

**EVALUATION OF STATUS OF COASTAL LAGOON HABITAT  
COMPLEXES AND SITE SPECIFIC MANAGEMENT PLANS**  
(Action A1)

**PROJECT REPORT**

“Rehabilitation of the Baltic Coastal Lagoon Habitat Complex”  
**LIFE05NAT/D/000152**

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## **A1 EVALUATION OF STATUS OF COASTAL LAGOON HABITAT COMPLEXES AND SITE SPECIFIC MANAGEMENT PLANS**

### **Implementation of the action 2006-2008.**

Since 2006 the international expert group visited 34 project sites and evaluated and analyzed the state of the Baltic Sea coastal lagoon habitat complexes in all countries participating in the project (Denmark, Germany, Estonia, Sweden, and Lithuania). In addition, to the project sites, also 19 reference sites have been visited and analyzed. The reference sites for this project have been selected on the basis of the following criteria:

- the habitat complex together with its characteristic species (birds, amphibians, plants) should be intact, restored or in the process of being restored;
- the structure of shorebird communities characteristic of the coastal lagoon habitat complex should be intact, and the target species (*Philomachus pugnax* and/or *Calidris alpina schinzii* and/or *Recurvirostra avosetta*) should be nesting there or the sites or they should have been breeding sites of *Calidris alpina schinzii* and/or *Philomachus pugnax* recently;
- sites where the extant populations of target species *Bufo viridis* and *Bufo calamita* are still present;
- sites where the habitat types, characteristic to the coastal lagoon habitat complex, have been successfully restored or maintained or the successful restoration of habitats and populations of target specie have been carried out.

As the numbers of the Baltic Sea populations of target species (*Calidris alpina schinzii*, *Philomachus pugnax*, *Bufo viridis* and *Bufo calamita*) have declined in all participating countries, it is necessary to evaluate and analyse still intact Baltic Sea habitat complexes of those species. Visiting reference sites gives a better understanding of the habitat demands, threats, reasons of the decline and/or extinction of the target species. Therefore the comparison of reference sites with various coastal lagoon habitat complexes provides crucial knowledge that helps to determine the key characteristics of breeding, nesting and foraging grounds of target species and landscape structure characteristic of viable metapopulations.

The reason why a rather high number of reference sites have been chosen from Estonia is that Estonia holds one of the largest population of the Baltic dunlin *Calidris alpina schinzii* and the number of breeding pairs of this species has been stabilized due to large scale habitat management and restoration. Several LIFE-Nature projects have been carried out in Estonia (in Matsalu National Park, Silma Nature Reserve, Hiiumaa and Saaremaa Islands) with the aim to restore the coastal habitats and improve the habitats especially for *Calidris alpina schinzii* and *Bufo calamita*, but also for other species characteristic for the coastal habitats (waders, plants). Therefore the international cooperation, along with the large number of reference sites and also project sites with the great variation in the types of coastal lagoon habitat complexes, provides the possibility to analyse the same Baltic Sea habitat complex by comparing its various parts and types. It gives a better understanding of the problems and allows experts to make the best recommendations concerning protection management activities and measures on the basis of their knowledge and practical experiences gained during visits to project areas.

Therefore, in addition to the general evaluation and analysis of coastal lagoon habitat complexes, special attention have been paid to the specific habitat demands of target

species (coastal shorebirds, amphibians) in order to determine the structure of their preserved meta-populations, to pinpoint the main threats linked to changes in the quality of habitats. Also the habitat management and actions that have caused a positive or negative development of the populations of those species will be taken into account and discussed carefully in order to elaborate potential measures for habitat restoration and improvement.

The new information, knowledge and experiences gained in the course of the evaluation, help to find the best solutions for restoration and maintenance of coastal lagoon habitat complexes, and can be used directly for the elaborating of site-specific management plans and guidelines. The management plans will ensure that the most recent knowledge on sustainable management of the coastal lagoon habitat complex including socio economic strategies, grazing strategies and control of invasive alien species, and the most recent conservation knowledge on the declining species *Calidris alpina schinzii*, *Philomachus pugnax*, *Limosa limosa*, *Recurvirostra avosetta*, *Bufo viridis* and *Bufo calamita* will be transferred to all site managers.

## 2006

The first expert visits to the Danish project sites were carried out in March. The group of experts from Denmark and Estonia (Ole Thorup, Lars Briggs and Kaare Fog all from Amphi Consult and Riinu Rannap from University of Tartu, Estonia) and site managers and representatives of the partners and landowners (Lars Malmberg from Storstrøms County, Per Klit Christensen from Amphi Consult, Jan Krause from Vest Zealand County, Søren Ferdinand Hansen from the Danish Ornithological Society) visited four project sites: Saksfjed-Hyllekrog (8 March), Store Vrøj-Krageø (14 March), Ulvshale (15 March), Korevlen (16 March) and Halk Nor (17 March).

The aim of the expert visits was:

- to evaluate the present management of the sites, based on information on breeding birds and amphibians, and observations on vegetation height and structure;
- to give a site-by-site description with suggestions for improved management for target species (Baltic dunlin, ruff, avocet, natterjack toad, green toad), other coastal waders and protected species.

