Creating space by giving space: a management plan for integration of economical development and protection of the Natterjack toad in a Dutch polder

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Abstract

Species protection often conflicts with economical interests. Applying a proactive approach to nature conservation, in which conservation measures are integrated into economical activities, can bring resolve.

In the Netherlands, the presence of the strictly protected Natterjack toad often leads to conflicts. For one particular region it is even clear that a conservative interpretation and application of legislation is counterproductive. Therefore, a species management plan (SMP) was specifically created for this region by means of a joint planning process which includes all stakeholders. The SMP is a framework for guaranteeing the long term viability of the population of the Natterjack toad in the region, while preventing unnecessary legal procedures. As such it has both economical and ecological advantages.

The SMP was carefully aligned with the legal principles applicable to the Natterjack toad. Two major components form the basis of the SMP. Firstly, it provides a protocol for management and spatial developments measures aimed at preventing negative impacts on the regional population. Secondly, it incorporates measures for developing the population of the Natterjack toad and its habitat to a level that is such that spatial developments that can reasonably be foreseen will not compromise the conservation of the species in the region. Furthermore, it contains concrete guidelines and a number of guarantees for its implementation. The plan has a strong ecological underpinning and is supported by all relevant stakeholders in the region. Weaker aspects of the SMP are the fact that it depends on the voluntary involvement of the stakeholders and that it concerns only one species.

Integration of economical and ecological considerations in day-to-day practice may provide new opportunities for reaching goals of nature protection legislation, in combination with ongoing economical growth. However, the feasibility and desirability of applying the new approach must be judged for each particular situation.

1. Introduction

Conflicts between economical and ecological interests often arise when species protection and spatial development projects claim the same space. Finding opportunities for solving these conflicts in a way that benefits economy as well ecology requires a creative and flexible approach. A promising option is applying a proactive approach to nature conservation, in which conservation measures are integrated into economical activities. This approach has been gaining ground in the Netherlands and in other European

countries, and as well as in the United States. Examples are the concept of 'Wetland Banking'[1,2] in the United States, and the Dutch initiative 'Building with Nature'[3]. 'Wetland banking' is aimed at compensation obligations and 'Building with Nature' at providing safety, economical growth and nature development.

1.1 Proactive conservation of the Natterjack toad in the Netherlands

In the Netherlands, the Natterjack toad (*Bufo calamita*, Figure 1) is a good example of a species that leads to conflicts- and interesting paradoxes. Although strictly protected under the European Habitat Directive[4], the species has a relatively wide distribution and can locally be abundant. European legislation requires that the so-called 'favorable conservation status' (Box 1) of the species be guaranteed within the European territory.

Figure 1. A specimen of the Natterjack toad.

In Europe, the Natterjack toad occurs from South Sweden in the North to the southern tip of Spain and from Great Britain to Belarus. Despite this wide geographical distribution, the species is considered a threatened species in many European countries like Germany, England, the Republic of Latvia and others.

[1] Environmental Law Institute, 2002. Banks and Fees. The Status of Off-Site Wetland Mitigation In the United States. Environmental Law Institute, Washington, D.C.
[2] Environmental Law Institute, 2006. The Status and Character of In-Lieu Fee Mitigation in the United States. Environmental Law Institute, Washington, D.C.
[3] http://www.ronaldwaterman.com/page10/page10.html
[4] Council Directive 92/43/EC.

The Netherlands are situated in near the center of the biogeographical distribution of the Natterjack toad (Figure 2). Because the Dutch population is also relatively large, it is considered to be an important core population[5]. But also this population has decreased by 40% since 1950, mainly due to the disappearance of suitable habitat. The Dutch Society for Reptiles, Amphibians and Fish Conservation (RAVON) concluded that the Natterjack toad in the Netherlands should be classified as 'vulnerable' according to the IUCN Red List criteria[6,7]. Later this year, this will be made official in the new Dutch Red List for reptiles and amphibians.

It is clear that the Natterjack toad does not have a favorable conservation status. This means that conservation of this particular species in the densely populated Netherlands will require measures aimed at developing the population and close attention for the species in management and construction activities.

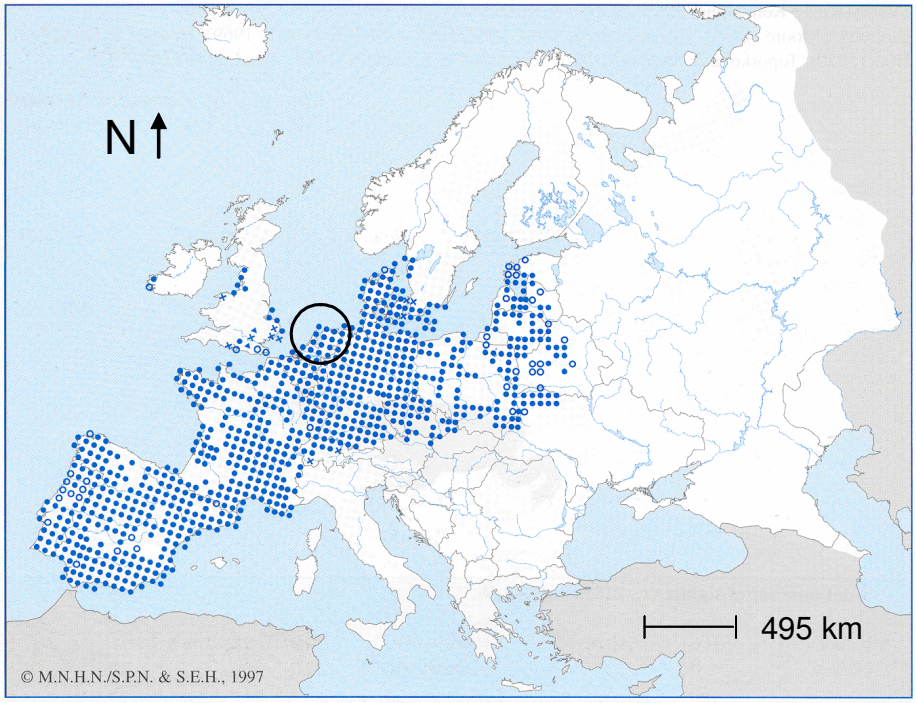

Figure 2. The biogeographical distribution of the Natterjack toad in Europe. The circle indicates the location of the Netherlands.

