

# Adaptive Management in Specially Protected Areas Implemented by the Nature Conservation Agency of the Czech Republic

Pavel Pešout, Eva Knížátková

In the Czech Republic, Specially Protected Area<sup>1</sup> management has been one of the most important tasks of the State Nature Conservancy since the 1990s. Due to improving the knowledge of species and natural habitat distribution and their development as well as increasing uncertainty caused by incomplete knowledge of impacts resulted from extensive

anthropogenic land-use changes and current and predicted climate change, a traditional long-term planned blueprint management has been untenable. Therefore, the Nature Conservation Agency of the Czech Republic (NCA CR) decided to apply in practice adaptive management (AM) and to introduce necessary information and economic tools for its implementation.

## Why we establish protected areas?

Since the beginning, a main motive for territorial protection has been effort to provide valuable and extraordinary natural or semi-natural sites with an effective protection against destruction or damage, either by mining, building-up, intensive grazing or anthropogenic disturbance, so that they will be maintained also for future generations. Moreover,

it has step-by-step been becoming clear that just establishing a protected area is mostly not enough. For keeping quality, patterns and diversity of protected areas, it is necessary to apply other measures aiming at preserving or as the case may be at improving the state of the subject of the protection/conservation. The subject of the protection/conservation concept as having been applied nowa-

days was born from the necessity to in a reasonable way sort and unambiguously name what is the most important for the State Nature Conservancy at the respective site/area. In newly declared protected areas, particularly in the European Union's Natura 2000 network of protected areas, the subject of the protection/conservation has been defined in a declaring regulation. Nevertheless, such an explicit legislative embedding can be missing.

Habitats/ecosystems having been protected, including all their natural components, are preferably identified as the subjects of the protection/conservation. If herb-rich beech forest is the subject of the protection/conservation, not only the phytosociological aspect is taken into account: the subject of the protection/conservation also includes animals and fungi, because their presence is considered as a habitat quality indicator, thus metaphorically also indicating protection, conservation and management quality. The particular species as the explicitly expressed subject of the protection/conservation is usually highlighted, only if its importance from a point of view of the particular site/area is higher than that of the ecosystem and if the species requires the specific measures and attention above and beyond management of the respective ecosystem. Thus, it would be an umbrella species representing by its habitat requirements and selection the biotic community/assemblage as a whole. For the subjects of the protection/conservation,

long-term goals and consecutive steps to reach them are set in planning documentation for the individual sites/areas. The Specially Protected Area network as a whole aims to contribute to halt biodiversity decline and loss in the Czech Republic.

## Current Management Planning

At present, Specially Protected Area management is based on a Management Plan elaborated and approved usually for ten years. Before the plan is produced, the subject of the protection/conservation within the respective Specially Protected Area has been assessed including assessment of the previous management and other information on stressing drivers/forces or external risks. The Management Plan's author tries to take into account the results gathered. Inclusion of Management Plans into Act No. 114/1992 Gazette on Nature Conservation and Landscape Protection, as amended later, was a progressive tool closely connected with former protected area planning and health-checking (Knížetová *et al.* 1987).

Moreover, it has recently been more and more evident that the above tool has to be modified. The NCA CR only produces more than 80 Management Plans annually, thus involving a lot of human and material resources: the same is in the case of discussing and negotiating Management Plans with appropriate stakeholders and approving them. Because they are consequently used marginally, the efforts to produce them is to a large extent wasted. There are some reasons for the above fact.

Small-size Specially Protected Area Management Plans are static detailed documents whose changes require quite high administrative efforts. Small-size Specially Protected Area Management Plan outline (MoE CR 2019a) is the same for all the subjects of the protection/conservation and includes some repeated parts of the content (Knotek 2019). For a significant proportion of the Small-size Specially Protected Area's subjects of the protection/conservation, ten years is a long time, since it is necessary to flexibly react to changes within the site/area. On the other hand, in other, e.g. geomorphological or geological phenomena, it is not necessary to rewrite always the same each decade.

