



Rospuda valley survey 2007



Butterflies	Lepidoptera
Dragonflies	Odonata
Molluscs	Mollusca
Leeches	Hirudinea
Amphibians	Amphibia
Reptiles	Reptilia
Fish	Teleostoma
Mammals	Mammalia

EU Habitats Directive species
Polish Red List species
Preliminary report - July 2007



Rospuda Valley Survey 2007

*Preliminary results of a survey on endangered species in the Rospuda Valley
carried out between 2 and 9 June 2007*

Organized by:

European Biodiversity Survey

initiative aiming to improve knowledge about biodiversity and endangered sites across Europe

Table of contents

Summary and advice for policy makers.....	3
Abstract.....	3
1. Introduction.....	4
2. Methods.....	5
3. Results.....	7
3.1 Calcareous fens and mires.....	7
3.2 Bog woodlands and alluvial forests.....	8
3.3 Riverine habitats.....	8
3.4 Active raised bogs.....	9
4. Conclusions.....	10
5. Acknowledgements.....	11
6. References.....	12
7. Changes with respect to earlier versions.....	12
Appendix: group members.....	12

European Biodiversity Survey

Van Royenlaan 42a

NL 9721 ES Groningen

The Netherlands

Phone: +31 6 33 04 53 77

E-mail: info@biodiversitysurvey.eu

Website: <http://www.biodiversitysurvey.eu>

© 2007 European Biodiversity Survey. No part of this publication may be reproduced without the prior permission of the European Biodiversity Survey.

This report deviates in small aspects from the first version, presented to the EU MP Thijs Berman. For a complete list of changes see chapter 7.

Cover photographs:

Pygmy Damselyf (*Nehallenia speciosa*) © 2007 Tim Faasen; Cranberry Fritillary (*Boloria aquilonaris*) © 2007 Tim Faasen

Summary and advice for policy makers

- Prior to the publication of this report, estimates of Rospuda's natural richness were based only on information about plants and birds
- The Rospuda valley was surveyed from June 2 through June 9 2007 to obtain additional information on dragonflies, butterflies, mammals and other faunistic groups
- New findings include the observation of 23 additional species belonging to the European Habitats Directive (16 species) or the Polish Red List (7 species)
- Many of the species found are indicative of pristine and natural habitats such as active raised bogs and calcareous fens, which are becoming increasingly scarce in Europe
- Water relations are crucial to preserve the area's natural richness. The slightest alterations in water relations are very likely to induce shifts towards much less valuable habitats, causing rapid and irreversible losses of associated biodiversity
- Human activities such as agriculture, cultivation of peatlands or infrastructure will in almost any case negatively affect the water relations in the area.

Abstract

In June 2007, the threatened Rospuda Valley region (Northeastern Poland) was surveyed on several key faunistic species groups. A substantial number of species were found that confirm the Rospuda valley's importance to biodiversity maintenance on both national and European levels. No less than 17 species were recorded belonging to the EU Habitats Directive (EU/92/43/EEG). These species represent a number of highly valuable habitat types, two of which have been prioritized under the EU Habitats Directive (pristine active raised bogs and bog woodland). In addition, eight species were found that are on the Polish Red List of threatened invertebrate animals. The area's pristine habitats and accompanying fauna are highly sensitive to activities related to road construction: drainage and even small changes in water relations will strongly degrade the area. We advise a long-term conservation strategy that excludes any human activity in the area.

1. Introduction

- Area is pristine: it is largely free from past cultivation or human disturbance
- Area contains endangered EU habitat types: may serve as important refuge for peat bog and fen related faunistic groups
- Study is the most recent assessment of the natural richness of the area regarding invertebrates, mammals, amphibians, reptiles.

1.1 Area

The Rospuda Valley is located in northeastern Poland. The valley comprises a 20 kilometer long fluvoglacial basin in which a lowland river is surrounded by large, calcareous peatlands and mires. The higher parts of the valley are characterized by a number of peat bogs and accompanying pristine bog forests. Cultivated pine forests located on fluvoglacial hills surround the area. In contrast to numerous other Polish peat reserves, peatlands in this area never underwent systematic peat excavation or substantial damages by cultivation in the past. Moreover, the area did not undergo any agricultural water drainages, leaving water relations undisturbed.