1.2 Protection of a pioneer species

The problem with the Natterjack toad is not only its status as strictly protected in combination with its wide distribution and potential for local abundance. Also the ecological life strategy of the toad plays an important role. The Natterjack toad is an opportunistic pioneer species that is capable of rapidly utilizing

[5] Spitzen-Van der Sluijs, A. M., R. Zollinger & A. C. van Rijsewijk. 2007. Ecologisch onderzoek aan de rugstreeppad in de Northeast Polder. Stichting RAVON, Nijmegen (in Dutch). p 49.
[6] Creemers, R. C. M., J. J. C. W. van Delft & A. M. Spitzen-Van der Sluijs. 2007. Basisrapport Rode Lijst amfibieën en reptielen. Stichting RAVON, Nijmegen (in Dutch).
[7] IUCN, Conservation International and NatureServe, 2006. Global Amphibian Assessment. www.globalamphibians.org.

new habitats on bare soil[8,9]. Development time of the eggs and larvae is short and the metamorphosed toads and subadults can potentially disperse over large distances. Due to reduced natural rejuvenation processes (e.g. erosion by wind and water) the original habitats of the Natterjack toad have diminished, and nowadays a large proportion of the available pioneer habitats are found in urban development areas. This means that the Natterjack toad will rapidly invade construction sites, and use the newly created little pools and heaps of sand as an environment to reproduce during the night and seek refuge during the day. Therefore companies that execute construction projects often have to take specific measures in order to prevent the species from moving into the project area[10]. As the toad is resourceful, these measures may not always be successful. In that case, the presence of a strictly protected species in a construction site means that the project can be seriously delayed. Various decisions in court have shown that the Natterjack toad requires close attention in urban developments[11].

1.3 The Northeast Polder

One particular initiative dealing with the problem concerning the Natterjack toad has been carried out in the Northeast Polder (Figure 3). In this polder (59,620 ha) the toad has a wide distribution (approximately 7% of the Dutch population occurs in the Northeast Polder, which covers 4% of the national surface). The Natterjack toad can be found almost anywhere in the area. However, the population consists of many small, often isolated subpopulations, reproduction is not optimal, mortality is high and habitat availability is not sufficient for a viable population. Therefore, RAVON concluded that the species currently does not have a favorable conservation status[12].

The Northeast Polder was reclaimed from the sea in 1942[13], largely for agricultural use, which includes greenhouse cultivation, flower bulbs, fruit farming and agriculture and to a lesser extent cattle breeding (at least 75% of the land is used for agriculture). Due to the agricultural management the landscape has a mainly large-scale and open character and the land use is highly dynamic. In order to optimally drain and irrigate the land, an extensive system of ditches and waterways is present in the polder.

Although the polder was created for economical purposes, the Natterjack toad is adapted to the resulting landscape, entailing a very specific situation in which the conflict between ecology and economy becomes very sharp. Many plans for building houses and barns, industrial areas and new infrastructure (spatial developments) exist and are being developed. Because the toad might be present anywhere in the polder every single activity must, according to current legislation, be examined on its effect on the sustainable maintenance of the population. However, many stakeholders in the polder consider this too costly and time-consuming, or even unnecessary. Maintenance of the legal regulations in this situation is an almost impossible task.

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[8] Boomsma, J. J. & J. W. Arntzen. 1985. Abundance, growth and feeding of Natterjack toads (*Bufo calamita*) in a 4-year-old artificial habitat. Journal of Applied Ecology 22: 395 – 405.

[9] Banks, B. & T. J. C. Beebee. 1986. Climatic effects on calling and spawning of the Natterjack toad *Bufo calamita*: discriminant analyses and applications for conservation monitoring. Biological Conservation 36 (4): 339 – 350.

[10] Smit, G.F.J., 2006. Urban development and the Natterjack toad (*Bufo calamita*) - implementation of the Habitats Directive in The Netherlands. In: Vences, J. Köhler, T. Ziegler, W. Böhme (eds): Herpetologia Bonnensis II. Proceedings of the 13th Congress of the Societas Europaea Herpetologica. pp. 167-170.

[11] Court of Justice Amsterdam July 25, 2002; Dutch Administrative Jurisdiction Department of the Council of State June 30, 2004.

[12] Spitzen – van der Sluijs, A. M., R. Zollinger & A. C. van Rijsewijk. 2007. Ecologisch onderzoek aan de rugstreeppad in de Noordoostpolder. Stichting RAVON, Nijmegen (in Dutch). p. 52.

[13] Wiggers, A.J., 1955. Het ontstaan van de Noordoostpolder, Tjeenk Willink NV, Zwolle, The Netherlands (in Dutch). P. 6.

As a result, the presence and protected status of the Natterjack toad are often ignored, leading to:

- Frequent violation of legislation;
- Suboptimal conservation situation for the Natterjack toad;
- Problems with spatial developments, because the proper ecological and legal studies have not been carried out.

This situation creates a lot of uncertainty about the possibilities for conservation of the Natterjack toad as well as for economical development. It is clear that a conservative interpretation and application of legislation is counterproductive here. Therefore, conservation of the Natterjack toad in the Northeast Polder requires a new approach.

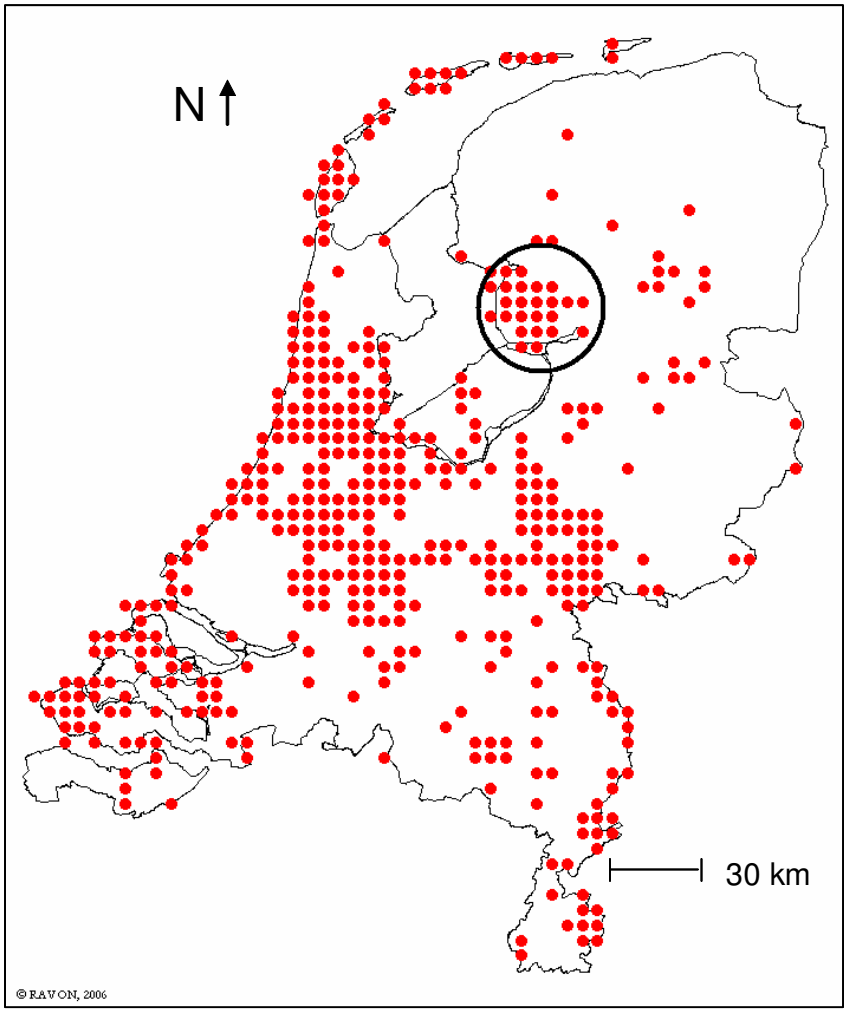

Figure 3. The biogeographical distribution of the Natterjack toad in the Netherlands. The circle indicates the location of the Northeast polder.