In the case of Protected Landscape Area (PLA) Management Plans there is the completely different situation, because although these are elaborated also for ten years and they include nature conservation goals and management principles (MoE CR



Without high-quality information on the state of the subject of the protection/conservation it is not possible to effectively implement territorial protection. A significant part of the knowledge gathering is provided by the Nature Conservation Agency of the Czech Republic's staff itself: the picture presents bird monitoring in the Lednické rybíky/Lednice Fishponds National Nature Reserve (South Moravia). © Jan Miklín

2019b), their management authorities, *i.e.* PLA administrations, are in charge of setting management objectives and particular measures. Therefore, as compared with the Small-size Specially Protected Area Management Plans which contain description of management up to the individual partial patches, the former would be more flexible. Anyhow, a missing part of the adaptive management cycle should be completed there. A significant proportion of resources (human, financial or institutional ones) allocated for management of all the areas, having been in charge of the NCA CR is spent by the differentiated PLA management. Thus, it is necessary to continuously assess whether they are spent effectively, *i.e.* for priority measures, and whether nature conservation goals have been met, therefore whether management objectives have been correctly set and whether they have been achieved.

## What is adaptive management?

As a response to high biological system dynamics, a huge range of uncertainty and nonsufficient knowledge of external factors, adaptive management (AM) was developed by C.S. Holling and C. Walters as a system to assess and manage natural resource exploitation as soon as in the 1970s (Holling 1978, Walters & Hilborn 1978). The AM is a never-ending cycle or a helix in the respective

Specially Protected Area management: it substantially is based on an iterative decision-making, *i.e.* evaluating results and outputs of the given protected area management including measurements having been applied in the field and adjusting actions on the basis of what has been learned (cf. Fig. 1). Therefore, it can be characterized as a process of repeated and permanent assessment of lessons learnt that takes into account changing ecological, social and political conditions. Contrary to the traditional blueprint management, AM is a permanent process that incorporates the outputs of previous measures, allowing to react in time and flexibly to ecosystem changes. In other words, contrary to blanket management, it is a structured, iterative process of optimal decision making in the face of uncertainty or a quasi-experiment, flexible "learning by doing" or an intentional approach to making decisions and adjustments in response to new information and changes in context.

At the same time, AM does not mean a continuous improvisation: it is an approach which simultaneously uses conservation planning methods including scenario analysis (Plesník 2010a, 2010b). Recently, the AM has been related to supporting ecosystems in providing services to humans (Birgé *et al.* 2016).



In the Lednické rybíky/Lednice Fishponds National Nature Reserve (South Moravia), the Nature Conservation Agency of the Czech Republic has been implementing adaptive management. © Jan Miklín



The AM applies knowledge gathered from formalized processes, e.g. outputs of regular monitoring or external random findings, as well as from results of intentional controlled experiments. According to presence of the methods, active AM (AAM) and passive AM (PAM) can be distinguish (Walters & Holling, Rist *et al.* 2012). In the Czech Republic, mostly PAM, *i.e.* a set of measures based on the best knowledge available, modelling and predictions, has been currently applied in Specially Protected Area management. These measures are updated and amended according to the improved and enhanced knowledge and experience. Moreover, there are dynamic ecosystems where the AAM has been in fact involved by the NCA CR (*cf.* Fig. 2).

Newly, the NCA CR aims at not linking the knowledge of Small-size Specially Protected Area management with the period of updating and amending their Management Plans, but at setting it as a continuous and permanent process. For that purpose, it is necessary to develop adequate information tools. While there was a lack of such knowledge in nature conservation, nowadays a lot of useful information which can be applied in practice and of comprehensive datasets has been available. The NCA CR's intention is to use its own intentionally gathered data, to identify relevant external information sources and to involve them into continuous assessment of the state in the subjects of the protection/conservation and fulfilling nature conservation and landscape protection goals. The permanently updated knowledge is a precondition for in time initiating changes in the management objectives, consequently also in particular measures in the field.

Future fate of planning

Management planning has been a basis of the AM cycle. In a Management Plan, long-term goals in the respective small-size Specially Protected Area have to be defined and also prioritized, or to set a process for their prioritization. The recent management plan outline (MoE CR 2019a) constitutes the cornerstone of such approach, when newly strongly highlighting definition of goals for the individual subject of protection/conservation and setting indicators; the latter will help to monitor reaching the goals<sup>2</sup>.