1.2 Motivation

The fact that this area is largely unaffected by agricultural activities, indicates that it might be one of the few refuges for numerous threatened species associated with the endangered habitat types such as bogs and peatlands. However, little or no effort has been put into collection of information on the natural richness of the area, especially where it concerns groups of organisms other than plants and birds. A proper assessment of the invertebrates, amphibians, reptiles and mammals is therefore highly needed. Direct motivation for a survey was provided by the plans of the construction of the Via Baltica highway that may potentially harm the undisturbed mire system.

1.3 Report

An assessment on the natural richness regarding the above mentioned faunistic groups in the Rospuda valley has been undertaken during spring 2007. This report provides the most recent data on the diversity of rare and threatened species in the Rospuda area, included in the European Habitats Directive (EU/92/43) or the Polish Red List (source). It is advised that these results will be used to establish solid decision making on the Rospuda valley's future. Furthermore, data may enhance restoration of degraded peatlands and bogs in other parts of Poland or the EU.

2. Methods

- 8 key faunistic groups were investigated during a week-long survey, excluding birds and plants
- 35 out of 75 squares from a 1x1 grid were assessed on natural richness
- The study focusses on the species included in EU Habitats Directive and Polish Red List.

The Rospuda valley was visited from the 2nd to the 9th of June 2007 by a group of 20 committed naturalists, of which 10 were professional biologists with experience on one or more of the faunistic groups under focus. Birds and plants were excluded from the survey, since data was already available on these groups. The following faunistic groups were surveyed: butterflies, moths, dragonflies, carabid beetles, aquatic invertebrates, flies, fish, amphibians, reptiles and bats.

The assessment of biodiversity in the area was performed by 35 different 9-hour long expeditions into the area during day and nighttime. In total, the Rospuda valley area and accompanying forests account for ± 75 square kilometers; this survey aimed to cover as many 1 x 1 kilometer grid squares in the area as thoroughly as was possible. 20 squares with the most pristine habitats were visited at least on two different occasions during the survey. 15 squares were visited at least once. Due to the limited accessibility of the area, assessments were done mainly by foot, bike or while canoeing on the main river.

Due to time constraints, no specific efforts other than going through the area were applied to collect observations of most species. Bats were identified using a high-frequency sound converter, aquatic fauna was sampled using nets and moths were observed using light traps. No highly elaborate measures were used to find species (e.g. sophisticated trapping methods or very intensive searching efforts for single indicator species). Some groups such as fish, flies, carabid beetles, reptiles and amphibians are therefore likely to be relatively less sampled compared to dragonflies and butterflies.

The main focus of the survey was to determine the persistent presence of any species belonging either to the European Union Habitats Directive (EU/92/43) or the Polish Red Data Book of Animals (INC-PAS, 2004), since these species have been internationally recognized as threatened or endangered. Other species which are recorded and were not on both lists will be included in the final report (publication date: October 2007).

Table 1. Species found during week-long survey that are enlisted on the European Habitats Directive list (see corresponding Annex numbers) or the Polish Red List (INC-PAS, 2004). Abundances indicated by + (rare species, seen once or twice) ++ (2-10 observations) +++ (common: 10-25 observations) ++++ (very common, more than 25 observations). Habitat types that are used are R: River habitats, F: Forests, L: Small lakes and pools, M: Mire, Fens and Bogs. Habitat types are explained thoroughly in results section.