1.4 A species management plan

Effective conservation of the Natterjack toad in the Northeast Polder means that in day-to-day practice, the goals of nature protection legislation have to be met while at the same time economic developments are not constrained unnecessarily. The approach chosen to tackle this challenge for the Natterjack toad in the Northeast Polder has been the drawing up of a species management plan (SMP) that should serve as a framework to guarantee the favorable conservation status of the Natterjack toad, which makes costly, time-consuming ecological research and dispensation procedures unnecessary. The SMP would have to be applied on a voluntary basis by the various stakeholders in the region. Therefore, it was considered crucial that all stakeholders would be cooperating in the process from the start. Furthermore, a very keen anticipation of legal obstacles was considered crucial.

This paper deals with the following questions:

1. What are the requirements and possibilities for the SMP in terms of legal obligations and stakeholder involvement?
2. How are legal, ecological, economical and stakeholder involvement issues implemented in the SMP?
3. What are the advantages and disadvantages of integrating economical development and species protection by means of a SMP?
4. What are the key success factors and pitfalls of this approach?

Paragraph 2 deals with the legal obligations and stakeholder involvement. Paragraph 3 will present the implementation of all the relevant issues in the SMP. Paragraph 4 evaluates the advantages and disadvantages and draws conclusions concerning key success factors and possible pitfalls of the SMP of the Natterjack toad. Finally, implications for the legal framework are briefly discussed.

2. Legal, ecological and stakeholder criteria for the management plan

2.1 The legal framework

European and Dutch legislation

Any initiative to solve the abovementioned problems will have to meet the goals formulated in the legal framework. The framework for nature conservation legislation within the European Union, formed by the Bird Directive[14] (BD) and the Habitat Directive[15] (HD), contains obligations for the Member States concerning both species protection and area protection. Species protection has been implemented into Dutch law by means of the Flora and Fauna Act (FFA); area protection in the Dutch Nature Protection Act 1998 (NPA). For this paper, only the species protection component is relevant, because area protection regulations do not apply to the Natterjack toad in the Northeast Polder.

The aim of the HD is: (1) to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies and (2) to maintain or restore, at favorable conservation status, natural habitats and species of wild fauna and flora of Community interest.

European legislation emphasizes ecological-scientific underpinning of population sizes, selection of species and areas, and evaluation of impacts of human activities on protected species.

[14] Council Directive 79/409/EEC. This directive will be left out of consideration, because it only concerns birds,
[15] Council Directive 92/43/EEC.

Box 1: Definition of key terms of the European Habitat Directive (Article 1).

Habitat of a species
An environment defined by specific abiotic and biotic factors, in which the species lives at any stage of its biological cycle.

Favorable conservation status
The conservation status of a species will be taken as "favorable" when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The regulations concerning species protection of the HD (articles 12-16) are implemented in the Dutch FFA. This act aims at a general level of species protection. The ultimate goal is conservation and restoration of the variability of wildlife, recognizing species as functional elements of ecosystems. This is also defined as the wish to conserve the genetic variability and species richness. Moreover, the opening words of the FFA explicitly mention the intrinsic value of animals as a reason for protection.

The FFA emphasizes passive protection of species by means of a general prohibition scheme. Special attention is paid to threatened species and species for which the Netherlands has international responsibility. Article 1 of the FFA concerns all ontogenetic stages of wild animals and plants. Article 2 gives the obligation to take all necessary measures to reasonably prevent that species living in the wild and their habitats suffer from human activities (duty to care principle).

Provisions applying to protected species mainly concern prohibition of removing plants from their habitat and killing, catching, owning and trading of animals, and deliberate disturbance of animals and/or their habitat (articles 8-12).

In order to determine whether the FFA will have consequences for an activity, first of all a (field) survey concerning the presence of protected species must be carried out in the area affected by the human activities. Articles 10 and 11 forbid the disturbance of individual animals and their nests, lairs, reproduction sites, or resting places, respectively. If one of these provisions may be offended, one must apply for dispensation on the basis of article 75, unless an exemption regulation applies.

Dispensation is only possible if the ‘favorable conservation status’ of the species is not jeopardized. The favorable conservation status is related to the population level (Box 1). Although the prohibition provisions for protected species primarily focus on individuals, judgments of acceptability of human activities are based on population effects[16]. Exemption regulations are given by the Exemptions Decision.

[16] De Nooij, R.J.W., R.S.E.W. Leuven, H.J.R. Lenders, T.E.P.A. Lam & S. Pieters, 2008. Relating the ecological and legal frameworks for nature conservation in Europe, Journal of International Wildlife Law & Policy 11(1): 63-95.

The Exemptions Decision considers three different species categories with an increasing level of protection:

1. Frequently occurring protected species of the groups mammals, reptiles, amphibians, ants, snails and vascular plants (Red Data List category 'least concern'; Red Data Lists are documents that classify species into different categories of threat based on data concerning rarity and trend in abundance and geographical distribution[17]);
2. Protected species of the groups mammals, reptiles, amphibians, fish, butterflies, beetles, crustaceans and vascular plants, in the Red Data Lists category 'near threatened';
3. Species of the groups mammals, reptiles, amphibians, fish, butterflies, dragon- and damselflies, mollusks and vascular plants listed in Annex IV of the HD and species classified in the Red Data Lists as 'extinct in the wild in the Netherlands', 'critically endangered', 'endangered' or 'vulnerable'. This category applies to the Natterjack toad since the species is listed in annex IV of the HD.
4. Bird species[18].

There are two kinds of exemptions of the obligation to apply for dispensation[19]:

1. A generic exemption for species of category 1;
2. An exemption provided that one acts in accordance with an approved code of conduct, for species of the categories 2, 3 and 4.

The exemption based on a code of conduct, approved by the Minister of Nature Management, does not apply to species of category 3 in case of so-called spatial developments (activities that lead to changes in the physical structure of the landscape, e.g. construction, excavations). To be able to get dispensation for species of category 3, a more extensive assessment is required, in which it must be shown that the favorable conservation status will not be jeopardized, alternatives for the activity do not exist and that the activity complies with a limitative list of interests.