To meet the long-term nature conservation goals set for the individual subjects of the protection/conservation within the respective small-size Specially Protected Area, management objectives should be defined: contrary to the long-term nature conservation goals, the objectives can be flexibly changed ac-

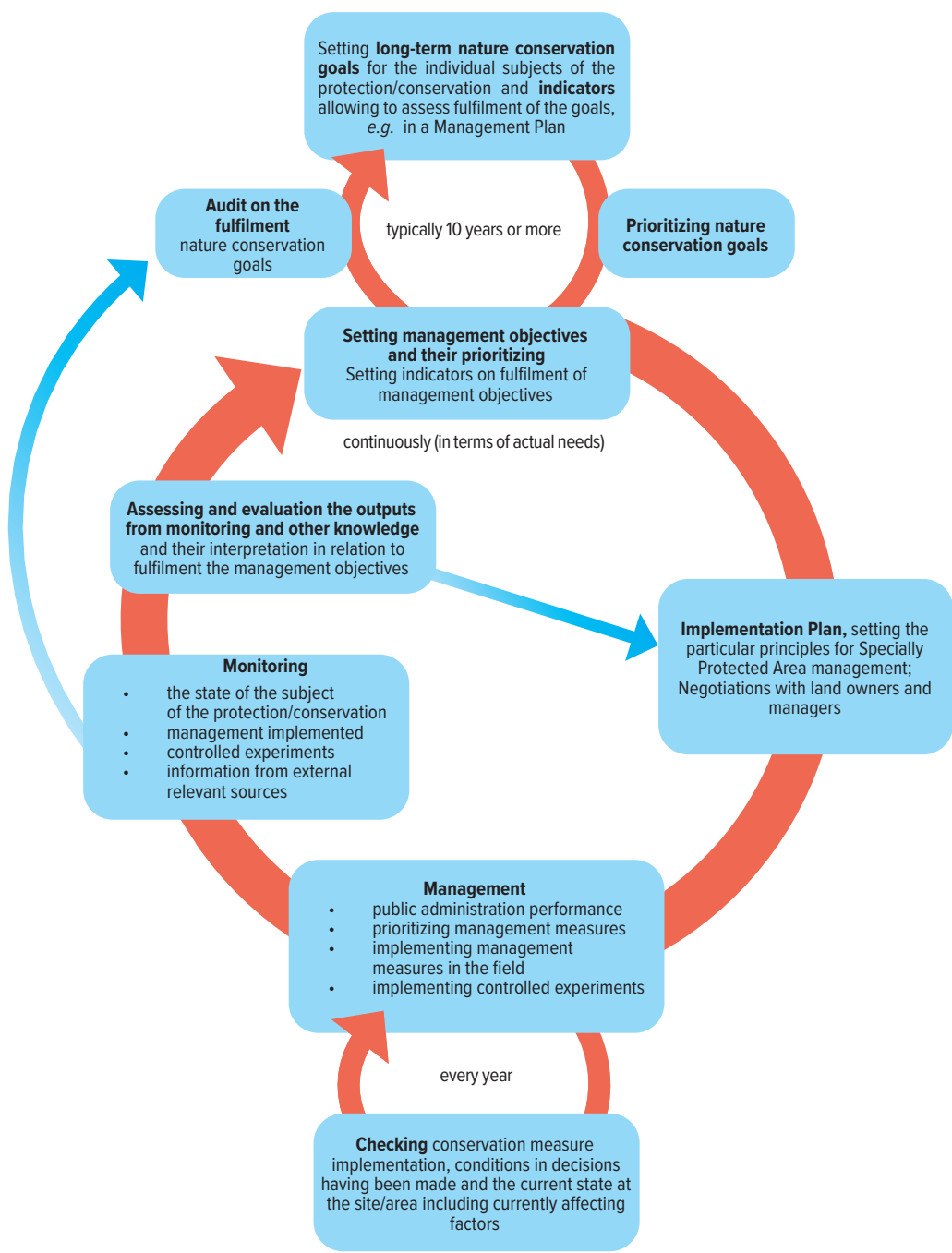


Fig. 1 Adaptive management (AM) cycle in the Specially Protected Areas in the Czech Republic  
Setting long-term nature conservation goals for each subject of the Specially Protected Area management and indicators on their fulfilment is a basis of the applied AM there. The goals are most often defined as preserving or improving of some habitat size or quality, state in populations of the targeted species, etc. For fulfilment of the long-term goals, it is furthermore necessary to specify the management objectives using the best knowledge available. The latter define the state of the environment (conditions necessary to preserve the subjects of the protection/conservation) caused by the given management. Indicators allowing to assess fulfilment of the management objectives, the so-called management indicators, are also set. The data is a part of the nature conservation planning phase. The next phase is the implementing one, covering elaboration of the particular way of the implementation and the implementation itself, either as conservation measures in the field or within the public administration performance. A key element within the AM cycle is the monitoring phase and particularly assessment of the data gathered in relation to the in advance defined indicators. The assessment together with the outputs of the targeted experiments is directly applied in possible changes or modifications of the decisions on management at all its levels, *i.e.* annual ones on modification of the implementation phase, ongoing on enhancing setting the management objectives or indicators and in the case of fundamental findings exceptionally on long-term nature conservation goals. Elaborated by Pavel Pešout, Eva Knižátková & Tomáš Pekárek