### Store Vrøj-Krageø

It was decided that extended grazing and some cutting of bushes and reed around the coastal lagoons and along the shore of Saltbæk Vig would ensure that the existing rich plant diversity would survive and expand the open habitats in the area. Concerning project's target species, the waders and amphibians are not present in this project site. The natterjack toad *Bufo calamita* occurred in this area until early 1990s. Although no amphibian species are present in this area today, the establishment of good habitat conditions will form the necessary bases for possible re-introduction of the natterjack toad in the future. Also other amphibian species, such as moor frog *Rana arvalis*, might colonise Krageø from the neighbouring areas.

### Halk Nor

Due to the destruction of the coastal lagoon habitat complex the natterjack toad *Bufo calamita* is not present in the project site any more. Still a small number of natterjack toads has been found in the neighbouring areas (farmyards, pastures and grazed coastal grasslands). In 2005 the only non-passerine breeding bird found in the project

area was one pair of redshank *Tringa totanus*.

Amphibian experts made also a visit to Monnet and Bågø project sites, to evaluate the suitability of the habitat complex for toads *Bufo calamita* and *Bufo viridis*. The management actions relevant for those toad species were discussed and the exact places for pond restoration were chosen.

Monnet has a small population of the natterjack toad and strong and increasing population of the green toad. The green toad population was in severe decline in 1980-s and after successful restoration of breeding waters the number of toads started to increase. The natterjack toad's population has not been very numerous at least during the last 10 years. The highest numbers at population counts during the last 5 years has been 15 calling males. Despite of several depressions, ponds and creeks, available in the meadow, the water is mostly too salty for the natterjack toads to breed in them.

#### Bågø

During the last decades large parts of the meadows were overgrowing due to cessation of grazing and haymaking. Natterjack toad *Bufo calamita* and avocets *Recurvirostra avosetta* breed fairly widespread on Bågø including at the BaltCoast lagoon project site, and the population of natterjack toad is still rather large on the island. However, it was concluded that the breeding conditions of the toads are very poor. The ponds were overgrown with tall vegetation, drained, too salty and/or polluted. Therefore it is very important to create suitable breeding sites for the toads and to establish good habitat connectivity in the western part of Bågø in order to safeguard future survival of the species on Bågø.

The experts concluded that in order to elaborate the best management strategy for target species on Bågø and Monnet, those sites should be visited several times during the project. Only in this way it is possible to find out the precise water regime in this area (natural fluctuations in the ponds and creeks), the vegetation growth, the effect of grazing, the possible impact of the predation etc.

Three of the four Estonian project sites (Teorehe, Linaküla-Sääreküla and Sõmeri) and seven coastal meadow reference sites were visited 16 – 22 April, just after most of the dunlins had arrived. In addition, five Estonian reference sites: most of the best dunlin breeding sites at present on coastal meadows and some of the historically best ruff breeding sites at near-shore alluvial meadows were visited 14 – 17 June in the late incubation and early chick rearing period of ruff, and the late incubation, chick rearing and around fledging time of late and early breeders of Baltic dunlin, respectively. The reference sites were coastal meadows where the Baltic dunlins and /or ruffs are still breeding and neighbouring alluvial meadows that years ago held the majority of ruffs in Estonia. The reference sites on coastal meadows are still (or again) managed for meadow birds and are housing the majority of the present Estonian breeding Baltic dunlin and the few remaining ruffs, while others were near-shore alluvial meadows that 20-40 years ago held large ruff populations and were probably the main breeding habitat for the species in Estonia. However, today the alluvial meadows near the coast have lost most of their breeding meadow birds. The reference sites on alluvial meadows allowed to compare the breeding sites, which had lost their value to those, where ruffs are still breeding. Such evaluation gives a much better understanding on those changes that have taken place in ruff nesting and chicks foraging habitats and allows to elaborate special requirements for management of coastal lagoon habitat complex in order to create high quality habitats for ruff.

The aim of the expert visit was:

- to evaluate the present management of the sites, based on observations on breeding birds and vegetation height and structure;
- to give a site-by-site description with suggestions for improved management for target species (dunlin, ruff, avocet, natterjack toad) and other coastal waders.
- to discuss further reintroduction possibilities of the natterjack toad and take those into account while elaborating management suggestions.
- to learn about the habitat demands of the Baltic dunlin and ruff by comparing the existing nesting sites with those which have lost their value and where the species does not occur any more.

The April visit was performed by: Lars Briggs and Ole Thorup, Amphi Consult; Kaarel Kaisel, Ilona Lepik, Alex Lotman, Kaja Lotman and Eve Mägi all from Estonian State Nature Conservation Centre Matsalu NP; Heikki Luhamaa from Kihnu State Marine Park (Estonia); Leho Luigujõe from University of Life Sciences (Estonia) and Riinu Rannap. The June visit was performed by: Ilona Lepik, Leho Luigujõe, Eve Mägi, Hannes Pehlak from University of Life Sciences (Estonia), Valerij Buzun from Russian Ornithological Society and Ole Thorup.