The codes of conduct must explain why particular activities, described in the code of conduct, do not have substantial effects on protected species. Working with the code of conduct is an implementation of the so-called ´Acting carefully principle ´, which is defined as: 'To act actively in order to prevent substantial influence on protected species. It can be concluded that an activity has no substantial effects if resistance or resilience of (the population of) a species on the short or long term is sufficient for maintaining the favorable conservation status' (Box 1).

The instrument called 'code of conduct' was, in many ways, a source of inspiration for the approach chosen with the SMP. The SMP also describes a way of dealing with protected species that ensures their favorable conservation status, and is also aimed at preventing unnecessary legal procedures. However, codes of conduct apply to a large range of species, the entire territory of the Netherlands and are developed for specific types of activities and related sectors (e.g. maintenance of roads, construction activities, forest management). The SMP, on the other hand, was developed for one particular species, one region and a broad variety of activities and related sectors.

[17] IUCN, RED LIST OF THREATENED ANIMALS (1993); IUCN SPECIES SURVIVAL COMMISSION, RED LIST CATEGORIES (1994).
[18] Bird species are in a special exemption category because of slightly deviating provisions in the Bird Directive.
[19] DUTCH MINISTRY OF AGRICULTURE, NATURE AND FOOD QUALITY, BUITEN AAN HET WERK? HOUD TIJDIG REKENING MET BESCHERMDE DIEREN EN PLANTEN! (2005).

2.2 *Interpretation and implementation of legal requirements*

A conservative interpretation and application of the FFA is not compatible with the SMP approach. The FFA is clear: when any of the articles 8 to 12 are violated, dispensation is required[20]. However, as explained in the introduction, these regulations do not function for the Natterjack toad in the Northeast Polder. An advice by a leading legal expert stated that a creative interpretation of the FFA and the HD creates possibilities for applying the approach. Some legal obstacles will remain, but when the SMP is supported by all relevant stakeholders, and especially the environmental NGOs, and a strong ecological foundation, it has a reasonable chance of being accepted by a judge[20].

Representatives of the Ministry of Nature Management, formally responsible for maintaining the regulations, and providing dispensation, acknowledged the problem with the Natterjack toad in the Northeast Polder. They stated that less strict interpretations are possible if the SMP is carefully aligned with the legal principles described in paragraph 2.1, and the dispensation procedure of the European HD. They also stated that when it is clear that the favorable conservation status of the population in the northeast polder is guaranteed, and sufficiently monitored, it will be possible to:

- Compensate for negative effects on local subpopulations by creating new habitats at different locations;
- Use a dynamic vision on habitat availability, for example by creating temporary habitats;
- Temporarily allow a decrease of the regional population.

The primary focus of the SMP is on the goal of the legislation: guaranteeing the favorable conservation status of the species of concern. Other focal points within the SMP are the 'duty to care' and the 'acting carefully´ principles. The implementation of these principles is aligned with the FFA, the Exemptions Decision (including the instrument codes of conduct) and the Habitat Directive.

Duty to care
The duty to care principle, described in article 2 of FFA, the obligation to take all necessary measures to reasonably prevent that species living in the wild and their habitats world sufferer from human activities, was implemented in the SMP by developing protocols for dealing with the Natterjack toad in nature and landscape management and spatial developments measures.

Acting carefully
The acting carefully principle is defined in the Exemptions Decision as: 'To act actively in order to prevent substantial influence on a protected species. In the SMP agreements are made with every stakeholder involved about how they will implement the acting carefully principle in their daily activities.

As described in paragraph 2.1, an activity has no substantial effects if resistance or resilience of (the population of) a species on the short or long term is sufficient for maintaining the favorable conservation status (box 1). Prevention of substantial effects is guaranteed by the SMP by making sure that the population is developed to a level that is resilient enough to withstand reasonably foreseeable negative impacts. Ecological requirements for a resilient population were derived from ecological studies (see paragraph 2.3). Furthermore, an inventory of existing activities and plans was made. Guidelines for acting carefully in management and spatial developments were incorporated in the SMP.

Dispensation procedure of the Habitat Directive
Dispensation can be obtained when there are no other satisfactory solutions for the intended activity, the favorable conservation status will not be threatened and the activity fits within a list of specified interests.

[20] Ch.W. Backes, 2008. Advies Juridische inpassing "natuurinclusief ontwerpen". Universiteit Maastricht. (in Dutch) p. 16.

In article 16 of the HD these interests are described. Among others, public health and safety or other imperative reasons of overriding public interest (including social and economical reasons), and measures aimed at positive effects for the environment are mentioned. In the SMP it is made clear how activities carried out by stakeholders in the Northeast Polder fit within the interests mentioned in the HD.

2.3 Stakeholder involvement

In the development of the SMP it was aimed to involve all relevant stakeholders in such a way that they will be actively contributing to and supporting the management plan. In order to achieve this goal, a joint planning process was started with the stakeholders in the North-East polder relevant to the SMP. These are the Province of Flevoland (who initiated the process around the SMP), the Ministry of Nature Management, two municipalities, the Water board, two farmer organizations, three nature management organizations, one NGO concerned with nature and landscape development, RAVON (an NGO concerned with protection and research regarding reptiles, amphibians and fish) and the Chamber of Commerce.

In order to insure their support for and contribution to the SMP, the stakeholders were involved in the process from the beginning. They were approached with requests to participate in a joint planning process aimed at creating a better situation for everybody. The first step consisted of meetings with each stakeholder in which the concept of the SMP was explained. They were asked to state which prerequisites should be met by the SMP in order to be fully compatible with their interests and activities.

The Province wants to create space for development. Their activities mainly concern reconstruction of canals and development and improvement of infrastructure.
The Water board's main interest is maintaining the water tables in the polder, preventing it from inundations and safeguarding the water quality. An important activity is reconstruction of canals. Management of water levels and vegetation in the network of ditches is crucial. This puts important boundary conditions onto the SMP.
The municipalities' main interests are creating space for building houses and industrial parks. The spatial development plan must fit well within the SMP.
The farming organizations emphasized their commercial interests. The SMP must provide financial compensation for investments done by farmers to comply with the plan. Clear, practical protocols for dealing with the Natterjack toad were also considered very important. Furthermore, the SMP should not lead to increase of financial and/or administrative burdens.
Nature and landscape management organizations stated that the SMP should provide clear guidelines for dealing with the Natterjack toad in their activities, a sound monitoring plan and a financial plan.
RAVON stated that the SMP should make sure a number of key factors, such as vegetation management and management of the water tables, are influenced in such a way that the population of the Natterjack toads will be enhanced.
The chamber of commerce main interest is to prevent limitations for future economical developments in the polder.