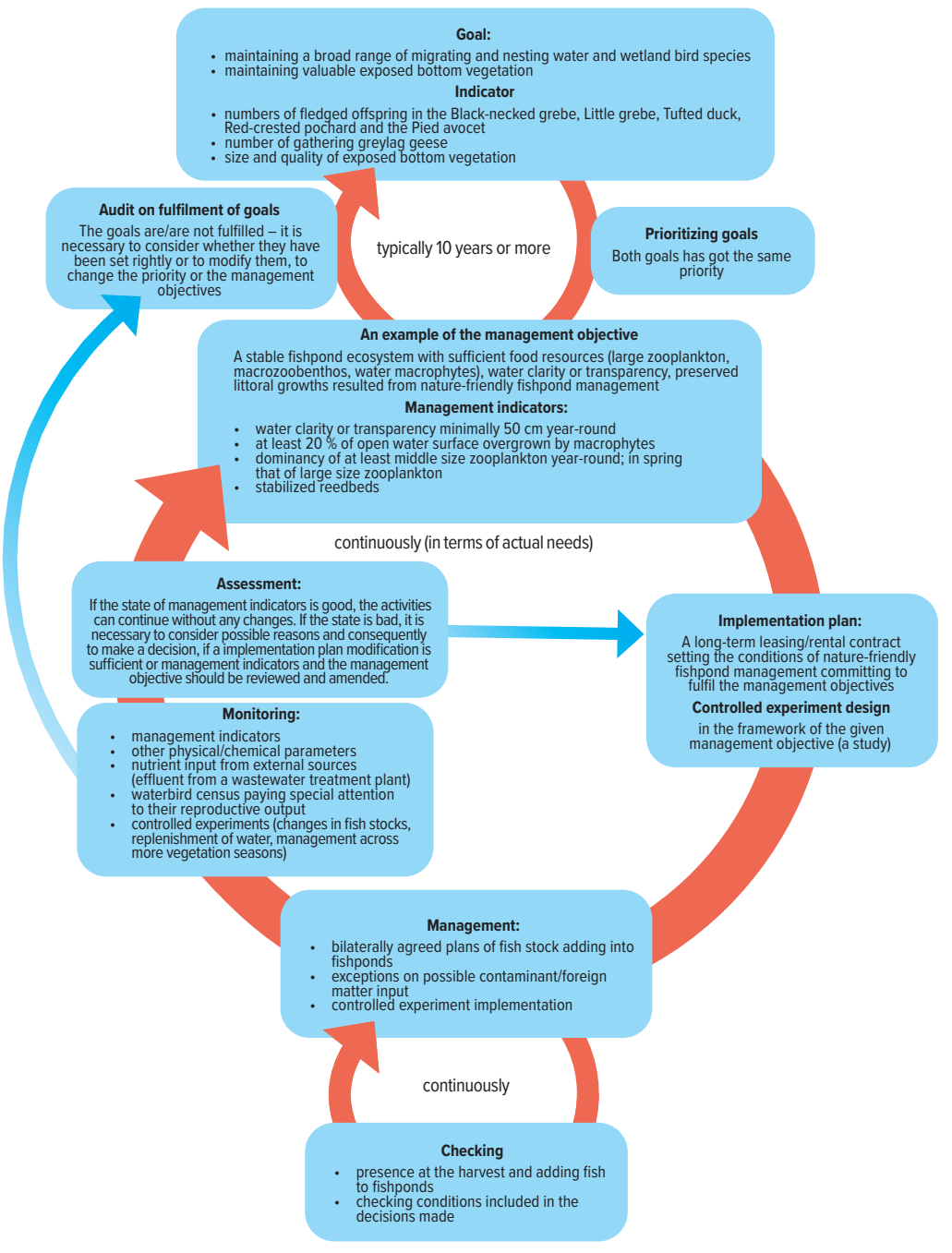


Fig. 2 The adaptive management cycle in the Lednické rybíky/Lednice Fishponds National Nature Reserve (South Moravia) presented on the example of two long-term nature conservation goals and of the elaborated management objectives of one of the goals. Elaborated by Pavel Pešout, Eva Knižátková & Tomáš Pekárek

According to assessment of monitoring the state of the subjects of the protection/conservation. Based on the management objectives, the particular activities in the field shall be consequently proposed.

Prioritization in nature conservation and landscape protection<sup>3</sup> must be carried out and also carries out at all levels where decision on using available resources for nature conservation, particularly financial, human and institutional ones, but recently

more and more contractor's capacities, is made. Also at the lowest decision-making level, *i.e.* at the level of the single particular small-size Specially Protected Area with more subject of the protection/conservation, it is necessary to develop a appropriate procedure for setting priorities. While at the national level, natural resource exploitation by humans has been driven particularly by priorities given in governmental strategic and policy documents, in the case of the particular small-size

Specially Protected Area especially knowledge of how the individual parts of the site/area contribute to meet the nature conservation goals, are taken into account. The prioritization should furthermore include the level of urgency of the measures (whether the particular is deferrable or non-deferrable), the expected effects, resources having been spent at the particular site/area (possible impairment of investments) or possible alternative solutions.

For ongoing AM's applications within the small-size Specially Protected Areas it is necessary to shift to digital Management Plans, thus supporting their possible linkage with information tools incorporating the recent knowledge into decision-making and in the future replacing usual periodical updating by permanent validity with updating if appropriate. Periodical checks can be, of course, kept. Side, but non-negligible effect of the digitalization is reducing their elaborateness, when only the part requiring improving due to new findings and knowledge is updated.

For PLAs, the NCA CR has been geo-differentially delineating areas of the field measures and has been annually prioritizing their implementation according to finances available. For the sites, nature conservation goals and management objectives are going to be defined and their fulfilment shall be systematically assessed. In this respect, the management plan for the Krkonoše/Giant Mts. grassland/meadow sites (Hošek & Janata 2017) can provide a suitable inspiration.