Order	Count	Species	Abundance	European Habitats Directive			Polish Red List	Habitat
				Annex II	Annex IV	Annex V		
Mammals (<i>Mammalia</i>)	1	Common name (scientific name) Pond bat (<i>Myotis dasycrane</i>)	++					R
	2	Daubenton's Bat (<i>Myotis daubentonii</i>)	++					R
	3	Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	+++					R
	4	Beaver (<i>Castor fiber</i>)	+++					R/F/L
	5	Sand Lizard (<i>Lacerta agilis</i>)	+					F
Amphibians (<i>Amphibia</i>)	6	Great Crested Newt (<i>Triturus cristatus</i>)	+					L
	7	Pool Frog (<i>Rana lessonae</i>)	++					M
	8	Bitterling (<i>Rhodeus sericeus</i>)	++++					L
Fish (<i>Teleostoma</i>)	9	Weatherfish (<i>Misgurnus fossilis</i>)	+++					L
	10	Scarce Heath (<i>Coenonympha hero</i>)	+++					M
Butterflies (<i>Lepidoptera</i>)	11	Woodland Brown (<i>Lopinga achine</i>)	+++					L
	12	Cranberry Fritillary (<i>Boloria aquilonaris</i>)	++					L
	13	Norfolk damselfly (<i>Coenagrion armatum</i>)	+					M
	14	Pygmy damselfly (<i>Nehalennia speciosa</i>)	++					L
	15	Large White-faced Darter (<i>Leucorrhinia pectoralis</i>)	+++					R/L
Dragonflies (<i>Odonata</i>)	16	Eastern White-faced Darter (<i>Leucorrhinia albifrons</i>)	++					R/L
	17	Bulbous White-faced Darter (<i>Leucorrhinia caudalis</i>)	++					R/L
	18	Green Club-tailed Dragonfly (<i>Ophiogomphus cecilia</i>)	+++					R
	19	Green Hawker (<i>Aeshna viridis</i>)	+++					R
	20	Northern Emerald (<i>Somatochlora arctica</i>)	+					M/L
Snails (<i>Bivalvia</i>)	21	Swan mussel (<i>Anodonta cygnea</i>)	+++					R
	22	Thick Shelled River Mussel (<i>Unio crassus</i>)	+++					R
Leeches (<i>Annelida</i>)	23	Medicinal leech (<i>Hirudo medicinalis</i>)	++					L

3. Results

- Main habitats with highest natural richness are calcareous fens, bog woodlands, lowland riverine habitats and active raised bogs
- In one week's effort, 17 species have been found belonging to the European Habitats Directive
- 8 species have been found belonging to the Polish Red List of which one is characterized as critically endangered, 4 as endangered and 3 as vulnerable.

Results are discussed according to the four key habitat types present in the Rospuda valley area: i) Calcareous fens and mires; ii) Bog woodlands and alluvial forests; iii) Riverine habitats; iv) Active raised bogs. Within one week, more than 1500 species records were collected in the Rospuda area. Populations were found of 23 species belonging either to the Polish Red List (8 species) or the European Habitats directive (17 species). The total list of all found species under both directives is represented in Table 1.

Habitats listed in the text below are based on observations on the present vegetation (unpublished results) and refer to Annex I of the Habitats Directive. Species which belong to the EU Habitats Directive are marked by ^{EHD}, species which belong to the Polish Red List are marked by ^{PRL}.

3.1 Calcareous fens and mires

By far the largest part of the Rospuda valley consists of alkaline fens (EU7230), alternated by transition mires and quaking bogs (EU7140). Alkaline fens and quaking bogs are characterized by a thick peat layer through which calcareous seepage creates alkaline (non-acid) conditions which facilitate a large diversity of highly sensitive plant species.

The moistest fen areas rich of open sedge vegetations contain the rare Pygmy damselfly (*Nehalonia speciosa*)^{PRL-Endangered}. Pygmy damselflies are threatened throughout Europe due to habitat loss and also in Poland, only 28 sites currently remain (INC-PAS, 2004).



figure 1. Typical calcareous fens and a transition towards bog woodland.

Photo © Bram Kuijper, 2007

Furthermore, small and open alkalic pools also contained high densities of Large white-faced darters (*Leucorrhinia pectoralis*)^{EHD}. The wet conditions in the fens prevent any tree from growing, resulting in open and moist grasslands accommodating healthy populations of the Scarce heath butterfly (*Coenonympha hero*)^{EHD}. The Scarce Heath has declined with 50-75% in the last 25 years in most European countries and has already disappeared from the Czech Republic, Denmark and the Netherlands (Van Swaaij & Warren, 1999).

These calcareous fens and the accompanying fauna are very susceptible to the slightest degradation: slight and only short-term declines in water levels can already directly spur tree succession, causing the fens to irreversibly degrade into less valuable marsh forest habitats: loss of the above-mentioned associated species will be unavoidable in that case. Also, changes in seasonal water

tables will disturb the balance between ground water seepage and nutrient-rich surface water, which in turn initiates succession and loss of calcareous flora. Calcareous fens and mires have been designated as a priority habitat type (EU Habitats Directive, annex I).