During the visits in April and June, the expert group visited almost all grazed coastal meadows in Matsalu NP, and a large part of the other major Baltic dunlin breeding sites in Estonia. It seemed obvious that breeding dunlins were suffering from lack of well-grazed shore meadows. In Matsalu NP as well as at the other visited sites, grazed meadows with an open shoreline are of limited extent. In order to safeguard the future of the Estonian population and thereby the total biogeographical population of breeding Baltic dunlin it is of major importance to ensure sufficient grazing at the most important breeding sites of the species: the Haeska meadows (reference site) and the Keemu-Salmi meadows (reference site) in Matsalu NP, the meadows on Võilaid (reference site) and the meadows at the north coast of Kihnu.

The expert group also concluded that the visited coastal meadows provided only limited breeding habitat for ruff. Ruffs avoid the halophytic meadow zone found along the coastline and around coastal lagoons and low-lying near-coast pools. On the other hand, ruffs are confined to the lower and wetter parts of meadows, and this means that only wet parts some distance away from the shore on fairly wide coastal meadows, typically around outlets of streams, provide the combination of wet, fresh to fresh-brackish meadow areas that ruffs favour. In fact, breeding sites for ruffs at coastal meadows structurally can be seen as small scale 'alluvial meadows' within the coastal meadow. The best example of this was found in the eastern and south-eastern parts of the Salmi meadows (reference site), but also at a very small scale at Põgari (reference site) and potentially (with proper management) at Teorehe. Also at Võilaid (reference site) one or a few, at best, ruff females have found suitable breeding habitat very locally.

9<sup>th</sup> –12<sup>th</sup> of May the international expert group together with site managers, local experts and nature conservationists has visited Danish project sites: Hjørnø, Endelave and Saltholm.

Saltholm is one of the largest brackish-meadows in Denmark with approximately 1300-1400 ha of grazed and/or mown meadows. Saltholm is a very important meadow bird site. In a large 2002 review, the island was ranked 7<sup>th</sup> in Denmark concerning importance for the vulnerable meadow birds with, on the average, 3.5% of the Danish breeding numbers of dunlin, ruff and black-tailed godwit.

Two toad species – the green toad *Bufo viridis* and the natterjack toad *Bufo calamita* – have been found on Saltholm. The green toad's population belongs among the 20 largest and most viable ones in Denmark.

During the expert visit it was realized that in order to elaborate the best management strategy at this core breeding area for the target species, Saltholm must be visited several times during the project. Only in this way it is possible to find out the precise water regime in this area (natural fluctuations in the ponds and creeks), vegetation growth, the exact effects of grazing and mowing, the possible impact of the predation etc. at this very complex site.

31<sup>st</sup> of May the international expert group Lars Briggs, Hauke Drews (from Stiftung Naturschutz Schleswig-Holstein), Riinu Rannap and Ole Thorup and project, regional and local managers Britta Küper (from Stiftung Naturschutz Schleswig-Holstein), Poul V. Rasmussen and Annita Svendsen (from Funen County) visited the Danish project site Monnet.

#### Monnet

Monnet is a very special area among the Danish project sites, as the site still has a very small but fairly stable breeding population of Baltic dunlin (a couple of pairs) as well as a small population of natterjack toad and a strong and increasing population of green toad.

Due to a fairly late cattle release and a rather small number of cattle this year most areas are in the process of a slight overgrowing. With slightly more cattle grazing the dunlin breeding habitat will again be well preserved, whereas the higher and drier parts – toad feeding areas – probably need some additional mowing and/or bush cutting.

1<sup>st</sup> of June ruff and dunlin experts Ole Thorup and Paul Eric Jönsson (from Vellinge municipality and Skånes Ornithological Society) visited Vellinge and Eskilstorps ängar (in the Falsterbo-Foteviken project site) and the Danish project site Saltholm.

#### Falsterbo-Foteviken

Paul Eric follows the population and reproduction of Baltic dunlins closely at Vellinge and Eskilstorps ängar. There has been continuous grazing in these coastal meadows for ages. Predation of dunlin eggs is the major problem for the species conservation here. In particular at Vellinge ängar the high predation pressure seems to be related to the apparent overgrazing of the area: the grass sword is so homogeneously short grazed that there are very few spots with sufficient vegetation for a nest tuft. Useful vegetation is concentrated in a few hundreds of square metres in particular at drift lines and the finding of the nests is therefore too easy for predators like corvids and foxes *Vulpes vulpes*. This ease was demonstrated by the fact that Ole found three new dunlin nests with eggs at the fairly short visit!

27<sup>th</sup> – 31<sup>st</sup> of July the expert group: Ole Thorup, Lars Briggs and Poul Evald Hansen from Amphi Consult, Riinu Rannap from University of Tartu, Hauke Drews and Britta Küper from Stiftung Naturschutz Schleswig-Holstein and Annita Svendsen from Funen County visited several Danish project sites: Store Egholm (27 July), Dejro (27 July), Hjelmshoved (28 July), Halmø (28 July) Urehoved (29 July) and Saltholm (30 July).

Store Egholm has diverse salt meadow vegetation and the site is classified as having the highest botanical value and is one out of the seven botanically most important salt meadows in the Fyn region. In 2004-2006 one pair of Baltic dunlin and one pair of

black-tailed godwit *Limosa limosa* bred annually. This makes Store Egholm one of the very few sites in eastern Denmark with regular breeding of dunlin. Currently only one toad species *Bufo viridis* is present on the island. Although *Bufo calamita* used to occur on Store Egholm, it has probably gone to extinct in the 1990s. The population of *Bufo viridis* is low and not exceeding 50 calling males.