A broad variety of interest and activities exists among the stakeholders. Most stakeholders emphasized clear guidelines for dealing with the Natterjack toad in their activities, a sound monitoring plan and a financial plan. All these inputs were used to create a discussion document that served as the basis for a meeting of all stakeholders. During the meeting view points were exchanged and remaining obstacles were brought to the surface and discussed.

After the meeting, a concept version of the SMP was created. This concept was discussed with each stakeholder separately in order to negotiate remaining issues. In these meetings agreements were made on what the contribution of each stakeholder to the implementation of the SMP would be. After these final

separate meetings, the SMP was finalized. After a last check by the representatives of each stakeholder, and implementation of the final remarks, the SMP was sent to the boards of each organization for approval.

3. Species management plan design

3.1 Structure & goals

In order to be compatible with legal requirements, the favorable conservation status is crucial. Furthermore, implementation of the duty to care principle, the acting carefully principle and preventing substantial effects are important.

Two major lines were developed (Figure 4). Firstly, a protocol for management and spatial developments measures was constructed in order to make sure that these measures are carried out in a way that prevents negative impacts on the population. Secondly, measures designed for developing the population of the Natterjack toad and its habitat to a level that is such that spatial developments that can reasonably be foreseen will not compromise the conservation status of the species in the region. The goal and measures are underpinned by an ecological study (Box 2).

The measures must lead to:
1. A doubling of the distribution area of the Natterjack toad in the North-East polder, expressed in the number of occupied kilometer squares[21];
2. An increase of the density of groups of calling males, and the number of males per calling group;
3. An increased success rate of reproduction[22].

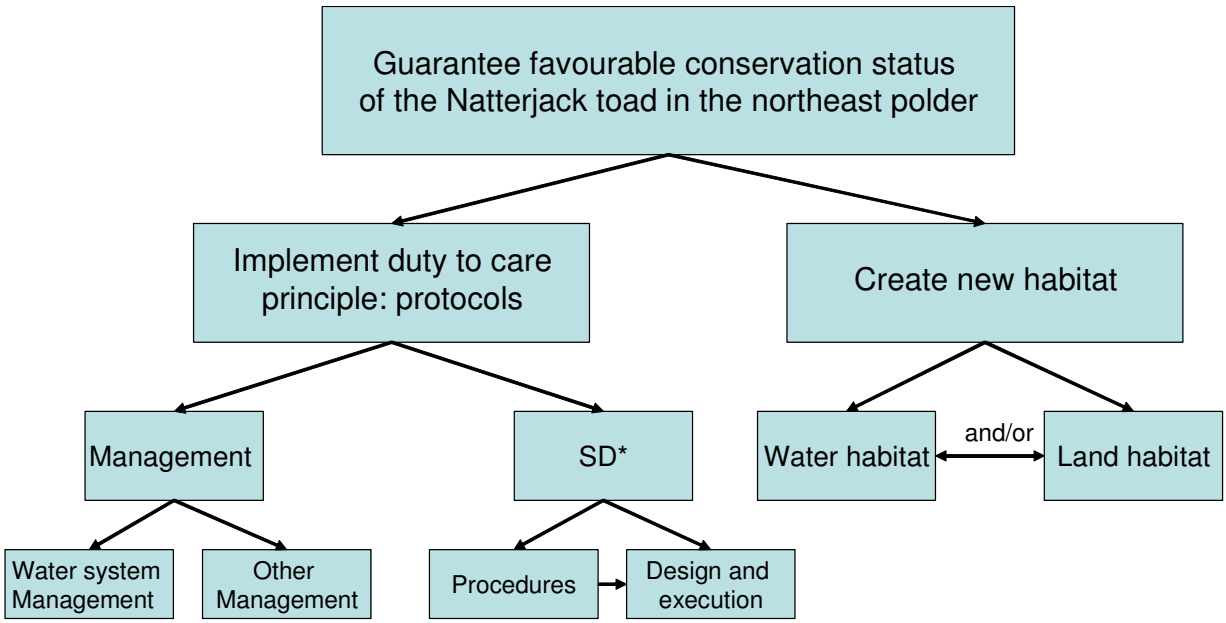

Figure 4. The structure of the SMP. * SD: spatial development

[21] A common way to express species presence on maps uses a grid formed by cells of one kilometre square.
[22] Spitzen – van der Sluijs, A. M., R. Zollinger & A. C. van Rijsewijk. 2007. Ecologisch onderzoek aan de rugstreeppad in de Noordoostpolder. Stichting RAVON, Nijmegen (in Dutch). p.53

3.2 Protocol for existing management and spatial developments

Existing management
Management of infrastructure, farms, nature areas and the water system will be carried out in a careful fashion (Figure 5). This means that, through careful planning of measures in space and time, and careful execution of these measures, adverse effects on existing habitats will be prevented. For example, terrestrial habitats will be spared from the beginning of October until the end of March (i.e. during hibernation). Removing vegetation in aquatic habitats such as ditches and ponds must not be done from the beginning of April until the end of July (the reproduction season).

The ecological research showed that management of the water system, and especially the management of vegetation and the water levels in the network of ditches and canals are crucial aspects (Box 2). Aquatic habitats must be kept in a pioneer stage, i.e. without vegetation. The water level in the ditches should be maintained at a minimum of 10 cm between the beginning of April and the end of July. Various technical possibilities are specified in the SMP.