Changes in Conservation Measures Implementation in Practice

Already now, when implementing conservation measures in the field, the respective Specially Protected Area's manager seeks in the absolute majority of cases for involving the current knowledge. Difficulties emerge when there is no support for the necessary measure in the valid Management Plan, or even if the Management Plan goes against the measure. Within the AM, taking new knowledge, findings and experience into account shall be on the contrary a fully standard and common procedure. Decision should be made by the staff responsible for the particular Specially Protected Area management who well knows the site/area.

Particularly when responding to climate change impacts and permanent changes in land-use caused by humans it shall be necessary to allow to imple-



ment to a very large extent and a lot more than now alternative and experimental measures in the Specially Protected Area management. It has to be, of course, a managed and controlled procedure which at the beginning presents reasons why the experimental procedure should be applied, namely which information is wanted, as well as the description how the outputs from the experiment shall influence future decision-making in the particular Specially Protected Area or commonly applied measures.

For supporting the measures implemented within the AM framework, it is necessary to review and newly set some parameters and conditions in subvention programmes/subsidy schemes.

Cooperation with stakeholders within AM

At present, Management Plans are negotiated with important land owners and managers every ten years. Moreover, seeking for more flexibility in Specially Protected Areas planning and management, particularly in decision-making on priorities, extent and implementation of measures in the field, must not reduce the cooperation. On the contrary, land owners and managers have to be involved continuously in planning, so that the consequent decisions on changes in the particular Specially Protected Areas will be understandable to them. This would not make difficulties, because nowadays each nature conservation measure or intervention has been negotiated with each land owner/manager. On average, in one third of the cases, namely in 33.2% in 2019, the NCA CR concludes a public contract with land owners and tenants on providing management measures by them and the proportion has been continuously increasing. In addition, there have been more and comprehensive contracts on management with owners which directly set such a bilateral communication (Pešout & Šmídová 2012).

