebrates in their regular exhibitions or have developed additional educational materials and activities regarding invertebrates (not necessarily aiming at <i>conservation</i>). An example are the various publications on invertebrates by the national museum of natural history NCB Naturalis in cooperation with European Invertebrate Survey – the Netherlands, including the book edited by Noordijk <i>et al.</i> (2010a). Knowledge on indigenous species, including invertebrates is also provided on the website Kennisnet (knowledge net); see: < http://natuurlijk.kennisnet.nl/natuur >. The aim of this website is to support education on schools. See further also 9.1.1.</p>
<p>9.4 Provide advice and education programmes and encourage direct liaison with land managers to help reduce damage to invertebrates (e.g. by minimising the use of pesticides and using integrated control methods and adopting appropriate mowing regimes).</p>	<p>Dutch Species survey or conservation NGOs, such as European Invertebrate Survey – the Netherlands, Dutch Butterfly Conservation and the ANEMOON Foundation advocate the interests of invertebrates in their various contacts with nature managers. See also 2.3.</p>
<p>9.5 Support initiatives to encourage the public to understand the environmental cost of ‘urbanisation` of the countryside.</p>	<p>-</p>
<p>10. CO-OPERATION AND IMPLEMENTATION</p>	
<p>10.1 Support and enhance the use of existing mechanisms for international co-operation (COE, EU, ECNC, CBD, IUCN, WWF and others) and continue harmonising legislation for the conservation of invertebrates in Europe.</p>	<p>Implicitly, invertebrates are addressed in international cooperation regarding functional agricultural biodiversity, pollinators or soil biodiversity, by representatives of the Netherlands or by Dutch NGOs or specialists. Other examples of addressing invertebrates in international cooperation include: - financial support by the Dutch government for identifying Important Butterfly Areas (see 3.2); - involvement of the NGO Dutch Butterfly Conservation in the development of SEBI indicators.</p>
<p>10.2 Increase awareness and enhance the use of ecosystems and habitats as entities for invertebrate conservation at all scales of political boundary, between and within states.</p>	<p>-</p>
<p>10.3 Promote dialogue between countries, sectors and key institutions that may be locally linked to harmonise strategic plans and develop common approaches to shared problems and pathways for invertebrate conservation.</p>	<p>-</p>
<p>10.4 Develop and implement local trans-boundary</p>	<p>-</p>

and shared water course initiatives relevant to invertebrates	
The role of the Council of Europe	
It is suggested that the Council of Europe: 10.5 Continue with Bern Convention engagement with invertebrate conservation issues by facilitating national implementation of this Strategy and strengthening co-operation with relevant regional and global institutions.	-
10.6 Continue and support the work of the Convention's Group of Experts on the Conservation of Invertebrates.	-
10.7 Work with key regional and global institutions (e.g. CBD, European Commission, European Environment Agency, IUCN, Planta Europa, Birdlife International and other appropriate partners) to promote the further development of effective invertebrate conservation measures for Europe and the Mediterranean Region.	-
10.8 Encourage and support cross-boundary initiatives in invertebrate conservation.	-
REFERENCES	<p>Berg, M.P. & Van Nieukerken, E.J. (2010). Biodiversiteit onderzoeken [Investigating biodiversity]. In: Noordijk, J., R.M.J.C. Kleukers, E.J. van Nieukerken & A.J. van Loon (eds.). De Nederlandse biodiversiteit. Nederlandse fauna 10. Leiden, the Netherlands: Nederlands Centrum voor Biodiversiteit Naturalis & European Invertebrate Survey – Nederland, pp. 17-52.</p> <p>Bogaart-Scholte, M.W.M., Van der Weijden, M.H., Naber A., Wetsteijn L.P.M.J. & Rog S. (2011). MWTL Meetplan 2011; Monitoring waterstaatkundige toestand des lands: milieumeetnet rijkswateren [MTWL monitoring plan 2011; Monitoring of the national hydrolic condition: environmental monitoring network for national waters] Lelystad, the Netherlands: Rijkswaterstaat.</p> <p>Broekmeyer, M.E.A. & Steingröver, E.G. (2001). Handboek robuuste verbindingen: ecologische randvoorwaarden [Manual for robust ecological corridors: ecological preconditions]. Wageningen, the Netherlands: Alterra.</p> <p>Commissie Vernieuwing Biologieonderwijs (2010). Naar actueel, relevant en samenhangend biologieonderwijs:eindrapportage van de Commissie Vernieuwing Biologie Onderwijs; met nieuwe examenprogramma's biologie voor HAVO en VWO [to an up to date, relevant and adherent biology education:</p>