Hjelmshoved is classified as having the highest botanical value in Fyns County with a very well developed salt meadow zonation. There is a small population of green toad *Bufo viridis* present on the island. Relatively small numbers of meadowbirds are breeding at Hjelmshoved, and none of the three vulnerable Danish meadowbird species (Baltic dunlin, ruff, black-tailed godwit) have been found in the period 1969-2004. Hjelmshoved is also housing several colonial breeding birds including a few avocets *Recurvirostra avosetta*. The greatest bird attraction at present is the occurrence of breeding short-eared owl *Asio flammeus* – a rare, very local and redlisted breeding species in Denmark.

#### Halmø

Currently two lagoons and some parts of the meadows have been restored by grazing. Nevertheless, there is still need to increase the number of cattle and enlarge the area of grazing in order to restore the lagoons and coastal meadows. The green toad *Bufo viridis* and the natterjack toad *Bufo calamita* are present on Halmø. The populations of both toad species are small and vulnerable, not exceeding 20 calling males per species. In the past the site had some ornithological importance being a breeding site for avocet *Recurvirostra avosetta*.

#### Urehoved-Dejrø

Currently the coastal meadows on Dejrø are used as a pasture for cattle grazing. The coastal meadows at Urehoved are grazed by couple of horses. However, the present management is not sufficient to achieve the favorable status of the coastal lagoon habitat complex in the project site. The green toad *Bufo viridis* has colonized Dejrø recently and is attempting to colonize Urehoved as one animal was seen in 2005. However, there are no suitable breeding ponds for the amphibians available neither on Dejrø nor on Urehoved. Avocets *Recurvirostra avosetta* are irregular breeders in the project sites.

The experts concluded that most of those project sites should be visited several times during the project, in order to elaborate the best management strategy for target species.

4<sup>th</sup> and 5<sup>th</sup> of September amphibian and meadowbird experts Lars Briggs, Riinu Rannap and Ole Thorup visited the project sites Hjarnø (4 September) and Endelave (4 and 5 September).

#### Hjarnø

During the last 10 years the grazing pressure has continuously diminished on the meadow, causing almost complete overgrowth of the lagoon with sea club-rush *Scirpus maritimus* and reed *Phragmites australis*. There is only one toad species, *Bufo calamita*, left on Hjarnø. The population is rather small. There is no meadowbirds breeding at the project site, and the small area of meadow means that the potential for breeding meadowbirds is low. The whole coastal meadow in the eastern part of the project area is insufficiently grazed. The eastern lagoon that is bordering the coastal meadow is fenced off from the present grazing area. Therefore most of the lagoon is overgrown with tall vegetation, and the grass litter is piling up on the coastal meadow and in the lagoon edges, which are the main breeding and foraging areas for the natterjack toad on Hjarnø.

## Endelave

Natterjack toad *Bufo calamita* is the only toad species on Endelave at present. None of the vulnerable meadowbirds Baltic dunlin, ruff *Philomachus pugnax* nor black-tailed godwit *Limosa limosa* were found in the project site but with good grazing agreements the potential for good populations of meadowbirds is present there, in particular on the large meadow areas at Flasken.

Based on the site visits, the first draft of the management plans for Hjarnø, Endelave, Halk Nor, Store Egholm, Monnet, Hjelmshoved, Saltholm and Store Vrøj-Krageø project sites were compiled. The management plans consist of the experts' recommendations concerning further protection management activities and measures on the basis of their knowledge and practical experiences gained during visits to the project area. The experts' opinion secures also that all the needs of the endangered species in the coastal lagoon habitat complex are incorporated into site management and into the management plans. The plans were presented to the landowners.

24<sup>th</sup> –28<sup>th</sup> of October Ole Thorup, Lars Briggs, Amphi Consult, Paul Eric Jönsson, Skånes Ornitologiska Förening and Jan Pettersson and Sigge Sundström, Kalmar County visited the Öland project sites Sydöstra Ölands Sjömarker (25 and 27 October) and Ottenby (26 and 28 October). It was evaluated how the state of sites was for the target bird species and it was evaluated where to dig ponds and block ditches to improve hydrology for both target bird species and for reintroduction of toad species. In order to make the right decision where to dig ponds and block ditches in habitat inhabited by Baltic dunlin and ruff we concluded that more visits are needed in different times of the year with different water levels.

## **2007**

8<sup>th</sup> -10<sup>th</sup> of January three German project sites: Kleiner Binnensee, Weißenhäuser Brök and Eichholzniederung were visited in order to discuss and agree the introduction strategy of the threatened toad species: *Bufo viridis* and *Bufo calamita*. One of the main topics of the discussion was the reintroduction of *Bufo viridis* and *Bufo calamita*: which species should be reintroduced in which project site and from which donor population the brood should be taken. Also the results of pond digging and terrestrial habitat management (mainly grazing) were evaluated. In all project sites the possible water bodies for reintroduction were selected and in some places the exact locations for the ponds were appointed. Lars Briggs, Riinu Rannap and Hauke Drews took part of the visit.