Adaptive management risks

When considering a shift to continuously applied AM we should be aware of the related risks (Walters 2007). The AM is subject to huge requirements on expertise and knowledge in decision-making. On one hand, a Specially Protected Area manager is provided with higher competence, on the other hand it means higher responsibility for him. The above fact can be related to the risk of higher possibility to make a bad decision under inadequate competence, but also to the unwillingness of Specially Protected Area managers to take



For preserving the subject of the protection/conservation in the Lednické rybíky/Lednice Fishponds National Nature Reserve fishpond management is needed. For fulfilling the management objectives, the Nature Conservation Agency of the Czech Republic concludes long-term leasing/rental contracts setting the conditions and commitments to meet the management objectives measured by key performance indicators, e.g. water clarity or transparency and the state of macrophytes and zooplankton. © Vlastimil Sajfrt

responsibility. Lack of resources for monitoring the management, particularly under more extensive range in applying alternative and experimental approaches, processes and procedures, poses another risk. In addition, AM places exact higher demands on expert/technical knowledge of executives and managers during the decision-making procedure in promoting the AM’s whole cycle.

By the year of 2027

For implementing full-fledged continuously applied AM, the NCA CR has developed and has been implementing some complementary projects.

Without high-quality up-to-date information on the occurrence and state of the selected species in Specially Protected Areas, AM cannot be carried out. Gathering such information is a part of the project entitled as *Monitoring and Mapping of the Selected Wild Plant and Animal Species and Inventory of Small-size Specially Protected Areas in Nationally Important Sites/Areas in the Czech Republic* funded by the Operational Programme “Environment” (OPE) financed from the European Union’s budget and co-financed from national sources.

In one of its key activities, the *Planning Documentation for the Selected Sites/Areas of National Importance* project, also supported from the OPE aims at assessing fulfilment the nature conservation goals at the Sites of European Importance (pursuant to Act

No. 114/1992 Gazette on Nature Conservation and Landscape Protection, as amended later, the term for Site of Community Importance, SCI under the European Union’s Habitats Directive), whereas it focuses on assessing the state of the subjects of the protection/conservation in relation to affecting factors or drivers and implemented management. The data gathered will be used both to improve future management in the field and to make possible changes in the planning documentation, if appropriate.

Although the NCA CR has currently had a lot of high-quality background information sources in relatively user-friendly environments of electronic tools (e.g. the Nature Conservancy Species Occurrence Finding Data Database, National Habitat Mapping Layer, database on implemented management measures funded from landscape management subvention programmes/subsidy schemes and many others) there are data sources and processes which have not been linked with the former: therefore, taking into account the latter in decision-making has been excessively time-consuming. The *Unified Information Nature Conservation System of the Czech Republic – a Tool for Supporting Assessment of the State of Protected Areas and Protected Species* project, abbreviated as *ISOP 2* has also been funded from the OPE and its target is digitalization of some important processes, e.g. the above Management Plans elaboration digitalization that would consequently strongly facilitate

The Integrated LIFE project „One Nature“

Most activities necessary for applying AM in practice have been implemented by the Nature Conservation Agency of the Czech Republic (NCA CR) as well as by other State Nature Conservancy authorities. Moreover, something has still be missing for the functionally interlinkage among the individual components of the AM cycle and for setting such innovation into motion. The integrated LIFE project One Nature aims at complementing the above elements. Applying AM in practice cannot be possible without knowledge capacity development. Therefore, in addition to developing practical tools within the project, education of the State Nature Conservancy staff has become an integral part of the project. Thus, not only the NCA CR’s staff, but also colleagues from Regional Authorities, Military Training Area Offices and National Park Administrations shall be offered to participate in the education and training courses. It is well known that nature conservation is not all that one and only player influencing viability of specially protected species populations and the state of habitats. Consequently, when assessing the management we shall take into account, if the available data allows that, also external factors/drivers, e.g. climate change or atmospheric nitrogen deposition. Significantly, the project also includes more intensive communication with land owners and managers. Their activity (or on the other hand, inactivity) substantially influences the Specially Protected Areas’ future direction. Thus, establishing new relations to these partners and maintaining old ones, raising their awareness of nature conservation and reaching