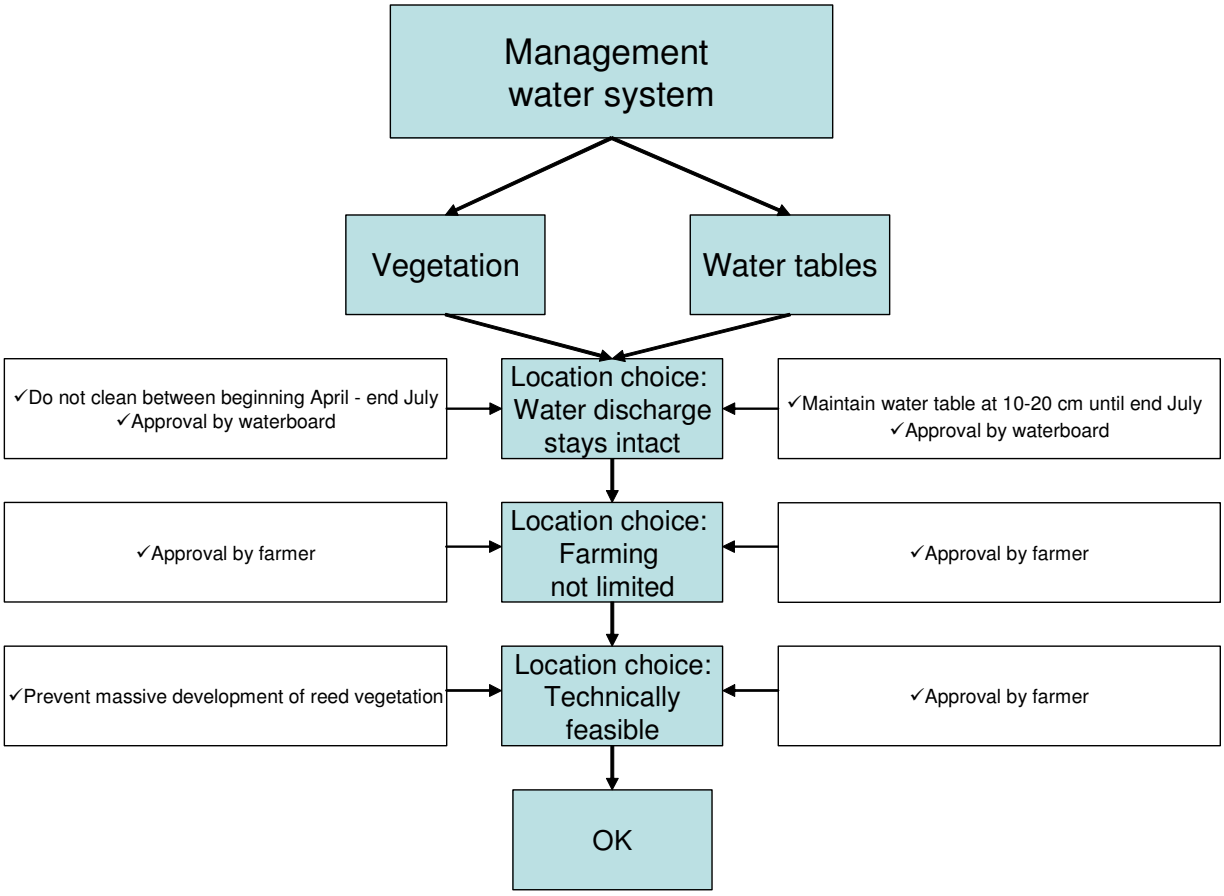

Figure 5. Implementation of the duty to care principle in the management of the water system.

Spatial developments
Spatial development projects aimed at construction of buildings and infrastructure, and reconstructions of the water system and nature areas will be carried out using two important concepts: nature inclusive design and careful execution (Figure 6) Nature inclusive design means that measures aimed at preventing habitat destruction and creating new habitat are an integral part of every plan for spatial development. The following guidelines are given:

- Create new habitat within 3 km of existing occupied habitat, and make sure no large barriers for migration by the Natterjack toad are present. This makes colonization of new habitats possible;
- Include management measures;
- When habitat is destroyed, make sure that the net surface area is positive by developing new habitat beforehand;
- Pro-active habitat creation measures can be taken anywhere in the polder, but must be realized before the existing habitat is destroyed.

Careful execution means that, through planning in space and time, habitat destruction is prevented, individual toads are treated carefully and when habitat is destroyed, individual toads will be transferred to the newly created habitats before the destruction of the existing habitat. These guidelines are also implemented in the existing procedures for spatial planning. The municipalities, who are formally responsible for spatial planning, will give project developers the obligation to make nature inclusive designs and plans for careful execution.

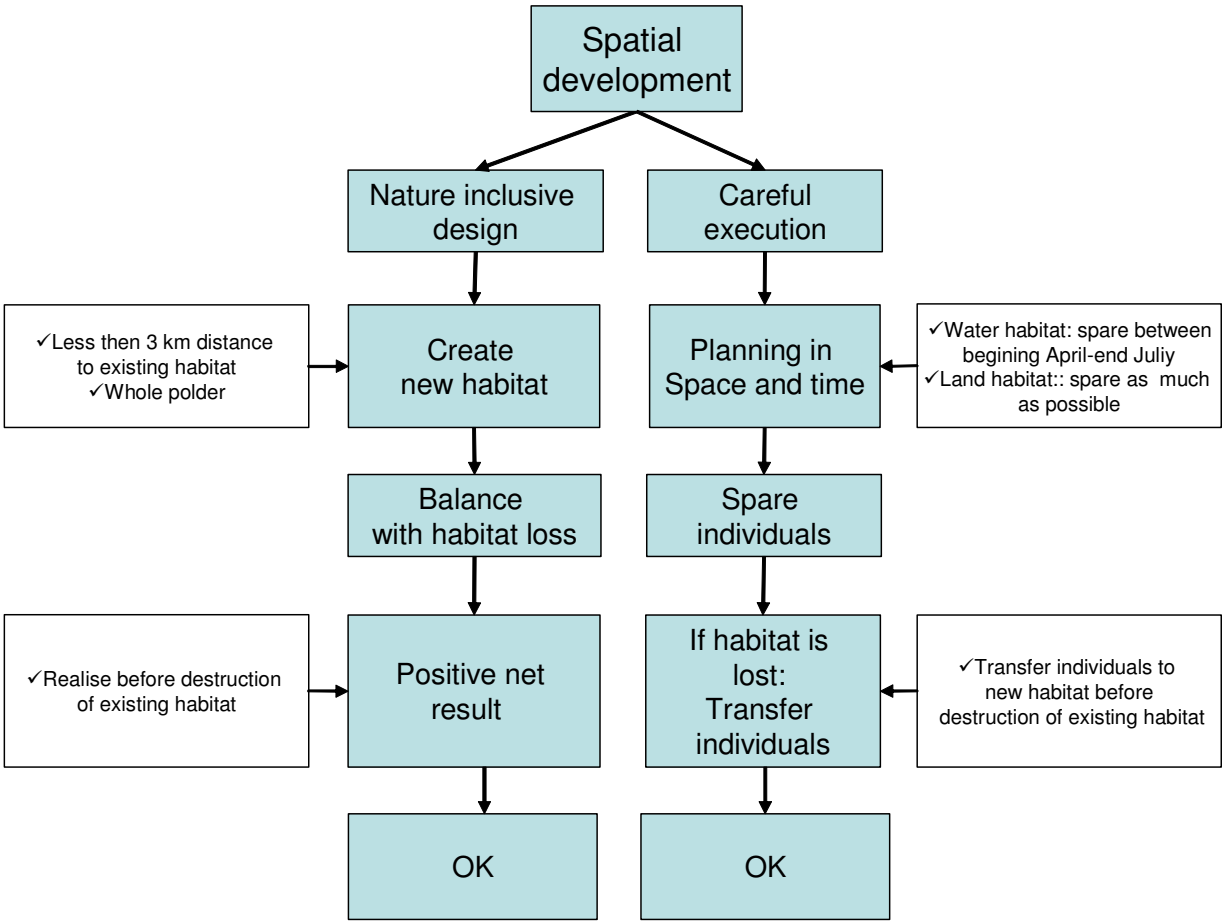

Figure 6. Implementation of the duty to care principle in spatial development projects.