3.2 Bog woodland and alluvial forests

Throughout the valley of the Rospuda, three types of woodlands were visited: i) Bog Woodland (EU91D0); ii) Alluvial forest patches (EU91E0) and iii) production forest. Bog Woodland was found around active raised bogs in the neighbourhood of two lakes in the Rospuda area. Furthermore, bog woodland is also found where calcareous fens and mires from the lower parts of the valley approach the surrounding fluvoglacial hills.



figure 2. Woodland brown (*Lopinga achine*), an endangered red list species associated with damp forests Photo © Tim Faasen 2007.

Populations of the following focal species have been discovered, which are characteristic of bog woodland: Woodland Brown (*Lopinga achine*)^{PRL-Endangered, EHD} and Northern emerald (*Somatochlora artica*)^{PRL-Vulnerable}, Great crested newt (*Triturus cristatus*)^{EHD}, Scarce Heath (*Coenonympha hero*)^{EHD} and the Large white-faced Darter (*Leucorrhina pectoralis*)^{EHD}.

Together with the visited calcareous fens and mires (see above), bog woodland is one of the most valuable habitat types of the area. The reason for this is that bog woodland has been degraded in many other parts of Europe due to agricultural water drainage and increased levels of nitrogen deposition. Flora and fauna present in the Rospuda bog woodlands are still indicative of a pristine and natural situation. Bog Woodland is also designated as a priority habitat type (EU Habitats Directive, Annex I).

Small patches of alluvial woodland were visited nearby the Rospuda river and resulted in additional findings of the Woodland Brown (*Lopinga achine*)^{PRL-Endangered, EHD}, together with valuable but unlisted species such as the False heath fritillary (*Melitaea diamina*).

3.3 Riverine habitats

The Rospuda river is a typical lowland river in which sandy river beds alternate with old reed beds alongside the river. The river system consists of the main river as well as several old meanders either still in connection to the river or closed off by sedimentation and peat formation.

Typical mammal species which are associated with healthy river systems are the Pond bat (*Myotis dasycneme*)^{EHD}, Daubentons' bat (*Myotis daubentonii*)^{EHD} and the Beaver (*Castor fiber*)^{EHD}. A characteristic insect species of the river is the Green Club-tailed Dragonfly (*Ophiogomphus cecilia*)^{EHD}. Other species found were the Thick-shelled River Mussel (*Unio crassus*)^{EHD} and the Swan mussel (*Anodonta cygnea*)^{PRL-Endangered}.

Old river meanders are covered to a large extent by the water plant Water soldier (*Stratiotes aloides*), which is an important indicator species for lowland river systems with moderate to high nutrient levels belonging to habitat type EU3150 (Natural eutrophic lakes with Pondweed associations (Magnopotamion)). The most important observation here was the Norfolk Damselfly (*Coenagrion*

armatum)^{PRL-Critical}, which is currently only known from 10 sites in Poland and is becoming dramatically scarce throughout Europe (INC-PAS, 2004). It is strongly dependent on constant water tables and demands knee-deep water with plants such as bulrushes (*Typha spec.*) and Water horsetail (*Equisetum fluviatile*).

Typical insect species include furthermore the Large white-faced Darter (*Leucorrhina pectoralis*)^{EHD}, Eastern white-faced Darter (*Leucorrhina albifrons*)^{EHD}, Bulbous white-faced Darter (*Leucorrhina caudalis*)^{EHD} and most importantly the Green Hawker (*Aeshna viridis*)^{EHD}. Important vertebrate species in the Rospuda river are the Weatherfish, (*Misgurnus fossilis*)^{EHD} and the Pool frog (*Rana lessonae*)^{EHD}.



figure 3. The Green club-tailed dragonfly (*Ophiogomphus cecilia*) is associated with sandy woodland rivers Photo © Ewoud van der Ploeg 2007

The observations of numerous individuals of the Green Hawker is a very important finding, since this threatened species has been considered extinct in the nearby Wigry National Park since 1921 (Wigry National Park Website, 2007). The Green Hawker is known for its close association with the water plant *Stratiotes* and is therefore indicative of healthy water systems, becoming increasingly scarce in Europe.

3.4 Active raised bogs

Two small lakes were surrounded by active raised bogs (EU7110) in the more forested areas of the Rospuda valley. These bogs are connected to bog forests and are highly pristine. They are prioritized habitats under the EU Habitats Directive and endangered throughout Europe.