19<sup>th</sup> - 21<sup>st</sup> of February an expert visit to the Monnet project site in Denmark took place. Monnet was visited in order to discuss and recommend the actions improving breeding conditions of *Bufo calamita* and *Bufo viridis*. Due to the winter storm the main breeding ponds of *Bufo viridis* were flooded by seawater and the conditions of the ponds were unfavourable for the toads to breed. The decision was made to pump the salt water out of the ponds and clean the bottom of the ponds from mud to secure the good water quality for breeding. The possible places of breeding pond management for *Bufo calamita* were selected as well. Also the farmer, who is grazing his cattle on Monnet, was contacted in order to discuss the possibilities to intensify the grazing in some certain parts of the meadow.

The experts (Lars Briggs, Riinu Rannap and Ole Thorup) also decided that the monitoring of target species in the project sites should be carried out during the whole project period. Only in this way it is possible to change the management actions and whole strategies in the right time and in the right direction. The most important project sites to follow are Saltholm and Monnet in Denmark. Those two sites are the only project sites with dunlin in Denmark. Saltholm is also one of the few places where it might be possible to increase the ruff breeding habitat. The population of *Bufo viridis* is in decline on Saltholm. On Monnet the population of *Bufo calamita* is very small and vulnerable (probably extinct on Saltholm in 1990es). In Estonia such project sites are Teorehe (possibilities for dunlin and ruff) and Linaküla-Sääreküla. In addition the management plans for Danish project sites were discussed and improved.

27<sup>th</sup> - 29<sup>th</sup> of March the expert group visited one Danish and one German project site. In Denmark the Saltholm project site was visited and the recommended management actions were discussed among the experts and site managers. In Germany the Reesholm project site was visited by the international group of experts. The area was partly well grazed, especially the higher sand dune area and the surrounding of the smaller lagoons. Several places for pond digging or restoration of natural depressions were selected. This site has rather high potential for the introduction of the natterjack toads. The presence of this toad species previously is not known in this project site. The first priority introduction site was the dune area alongside to the well-grazed coastal meadow. Before introduction of toads to this area a fresh water pond should be restored.

11<sup>th</sup> – 12<sup>th</sup> of April the expert group visit to Bågø and another visit to Monnet in Denmark took place.

#### Bågø

The project site of Bågø was evaluated in terms of target species – coastal waders (dunlin, ruff, black –tailed godwit) and toads (*Bufo calamita*). Also *Rana dalmatina* (Annex IV of Habitats Directive) is present on the island. During the site visit to Bågø Island, the possible extension of this particular project site was one of the main topics discussed. The present Bågø project site includes two coastal lagoon areas: ‘Ferskesø’ and ‘Vestermose’. Before the grazing season 2005 the ‘Vestermose’ grazing field was extended to the north to include a coastal lagoon system ‘Mellemmose’ including adjacent fresh-brackish and fresh meadows. Already in the 2007 breeding season, ‘Mellemmose’ apparently has become a core area for meadow birds. At the April expert visit 1 pair of avocet, 4 pairs of redshank and 5 pairs of lapwings were territorial in this part of the meadow-lagoon system.

The more fresh meadows of ‘Mellemmose’ and the higher narrow meadows between ‘Mellemmose’ and ‘Vestermose’ are very important for dispersal of natterjack toad between the strong population in the western lagoon system and small populations to the north of the island. Within the present project site there is a very limited extent of fresh-brackish meadows suitable for natterjack toad. The suggested extension of the project site will give much better opportunities to create new breeding ponds. With such digging of breeding ponds ‘Mellemmose’ will be a site with a large potential for natterjack toad.

In order to ensure good management in the entire coastal lagoon habitat complex on western Bågø and thereby establish good habitat connectivity in this part of the island,

the experts recommended to include the 'Mellemmose' grazing field and the meadow buffer area immediately east of the fence into the Bågø project site.

In addition, the management plans for Danish project sites: Hjarnø, Endelave, Halk Nor, Store Egholm, Monnet, Saltholm, Hjelmskov, Saksfjed-Hyllekrog and Ulvshale were discussed by the expert group. All proposed actions were agreed, the text was improved and the locations of proposed actions were marked on the site maps. The final drafts of the management plans were completed. The first drafts of the management plans for Halmø and Urehoved-Dajrø were also compiled.

#### Monnet

At this additional visit to Monnet the improved grazing during the 2006 season was evaluated especially in the light of being able to monitor whether a sufficient area of potential favourable dunlin chick feeding habitat was present. This is apparently the case.

16<sup>th</sup> –19<sup>th</sup> of April the remaining project site (Kõrgessaare-Mudaste) and seven coastal meadow reference sites on Hiiumaa and in Silma nature reserve in Estonia were visited by the international group of bird and amphibian experts and by regional managers. Some Baltic dunlins had arrived at their breeding meadows and started displaying. From amphibians, only the natterjack toad (*Bufo calamita*) used to occur in the sites visited. In the first half of the twentieth century, this amphibian was widespread and abundant on managed coastal grasslands in the west-coast and western archipelago of Estonia, but subsequently experienced a steady decline in its numbers. Kõrgessaare-Mudaste project site was the very last place where the natterjack toad was heard on Hiiumaa Island. According to unverified data the natterjack toad was last time heard in 2000 on Tahu coastal meadow reference site (Silma Nature Reserve). The reintroduction started in 2003 on Tahu and has continued since.