3.3 Measures for developing the population

The second line within the SMP concerns measures for developing the population to a level that is sufficiently large for guaranteeing the favorable conservation status (Figure 7). In the SMP, the following general guidelines[23] were incorporated:

- New habitats must be created and maintained, at less than 3 km distance from each other, without migration barriers between them. For the Northeast Polder, this means that a minimum of 36 habitat areas must be developed and maintained;
- The exact size, location and design of these new habitat areas can be variable and should be adapted to each situation;
- A complete habitat consists of reproductive waters and terrestrial habitats.

For aquatic and terrestrial habitats the design and management was specified.

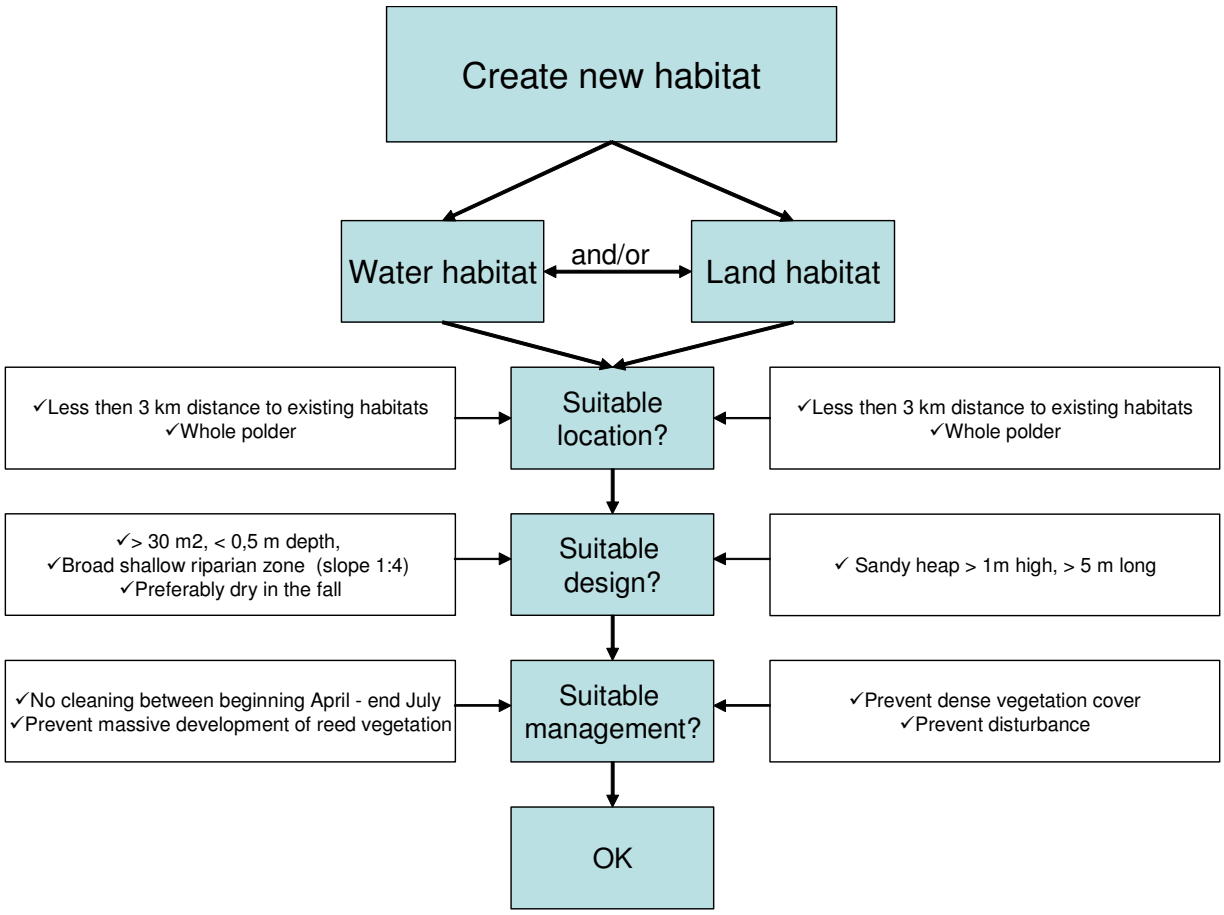

Figure 7. The protocol for creating new habitats for the Natterjack toad in the Northeast polder.

[23] Spitzen – van der Sluijs, A. M., R. Zollinger & A. C. van Rijsewijk. 2007. Ecologisch onderzoek aan de rugstreeppad in de Noordoostpolder. Stichting RAVON, Nijmegen (in Dutch). p.53

Box 2. Ecological studies for the species management plan[24,25,26].

Research goals

To be able to define the conditions that should be met to obtain and preserve a viable population a preliminary study was done in 2004 and in 2005[24] and an extensive ecological study was conducted in 2006 and in 2007[25,26]. These studies provided the basic conditions and advised on the proper measures that need to be taken in time as well as in space, to obtain or preserve a viable population natterjack toads in both the agricultural and urban landscape of Flevoland.

Methods

In 2006 the terrestrial and aquatic land use of the natterjack toad was studied with the aid of transmitters. Additionally transect counts were conducted in 2006 as to gain insight in the characteristics of their reproductive waters and in 2007 a specific study was done on the reproductive success rate of natterjack toads.

Fifteen toads (9 males and 6 females) were collected from the study area and replaced at their exact location. Toads were collected at 4 batches; in April (5), May (5) August (3) and September (2). Implantable transmitters were inserted into the abdominal cavity. The transmitter life span was approximately 3 months. The animals were located nearly daily and their positions mapped. At the end of the study, the transmitters were removed and the toads released. From the data information on the habitat use of the toads was calculated.

All procedures were performed in compliance with relevant laws and institutional guidelines and approved by an appropriate institutional committee.

In 2006 calling males were inventoried every other week, at night, along three fixed routes. By day characteristics (vegetation, water quality etc.) of the reproductive water as well as from nearby water where no calling was recorded, were noted. In 2007 the reproduction process of natterjack toads was intensively monitored at 33 locations. From the data habitat characteristics for successful reproduction were distilled.

Major conclusions

The natterjack toads showed a preference for their reproductive waters and its banks. Landscape resistance was highest for arable land. Ditches take up a big majority of all the freshwater surface area, therefore the majority of the natterjack toad population (75%) occurs in ditches. Reproduction was successful at 76% of the monitored sites, with a lower success rate in ditches than in other water types. Barns and sheds are essential for the hibernation of the natterjack toad. Three arterial roads form effective barriers for the toads, dividing the study area in three parts and by this in three separate populations.

Currently, there are no guarantees that the population of the Natterjack toad in the Northeast Polder is viable and therefore the situation for the toad is indicated as '*moderately unfavourable'*. In order to obtain a viable population focus should be on maintenance and design of ditches. This way, a lot of result with relative little effort can be gained, as the water system is so extensive and technical measures can be taken easily. Additionally specific sites (aquatic and terrestrial) should be developed and maintained especially for the natterjack toad in order to obtain a more or less stable population size.