- final report of the Commission for the Renewal of Biology Education; includes new programmes for biology exams for the school of higher general secondary education and for pre-university education]. Utrecht, the Netherlands.
- Commissie voor de milieueffectrapportage (2011). Cahier natuur: natuurwet- en regelgeving, voorbeelden, praktijkervaringen en tips voor milieueffectrapportages ['Exercise book' nature: laws and regulations regarding nature, examples, practical experiences and tips for Environmental Impact Assessments]. Utrecht, the Netherlands.
- Huigens, T. & De Jong, P. (eds.) (2006). Muggenzifters en mierenneukers: insecten onder de loep genomen [nit-pickers: taking a close look at insects]. Wageningen, the Netherlands: Laboratorium voor Entomologie.
- Jagers op Akkerhuis, G.A.J.M., Groot Bruinderink, G.W.T.A., D.R. Lammertsma, D.R. & Kuipers, H. (2007) Biodiversiteit en de Ecologische Hoofdstructuur. Een studie naar de verdeling van soorten over Nederland en de dekking van hun leefgebieden door de Ecologische Hoofdstructuur [Biodiversity and the Dutch National Ecological Network (EHS): a study on the distribution of species in the Netherlands and the coverage of their habitats by the EHS]. Wageningen, the Netherlands: Alterra, report 1319.
- Knegtering, E., Drees, J.M., Geertsema, P., Huitema, H.J. & Schoot Uiterkamp, A.J.M. (2005) Use of animal species data in Environmental Impact Assessments. *Environmental Management* 36: 862-871.
- Noordijk, J. (2009). Arthropods in linear elements: occurrence, behaviour and conservation management. Ph.D. thesis Wageningen University, the Netherlands.
- Noordijk, J., Kleukers, R.M.J.C., Van Nieukerken, E.J. & van Loon, A.J. (eds.) (2010a). De Nederlandse biodiversiteit [Biodiversity of the Netherlands]. *Nederlandse fauna 10*. Leiden, the Netherlands: Nederlands Centrum voor Biodiversiteit Naturalis & European Invertebrate Survey – Nederland.
- Noordijk, J., Van Nieukerken, E.J. & Kleukers, R.M.J.C. (2010b). Overzicht van de Nederlandse biodiversiteit [Overview of the biodiversity of the Netherlands]. In: Noordijk, J., R.M.J.C. Kleukers, E.J. van Nieukerken & A.J. van Loon (eds.). *De Nederlandse biodiversiteit. Nederlandse fauna 10*. Leiden, the Netherlands: Nederlands Centrum voor Biodiversiteit Naturalis & European Invertebrate Survey – Nederland, pp. 53-302.
- Schouten, M.A. (2007). Patterns in biodiversity: spatial organization of biodiversity in the Netherlands. Ph.D. thesis Utrecht University, the Netherlands.
- Van Swaay, C, Van Strien, A. & Plate, C. (2011). Europese indicator toont achteruitgang graslandvlinders [European Butterfly Indicator shows decline grassland species]. *Landschap* 28 (1): 5-14.
- Veling, K. (1997). Verspreidingsanalyse doelsoorten EHS: overkoepelende rapportage. [Analysis of the distribution of "target species" for the National Ecological Network (EHS): Cover report.]
- Veling, K., Smit, J. & Siebering, V. (2004). Bosrandbeheer voor vlinders en andere ongewervelden [Management of fringes of woods for butterflies and other invertebrates]. Utrecht, the Netherlands: KNNV Uitgeverij.
- Vereijken, P.H., Jansen, M.J.W., Akkermans, W.M.L., Staritsky, I.G. (2005) Kan het natuurbeleid ruimtelijk-economisch efficiënter? [Is a spatially and economically more efficient nature policy possible?] Wageningen, the Netherlands: Plant Research International: report 109.
- Verheijen, S., Van Koppen, C.S.A., Wammes, D.F. & Jansen, P. (2010). Naar een kern voor leerlijnen natuur- en milieueducatie: analyse van bestaande leerlijnen en synthese van een kern-leerlijn NME [To the essentials of learning guidelines for environmental education and education for sustainable development: analysis of existing learning guidelines and a synthesis of essentials]. Utrecht, the Netherlands.

	<p>VEWIN (2010) Biodiversiteit en waterwinning [Biodiversity and water collection]. Rijswijk, the Netherlands: VEWIN.</p> <p>Wallis de Vries, M., Boesveld, A., Bosman, W., Reemer, M. Regelink, J., Rossenaar, A.J., Schaminée, J. & Veling, K. (2008). Verkenning herstel kleinschalige lijnvormige infrastructuur heuvelland. [Pilot study on the restoration of small-scaled linear infrastructure of the hills of Limburg]. Ede, the Netherlands: Ministerie van Landbouw, Natuur en Voedselkwaliteit.</p>
--	---