In May and August several site visits were made to the following Danish project sites: Monnet, Hjarnø, Endelave, Store Egholm and Halmø. The sites were visited by the international amphibian expert group (Lars Briggs and Riinu Rannap). Most of the sites (except Store Egholm) have small and threatened populations of the natterjack toad. The green toad occurs on Monnet, Store Egholm and Halmø. Monnet is one of the few Danish project sites where in addition to the two threatened toad species also Baltic dunlin is present. Therefore all those sites need frequent visits by project expert to follow up the management activities and evaluate the impact of the management to the target species. Thus the aims of the site visits were:

- to follow the effect of management actions, initiated in the sites, on the target species and habitats;
- to become aware of the natural condition in the site (water regime, vegetation growth) in different times of the year;
- to evaluate and specify the proposed actions according to the present and changing situation;
- to complete the management guidelines for the project sites and put together the final drafts of those.

#### Monnet

On Monnet the exact actions improving the breeding condition of the natterjack toad were discussed and the precise localities for pond restoration were pointed. Also the necessary actions to be done for the Baltic dunlin (bush cutting) were decided.

On Hjarnø and Endelave, where the small populations of the natterjack toad are present, were visited in order to evaluate the breeding conditions of the species.

On Hjarnø the natterjack toad's population is not very numerous, occurring only in the semi natural grasslands and coastal lagoon in the project site. The highest numbers at population counts during the last 5 years has been 15-20 calling males. The main breeding ground for the natterjack toads is the brackish-water lagoon bordering with the grazed coastal meadow. The lagoon is losing its value as the breeding place for the toads, and the meadow is partly unsuitable for toads as the foraging ground.

On Endelave the natterjack toad is the only toad species on Endelave at present. The strongest sub-population exists in the project site Flasken with 25-35 calling males in 2005. Outside the project site there are two smaller sub-populations found in Øvre and Lynger (approximately 10 calling males at each site).

During the expert visits the precise breeding places were determined and the possible management actions improving breeding conditions (Hjarnø) or creating additional breeding areas and connection corridors between breeding populations (Endelave) were discussed.

On Halmø the populations of both the natterjack toad and the green toad are small and vulnerable. Lack of grazing has had a negative effect on the toads' populations on Halmø, causing overgrowth of meadows, shallow coastal lagoons and natural depressions, the foraging and breeding grounds of amphibians. Currently there are almost no suitable breeding waters for the toads remaining on the island. One of the main breeding sites for two toad species has been a shallow lagoon in the west-coast of the island, which is silted up today. Thus the water condition is not favorable for the tadpoles' development in the lagoon.

The precise places for possible breeding ponds for the natterjack toad and the green toad were determined. It was not possible to point out the precise places for new breeding waters earlier, before the effect of the cattle grazing appeared. The precise places for five-six possible new breeding ponds/depressions were pointed out.

#### Store Egholm

Today only one toad species, the green toad is present on the islet. Also the natterjack toad used to occur on Store Egholm, but has probably gone to extinct in the 1990s. The population of the green toad is low and not exceeding 50 calling males. The breeding success of the green toad was recorded last time in 2000, when less than 10 tadpoles were caught in the old cattle pond in the western part of the islet while the present breeding success is not known. The situation at present is that the amphibian breeding habitats are mainly destroyed by the seawater or overgrown due to the decreased cattle grazing. The dikes around meadows are partly collapsed and cannot prevent the flooding from the sea. Thus the breeding waters of amphibians are too salty and not suitable for the embryonic and larval development. Decreased cattle grazing have caused overgrowth of meadows, which has led to the reduction of low vegetated meadow areas, as amphibian foraging and breeding ground. There are no suitable breeding places for the natterjack toad remaining on Store Egholm. Though the green toad, as the most salt tolerant anuran species in Denmark, can still find places to breed, the available ponds might not be sufficient to guarantee the survival of its population in long term.

Although the grazing of the meet cattle was initiated in the spring 2007, the cattle were drawn during the summer flooding. Therefore the islet was still grazed only by sheep in August 2007. The precise places for possible breeding ponds for the green toad were determined. Also the places for new freshwater ponds in the old fields, as well as the suitable parts of the ditches for enlargement and pond creation were

discussed and determined. After the re-initiating of grazing and breeding pond restoration/digging, it might be taken into consideration to start reintroduction of the natterjack toads to the islet.

In addition, the management plans for the project sites Saltholm, Monnet, Halk Nor, Hjarnø, Endelave, Store Egholm, Urehoved – Dejrø, Halmø, Hjelmshoved, Store Vrøj and Krageø and Korevlen were compiled.

In August international amphibian and meadowbird experts (Lars Briggs, Riinu Rannap and Ole Thorup) and bird, vegetation and amphibian experts from Schleswig-Holstein (Heiko Grell, Hauke Drews, Arne Drews, Martin Altemüller, Antje Walther) and local managers and caretakers visited all German project sites within the Life BaltCoast project.

13<sup>th</sup>-17<sup>th</sup> of August Reesholm, Schwansener See, Neustädter Binnenwasser and Oehe-Schleimünde project sites were visited.