The most valuable species found are Pygmy damselfly (*Nehalonia speciosa*)^{PRL-Endangered} and Cranberry fritillary (*Boloria aquilonaris*)^{PRL-Vulnerable}. The latter species indicate large amounts of raised Sphagnum, creating the right conditions for the Cranberry fritillary's food plant, the Cranberry. Other important species found were the Northern emerald (*Somatochlora arctica*)^{PRL-Vulnerable}, Bulbous White-faced Darter (*Leucorrhinia caudalis*)^{EHD}, Eastern White-faced Darter (*Leucorrhinia albifrons*)^{EHD} and Large White-faced Darter (*Leucorrhinia pectoralis*)^{EHD}. These lakes also contain Beaver (*Castor fiber*)^{EHD} and Medicinal leech (*Hirudo medicinalis*)^{PRL-Vulnerable}.

Species composition is indicative for a largely undisturbed situation, in which nutrient poor water and rather constant water levels allow for the formation of active raised bogs. This makes this part of the Rospuda area only one of the few areas in Poland in which several rare dragonfly and butterfly species can still be encountered.

Transitions towards active raised bogs were also found within some of the calcareous fens and mires (see 3.1), in which peat growth on the fens has been raised high enough to loose association with groundwater seepage. These areas are characterized by a population of the Northern emerald (*Somatochlora arctica*)^{PRL-Vulnerable} and also by the observation of the Cranberry blue (*Plebeius optilete*), which is not a red list species but commonly characterized as a sensitive indicator of raised bog habitats.

4. Conclusions

- Species composition is characteristic of undisturbed natural habitats, strongly dependent on unaffected water relations;
- Species numbers are comparable to other European peatland and bog reserves, but those areas need a much larger area to contain a comparable number of species;
- Short term changes in water conditions almost certainly have negative and irreversible effects on the species composition on the area;
- Any infrastructural or agricultural activities will have a profound influence on the water relations in the area, negatively affecting almost all mentioned species;
- Attempts to mitigate these negative effects by attempting to artificially preserving water conditions are full of various risks putting the area in jeopardy.

Three of the visited habitat types in this area belong to the prioritized category of the European Habitats Directive (EU/92/43: Annex I): i) Bog woodland (EU91D0), ii) Active raised bogs (EU7110) and Calcareous Fens and Mires (EU7230).

Large amounts of comparable bog, fen and mire areas in Europe have been degraded (Raeymaekers 2000). Calcareous fens and mires are one of the most problematic areas, due to their dependence on calcareous seepage and constant ground water levels, in order to keep flora and fauna intact and to prevent succession towards less valuable peat types. Any drainage activities, realisation of temporary road banks or digging activities will result in alterations of groundwater relations, highly likely to induce irreversible degradation.

In Rospuda, the relatively large area of calcareous fens is up to date largely untouched and is a crucial habitat for vulnerable and endangered species such as the Scarce Heath and Pygmy Damselfly. Moreover, the combination of large fens adjacent to a meandering river lead to several pools (dead meanders) with constant water levels and a rich vegetation: this is one of the last residences of the

Table 2. Comparison of amounts of endangered species among nature reserves in Western Europe containing of bogs and/or fen and mire. To allow a proper comparison, only EU Habitats Directive Annex II species are listed (endangered species which require the designation of special conservation areas). Note the relatively high amount of endangered species in the Rospuda Valley, given its size. Source for the other areas is the EEA-EUNIS species database (2007).

site	size (ha)	Number of species listed in the EU Habitats Directive, Annex II					
		Insects	Fishes	Mammals	Amphibians	Molluscs	Total
Rospuda Valley (PL)	1227	3	1	2	1	1	9
Peenetal (D)	8331	4	7	2	2	2	17
Rehdener Moor (D)	1737	0	0	0	0	0	0
Müritz (D)	32200	4	3	3	2	1	13
Stoteler Moor (D)	481	0	0	0	0	0	0
Wieden (NL)	9412	2	4	1	0	0	7
Nieuwkoopse plassen and de Haeck (NL)	2078	1	2	2	0	0	5
Oostelijke vechtplassen (NL)	5739	2	3	2	1	0	8
Ilperveld, Varkensland and Twiske (NL)	1840	0	4	2	0	0	6

critically endangered Norfolk Damselfly in Poland. Previously mentioned interruptions will almost inevitably lead to the loss of Rospuda as a refuge for these species.