[24] Rijsewijk, van. A.C., W. Bosman & R. Zollinger. 2005. Gebiedsdekkend onderzoek naar het voorkomen van de rugstreeppad (*Bufo calamita*) in de provincie Flevoland. Stichting RAVON, Nijmegen (in Dutch).
[25] Spitzen-Van der Sluijs, A.M. 2006. Literatuurstudie rugstreeppad. Stichting RAVON, Nijmegen (in Dutch).
[26] Spitzen-Van der Sluijs, A.M., R. Zollinger & A.C. van Rijsewijk. 2007. Ecologisch onderzoek aan de rugstreeppad in de Northeast Polder. Stichting RAVON, Nijmegen (in Dutch).

3.4 Guarantees

Project group
In order to provide guarantees for implementation of the SMP in the activities of the stakeholders, a project group of all stakeholders will be created. This project group will convene twice a year and will monitor the progress of the process of implementation of the SMP and the population of the Natterjack toad. The agenda will consist of the following items:

- The establishment of a short-term goal to be realized.
- Evaluation of the progress of implementation of the SMP.
- Evaluation of the development of the population of the Natterjack toad.
- Discussion of successes and problems with the implementation of the SMP, and ways to solve problems.

Monitoring program
With the monitoring program, all newly created habitats will be surveyed once every two years. Every five years, the whole polder must be surveyed on the level of kilometer squares. The monitoring of newly created habitats must answer the following questions:

1. Are newly created habitats actually used by the Natterjack toad?
2. In what densities is the Natterjack toad present in these habitats?

The monitoring of the whole polder must answer the following questions:

1. Has the distribution area, expressed in a number of occupied kilometer squares, doubled?
2. Have the density of groups of calling males, and the number of males per calling group increased?

Financial aspects
Activities that will be deployed as a result of the SMP are adaptation of existing protocols for management and spatial developments, creation of new habitats, management of new and existing habitats and monitoring. The implementation of the protocol for existing management and spatial developments will be financed by each stakeholder involved. The measures for creating new habitats will be financed using a national budget for developing the countryside. The SMP will serve as a basis for obtaining subsidies for a master plan for the entire polder. Maintaining new habitats can be subsidized by a national program for management of natural areas and nature friendly farming. Furthermore, companies will be invited to contribute to the SMP and by sponsoring the creation and maintenance of new habitats for the Natterjack toad. Agreements on financing the monitoring program were not made during the process of creating the SMP. However, the province and municipalities have stated that possibilities for funding the program exist.

4. Evaluation of the SMP and the planning process

4.1 Strengths and weaknesses of the SMP

The SMP has the potential to be an instrument that saves time and money, by preventing unnecessary legal procedures, and creates much better survival conditions for a strictly protected species at the same time. As such it has economical as well as ecological advantages. Procedures for spatial developments will be streamlined, regional cooperation will improve and many other species will profit from the SMP. The plan has a strong ecological underpinning and is supported by all relevant stakeholders in the region, which is highly important for acceptance by the national and European authorities. It is also a very practical instrument, containing concrete guidelines for dealing with the Natterjack toad. Finally, the SMP provides a number of guarantees for its implementation and making sure the measures will have the desired effect.

Weaker aspects of the SMP are the fact that it depends on the voluntary involvement of the stakeholders and that it concerns only one species. There is a fairly high chance that (some of) the stakeholders will continue with their business as usual, without implementation of SMP. This will benefit economic goals but not the population of the Natterjack toad. It will also mean that the number of illegal activities will increase. On the other hand, the SMP is not a guarantee that action groups will not try to obstruct spatial development projects by appealing to existing legislation. Because the SMP concerns only one species, the stakeholders will still need to apply for dispensation for all other protected species they encounter. They may feel discouraged to continue implementing the SMP after a number of procedures.

4.2 The planning process

Key success factors in the process relate to ecological information, legal aspects and stakeholder involvement. Important throughout the whole process was the ecological basis. RAVON carried out a thorough study in 2006, 2007 and 2008 concerning distribution, habitat use as well as the reproduction success of the Natterjack toad in the Northeast Polder. Together with a literature study, this information provided the knowledge required for determining the current conservation status as well as the conditions for a favorable conservation status of the Natterjack toad in the polder.

Another success factor is the close alignment with goals and regulations in the relevant legislation. Important guiding principles are made operational and implemented in the SMP. The plan is explicitly aimed at developing the population to a sustainable level and guaranteeing the favorable conservation status (which is the ultimate goal of the legislation). The third category of success factors relates to the involvement of all stakeholders from the beginning and careful communication about all relevant issues. Consensus about the importance of creating a SMP, the current conservation status of the Natterjack toad, key factors for reaching and maintaining a favorable conservation status of the species in the region, and guarantees had to be reached in every phase of the process. Finally, it has been very important that all stakeholders were willing to cooperate with each other.

5. Discussion

Integration of economical and ecological considerations in day-to-day practice may provide new opportunities for reaching goals of nature protection legislation, in combination with ongoing economical growth. It also has the potential to improve the image of economic stakeholders as well as proponents of nature conservation. Furthermore, this approach can create more possibilities for nature development, and therefore a higher biodiversity, because more parties are motivated to invest in nature oriented measures. However, the feasibility and desirability of applying the new approach must be judged for each particular situation. It can certainly be considered a valuable option for regions that harbor strictly protected species with a wide distribution.

There is also an important potential downside. A broad application of the concept behind the SMP presented in this paper may lead to a situation where the legal background of the concept is eroded. The proactive approach presented in this paper makes maintenance of the law in the field superfluous and limits options for public participation by civilians who are not part of the set of stakeholders. It also undermines the ability of legal authorities to enforce measures that are obligatory from a legal point of view.

Before this point is reached, however, the concept and the SMP will first have to be approved by the Dutch Ministry of Nature Management and accepted by the European Commission. Since the SMP does not comply with a strict interpretation of the legal regulations, this will probably be a delicate and difficult process.

Future developments
The Dutch Ministry of Nature Management indicated early in the process that three possible pathways could be followed. The first option would mean that all the stakeholders in the Northeast Polder who committed themselves to the SMP would be free from the obligation to apply for dispensation. The second option would entail a generic dispensation for activities specified in the SMP. A third option, for the long run, would be the adaptation of the legal framework. This would mean general exemption for activities and regions where a SMP has been constructed. At the time this paper was written, a request for a generic dispensation for activities specified in the SMP, was being processed by the Ministry.

In any case, this process fits well with the general trend to develop a proactive approach to nature conservation, in which conservation measures are integrated into economical activities. One way or the other, this is probably the best option we currently have for reaching a situation where biodiversity considerations are integrated into a sustainable economy.

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