Schwansener See is one of the very few German sites where Baltic dunlin and ruff still breed but both species are present in very small numbers only and the survival of the species is threatened. The heterogeneous and mosaic grazing pattern and the presence of recently dug depressions seems a perfect habitat management for ruff whereas the grazing down of more of the coastal zone would improve the breeding conditions for Baltic dunlin by creating more crucial feeding habitat.

20<sup>th</sup>-24<sup>th</sup> of August the site visits to the German project sites Grüner Brink, Wallnau and Sundwiesen on Fehmarn Island and Eichholzniederung, Weisenhäuser Brök, Sehlendorfer Binnensee and Kleiner Binnensee on the mainland took place.

The state of the populations and the habitat conditions of the natterjack toad and green toad were discussed in project sites on Fehmarn, where both toad species occur. The breeding conditions in Grüner Brink are rather poor, especially for the natterjack toad, because of the lack of suitable freshwater ponds. The best conditions for the toads occur in Wallnau, where there are some well-managed meadows, favourable for the natterjack toad for breeding and foraging. Nevertheless, the suitable area should be enlarged, in order to secure the long-term survival of the natterjack toad population.

In rest of the project sites visited, both toad species have gone to extinct. There are some efforts made in Eichholzniederung and Sehlendorfer Binnensee, restoring habitats for the toads and starting reintroduction program for the species.

In Wallnau ruffs and black-tailed godwits had good breeding populations in the past. The habitats are still present but fragmentation by reed and also reed coverage of many of the wetter (shoreline) zones means that the conservation condition for these species could be improved. Habitat demands in meadowbirds often compete with demands for other vulnerable and/or Annex I listed species like great bittern *Botaurus stellaris* and marsh harrier *Circus aeruginosus* that to a great extent profit by fragmented landscapes.

In the past Kleiner Binnensee was an important breeding site for Baltic dunlin. The species disappeared with a cease of cattle grazing and compared to then the hydrology management today also creates drier meadows. With reintroduction of well grazed meadows grazed by cattle and wetter meadows in the breeding season April-June the breeding potential for the species is still there.

23<sup>rd</sup> of October Mellby Ör in the Sydöstra Ölands Sjömarker project site was visited. The different effect on the vegetation structure in meadows with late mowing only versus meadows with late mowing and after-grazing was studied and evaluated. Lars Briggs, Riinu Rannap, Ole Thorup, Claes Andrén from Nature, Martin Altemüller from Fehmarn NR, Daniel Hasselbratt, Helena Lager, and Brita Fahlström from Kalmar County took part of this visit. The entire group visited also the lagoon and the coastal meadows at Högby Hamn project site. The hydrology was inspected carefully including two potentially very important rather deep drainage ditches functioning as outlets of the main lagoon. Optimal sites for placement of reintroduction ponds and future breeding pond for green toad were searched for.

24<sup>th</sup> of October the expert group visited Skärlöv in the Sydöstra Ölands Sjömarker project site— one of the important breeding areas for Baltic dunlin and ruff. Here the vegetation height and structure was inspected, as was the local hydrology. Also the important breeding site for the two species Hulterstad was visited briefly, and the new dam (Görans damm) and the adjacent wetland was visited. Also the southern well-grazed part of Schäferiängarna at the Ottenby project site, where the main target was an old cattle watering pond, was briefly visited. The potential of this pond as a reintroduction pond for green toad with proper restoration was inspected.

One of the main topics of the discussions was the possibility to reintroduce green toad *Bufo viridis* to the project sites. This toad species went to extinction in 1990es on Öland so far the attempts to reintroduce it back to Öland have not been successful. It was decided that in order to prepare good habitat conditions for the green toad and make the reintroduction possible, the best areas for reintroduction have to be selected. It includes also the selection of the precise sites for restoration and creation of breeding habitats. To be able to choose the most optimal places for habitat restoration the natural water fluctuation, grazing pressure and presence of the whole habitat complex (foraging ground, migration possibilities, hibernation sites) have to take into account. Therefore the sites have to be visited several times to become aware of the natural condition in the site (water regime, vegetation growth) in different times of the year.

25<sup>th</sup> of October the Bågø project site in Denmark was visited. The project site was visited in order to evaluate the management of the lagoon habitat complex in the project site and find the exact locations for the natterjack toad's breeding ponds. Further the management plan was improved.

## 2008

4<sup>th</sup>-8<sup>th</sup> of February the expert group visited the coastal lagoon habitat complex of Sehlendorfer binnensee, Hohwacht in Germany. The experts evaluated the management and restoration actions carried out in 2006 –2007 in this site and discussed the further activities needed to create high quality habitat complex. The sites was an important avocet site until a few years ago. Today breeding must be restricted by the overgrown coastal saltmarsh along the shorelines, and grazing these areas down is of significant importance for the avocets. Management directed at improving breeding conditions for avocet and Baltic dunlin would most probably also create the right vegetation structure locally for breeding ruff.

Since 2005 the whole area was totally overgrown. The grazing by meat cattle started in 2006. In winter 2007 the lagoon system with shallow depressions was restored and

cleaned from mud and rank vegetation. In summer 2007 the reintroduction of the natterjack toads and green toads started. There is still need to increase the grazing pressure and create one large and shallow pond.

Also the Neustädter Binnenwasser project site was visited in order to elect the exact sites for new pond creation and overgrown or drained depressions for restoration. First of all the existing drainage system of the site should be broken to restore the natural hydrology.