Other interesting, albeit smaller, areas are the active raised bogs in the area. The diversity of focal species from the two bog sites adjacent to the lakes is presumably the highest of the Rospuda area. Bogs are important for populations for several species of dragonflies and butterflies that are increasingly becoming scarcer in Europe. As with calcareous mires, the most important condition for the sustained conservation of these habitats is a constant water table. As soon as water levels decline, active bog formation will be arrested, leading to bog degradation and loss of essential host plants for many insect species present in the area.

A preliminary comparison on species numbers belonging to the EU Habitats Directive (Annex II) among several Dutch, German and Polish peatland areas is given in Table 2. The amount of Annex II species resulting from a week-long survey of the relatively small Rospuda valley is comparable to much larger areas such as Müritz or Peene. With the notion that additional surveys are likely to reveal new endangered species with a different seasonality, the density of endangered species is considerably large in the Rospuda area. In contrast to the Rospuda Valley, all areas in Table 2 are now specially protected areas (SPAs).

Conclusively, the diversity of the fauna observed at calcareous fens and the active raised bogs is remarkable, given the species they contain and the relative size of the area in comparison with natural reserves. Fauna can only be preserved by preserving the habitats, which in turn implies that the water relations are left untouched. Due to the fact that peatlands often require very specific ecological conditions, negative effects of human activities on water relations are almost impossible to mitigate. With or without mitigation, the most valuable parts of the Region will be lost in case of human development or infrastructure planning.

5. Acknowledgments

This project could not have been completed without the assistance and efforts of a number of individuals and organizations that provided input, direction and financial and technical support. We thank the following Polish organizations: CMok (Save Wetlands association) http://cmok.free.ngo.pl/index_en.html, in particular Paulina Dzierza. The PNRWI “Workshop for All Beings” (<http://www.zb.eco.pl/gb/3/workshop.htm>), in particular Adam Bohdan. We are supported by funding of the Dutch Uyttenboogaart-Eliassen Stichting for the promotion of Entomology (<http://www.nev.nl/ues.html>), the Bulbzicht foundation and Schrama Notarissen. We thank Wildzoekers (<http://www.wildzoekers.nl>), the Animal Ecology Group at the University of Groningen and Janko van Beek for providing GPS-apparel. Next to the experts as listed in appendix I we are also grateful to all the other volunteers whose input was indispensable for the completion of this report: Tim de Boer, Rinskje Klooster, Thomas Lameris, Rim Lucassen, Elise Biersma, Vasco Tenner, Tjalling van der Horst and Fons van der Plas.

6. References

EEA-EUNIS (2004). *EUNIS Biodiversity Database of species, habitats and sites across Europe*.
<http://eunis.finsiel.ro/eunis/>

European Habitats Directive (92/43/EEC) (1992). http://ec.europa.eu/environment/nature/nature_conservation/eu_nature_legislation/habitats_directive/index_en.htm

INC-PAS (2004). *Polish Red Data Book of Animals, Invertebrates*. Głowacinski, Z. and Nowacki, J., eds.

URL: <http://www.iop.krakow.pl/pckz/default.asp?nazwa=default&je=en>

Raeymakers, G. (2000). *Conserving mires in the European Union*. Office for Official Publications of the European Community, Luxembourg. Sundseth, K. and Ganzebeek, A., eds.

Van Swaaij, C.A.M. and Warren, M.S. (1999). Red data book of European Butterflies (Rhopalocera). Nature and Environment, No. 99. Council of Europe publishing, Strassbourg, France

Wigry National Park website (2007). Invertebrates section http://www.wigry.win.pl/fauna/bezt_en.htm

7. Changes with respect to earlier versions

This report is downloadable from the website of European Biodiversity Survey, www.biodiversitysurvey.eu. This enables us to make small changes in the report, keeping it up-to-date. By no means however the content of this report as reflected in the summary, results and conclusions are changed with respect to previous versions. The first version of this report was made under high pressure of work. This resulted in small idiomatic and spelling mistakes that were corrected in this version. Changes that concern the content of the study are listed here.