Also Bågø project site was visited in order to select and mark to the map the exact locations for the pond management (creation or restoration) for the natterjack toads.

Öland project site was visited in February and in April 2008 by Lars Briggs, Niels Damm and Claes Andren in order to discuss the green toads' reintroduction possibilities, find the most suitable meadows for reintroduction and possible places for pond digging.

13<sup>th</sup> – 18<sup>th</sup> of April Denmark the amphibian experts monitored the state of the populations of the natterjack toad and the green toad on Monnet, Endeleave and Hjarnø project sites.

The aims of the site visits were:

- to follow the effect of management actions, initiated in the sites, on the target habitats and species, particularly on the natterjack toads and green toads;
- to specify the proposed actions according to the present and changing situation.

27<sup>th</sup>–28<sup>th</sup> May, meadowbird experts Martin Altemüller, NABU Wallnau and Ole Thorup, Amphi Consult and the local manager Nerijus Zableckis, Lithuanian Fund for Nature, visited the Lithuanian project site Rusne in Nemunas Delta.

Most of the project site is overgrown but locally, agreements with a cattle farmer have provided a well grazed meadow with a mosaic structure favourable for breeding meadowbirds including the two internationally redlisted species black-tailed godwit *Limosa limosa* (15 pairs counted) and great snipe *Gallinago media* (1 bird flushed from nest with eggs).

Lack of grazing in most of the area is a problem but the overwhelming problem at the site is drainage. A new pumping station keep the water level 30-50 cm too low for this season, and in addition to the meadowbirds this is catastrophic for the most important breeding species in the project site, the globally threatened aquatic warbler *Acrocephalus paludicola*. No breeding birds of this species were found (and no suitable habitat) at the visit, whereas a few years earlier 22 pairs were found in 2004.

Higher water level and extension of the grazed areas is crucial in this area.

Following the Rusne visit an aquatic warbler breeding site was visited in Zuvintas NP.

In September 2008 Ole Thorup, Lars Briggs, Amphi Consult, Riinu Rannap, Estonia and Susanne Forslund, Daniel Hasselbladt, Kalmar County visited the Öland sites and we found precise places to block ditches to benefit Baltic dunlin and dig ponds for safeguarding the reintroduction of the Green Toad.

Based on the results of the expert visits to the project sites (2006-2008), the status of the natterjack toad and the green toad have been evaluated (Table 1).

Table 1. The status of the natterjack toad and the green toad in the project sites

<i>Bufo calamita</i>		
Project site	Status	Comment
<b>Denmark</b>		
Saltholm, Store Egholm, Urehoved, Store Vrøj-Krageø	extinct	Brackish meadow and depressions totally overgrown.
Hjarnø, Halmø, Halk Nor, Ulvshale	very threatened	Coastal meadow overgrown. Only one breeding place in a low quality left.
Endelave, Monnet, Bågø	threatened	Small patches of brackish meadow well grazed. Some temporary ponds in good quality. On Bågø many ponds in low quality.
<b>Germany</b>		
Kleiner Binnensee. Oehe-Schleimünde	extinct	Brackish meadow and depressions partly overgrown. Kleiner Binnensee hydrology destroyed. Terrestrial habitat overgrown.
Schw. See, Grüner Brink	very threatened	Coastal meadow overgrown. Only one breeding place not in optimal quality left.
Fehmarn in general	threatened	Small patches of brackish meadow well grazed. Some temporary ponds in good quality. Most of potential habitat overgrown.
<b>Sweden</b>		
Falsterbo	stable, slightly in decline	Mainly adult animals seen.
<b>Estonia</b>		
Kõrgessaare-Mudaste (Hiiumaa), Linaküla-Sääreküla (Kihnu), Teorehe (Matsalu)	extinct	Coastal meadows and suitable breeding depressions totally overgrown. In Kõrgessaare-Mudaste the breeding pond exists but the juveniles' foraging ground diminished
<i>Bufo viridis</i>		
<b>Denmark</b>		
Endelave, Urehoved	extinct	Coastal meadows totally overgrown (except Endelave). Suitable breeding ponds overgrown or diminished.
Store Egholm, Dejro, Halmø, Hjelmshoved	very threatened	Coastal meadows (both salt and brackish parts) overgrown. Only few breeding places in low quality left.
Saltholm, Monnet	stable/increasing	Many breeding ponds and lagoons with good quality. Surroundings of the ponds and salt meadows well grazed.
<b>Germany</b>		
Coastline from Kiel to Fehmarn	extinct	Coastal meadows partly overgrown. Suitable breeding sites gone.

Grüner Brink	very threatened	Coastal meadows (both salt and brackish parts) had uneven grazing last 20 years. Only one breeding place in low quality left.
Wallnau-West Fehmarn	stable/increasing	Breeding sites with good quality. Surroundings of the ponds and salt meadows well grazed.
<b>Sweden</b>		
Öland	extinct	Suitable breeding sites gone.
Falsterbo	very threatened	Coastal lagoons not suitable. Breeding ponds of low quality.
Eskilstorp	stable	Only few breeding sites, that seems not optimal.
<b>Estonia</b>		
-	-	Not present in the project sites