In table 1 the Roman snail (*Helix pomatia*) was replaced with the Swan mussel (*Anodonta cygnea*). Though the Roman snail was seen frequently it is i) not considered indicative for the area ii) listed solely on the Habitats Directive Annex V. Swan mussel was accidentally not included in table 1 in the first version, it is however considered indicative and is listed on the Polish Red List. This change also effected the numbers of species stated in the different chapters.

Earlier versions of the report are always available on request.

Appendix: Group members

Tim Faasen, MSc. Biology

Achilleslaan 35

5631 BS Eindhoven, the Netherlands

tim.faasen@ecologia.eu

Expertise: butterflies, moths, dragonflies, general ecological assessments

Tim Faasen is director of Ecologia BV, an ecological consultancy

Ewoud van der Ploeg, BSc Environmental Sciences
agrius_convolvuli@hotmail.com
Expertise: Terrestrial beetles, moths, butterflies.
Ewoud is working as a macrofauna expert at Koeman & Bijkerk, ecological research and consultancy.

Andre van Nieuwenhuijzen, MSc. Biology
Tuinbouwdwarsstraat 11
9717 HT Groningen, the Netherlands
a.j.h.van.nieuwenhuijzen@rug.nl
Expertise: aquatic invertebrates
Andre van Nieuwenhuijzen is working as a macrofauna expert at Koeman & Bijkerk, ecological research and consultancy.

Bram Koese, BSc. Biology
Groenhovenstraat 12
2311 PS Leiden, the Netherlands
koesii@yahoo.com
Expertise: aquatic predatory beetles, amphibians and reptiles, stoneflies.
Bram Koese is currently investigating endangered water beetles in the Netherlands and has recently published a key on the Plecoptera (stone flies) of the Netherlands

Wouter Moerland, BSc Biology
Neeltje van Zuijtbroeckhof 50
2311WD Leiden, the Netherlands
w.moerland@umail.leidenuniv.nl
Expertise: moths and butterflies.
Wouter is currently finishing his Msc with a project on the endangered Grizzled Skipper.

Jelle Tienstra
Dijkstraat 15
9724 KW Groningen, the Netherlands
jelletienstra@hotmail.com
Expertise: amphibians and reptiles, grasshoppers

Matthijs Courbois
Haarweg 21
6709 PH Wageningen, the Netherlands
matthijs.courbois@wur.nl
Expertise: water beetles, dragonflies and butterflies
Matthijs Courbois is an undergraduate student of Forestry and Nature Conservation at Wageningen University.

Maarten Schrama, BSc. Biology
van Royenlaan 42A
9721ES Groningen, the Netherlands
m.j.j.schrama@rug.nl
Expertise: diptera and dragonflies.
Maarten Schrama is preparing his PhD project on the role of invertebrates in marine subsidized food webs, starting in October 2007.

Bart Kranstauber, BSc. Biology
Opwijkstraat 20
2272BD Voorburg, the Netherlands
b.kranstauber@student.rug.nl
Expertise: bats and other mammals.
Bart Kranstauber is currently enrolled in a graduate program on Evolutionary Biology at the University of Groningen

Berber de Jong, Bsc. Biology
Tuinbouwdwarsstraat 15
9717 HT Groningen, the Netherlands
b.de.jong.6@student.rug.nl
Expertise: terrestrial molluscs
Berber de Jong is currently finishing her Msc in Biology at the University of Groningen.

Tommer Vermaas, BSc. Geography

Van Dijkstraan 1-A
3723CE Bilthoven, the Netherlands
t.vermaas@students.uu.nl
Expertise: terrestrial beetles
Tommer Vermaas is currently enrolled in a graduate program in Geography at the Utrecht University.

General Staff

Jord Prangma, MSc. Physics
Schuttersstraat 17
3512 XK Utrecht, the Netherlands
jordprangma@gmail.com
Jord Prangma is working as a PhD-student in Nanotechnology at the Institute for Atomic and Molecular Physics (AMOLF) in Amsterdam.

Bram Kuijper, MSc. Biology
Van Royenlaan 42a
9721 ES Groningen, the Netherlands
a.l.w.kuijper@rug.nl
Bram Kuijper is working as a PhD-student in Evolutionary Biology at the University of Groningen