a full understanding and a mutual consensus on the long-term management on their land are among the important project’s goals. The project primarily deals with the EU Natura 2000 network sites managed by the NCA CR, moreover some activities, e.g. monitoring and assessing the state of the subjects of the protection/conservation shall be implemented at all the sites. Nevertheless, the project’s goals also include transfer all the tools made and know-how gathered and learned to all sites/areas within a national network of Specially Protected Areas in the Czech Republic. Benefits provided by the EU Natura 2000 network sites and natural ecosystems in total to human well-being shall be assessed during the course of the project, too. The topic will be more elaborated by a special article to be published in some of next Ochrana přírody/Nature Conservation Journal issues. The project is scheduled from 2019 to the end of 2026 and the Ministry of the Environment of the Czech Republic is its coordinating body. In addition to the NCA CR, the Charles University Environment Centre Prague, Global Change Research Institute (Czech Globe) of the Czech Academy of Sciences Brno and the SoWa (Soil and Water) Research Infrastructure, a part of the Biology Centre, the Czech Academy of Sciences České Budějovice have also been participating in the project. Further information is available on the project’s webpage [www.jednapriroda.cz](http://www.jednapriroda.cz). (Elaborated by Iva Hönigová & Zdeněk Brož)

their application in annual considering priorities in implementation of nature conservation measures in the field and introducing supporting and subsidiary tools for mostly missing monitoring the state and assessment of the particular sites/areas.

Finally, the Integrated LIFE project *One Nature (LIFE-IP: N2K Revisited - LIFE17 IPE/CZ/00000)* develops a lot of processes and relations which are essential for introducing the effective AM. In the AM’s context, it is particularly important that the project pays attention to assessing the state of the subjects of the protection/conservation at the sites/areas, management having been implemented, active management prioritization, experimental management, involving knowledge into planning documentation and into negotiations on management measures with land owners and managers (for more details, see Box up).

After implementation of the above projects, management of most of the small-size Specially Protected Area in charge of the NCA CR shall be carried out as the continuously updated AAM.

What is a main benefit?

An AM successful introduction in the Specially Protected Areas managed by the NCA CR is conditioned by facilitating use of many results gathered during biodiversity monitoring provided by the NCA CR as well as of a huge range of external data and findings. It will allow taking the current knowledge into account within the operational decision-making on setting or changing management objectives, choice of the particular nature conservation measures as well as within public administration performance. At the same time, the conservative traditional approach has been main-

tained in changes in the long-term nature conservation goals set for the individual subjects of the protection/conservation within the respective Specially Protected Area. Well-set AM supported by fully built information tools and modified economic tools would significantly reduce routine activities of Specially Protected Area managers and conversely guarantee early knowing the state of implementing the management indicators and long-term nature conservation objective indicators. Moreover, all automatized and standardized processes do not reduce individual decision-making of Specially Protected Area managers. Nevertheless, the AM success will depend on their correct interpretation of the current knowledge, assessment long-term development in the subjects of the protection/conservation and on experience.

Notes:

<sup>1</sup>Pursuant to Act No. 114/1992 Gazette on Nature Conservation and Landscape Protection, as amended later, in the Czech Republic Specially Protected Areas are areas which are highly important or unique from the point of view of natural science or from the aesthetic point of view. There are six categories of Specially Protected Areas (in brackets number as of April 30, 2021): National Parks (4), Protected Landscape Area (26), National Nature Reserves (111), National Nature Monuments (125), Nature Reserves (814) and Nature Monuments (1,591). National Parks (NPs) and Protected Landscape Areas (PLAs)are considered to be large-size Specially Protected Areas and they can include small-size Specially Protected Areas, i.e. the other categories which are also located outside the NPs and PLAs. PLAs are managed by their administrations which are a part of the Nature Conservation Agency of the Czech Republic. The NCA CR also manages National Nature Reserves and National Natural Monuments (they are at least of national importance) outside the National Parks. In total, the Specially Protected Areas cover 16.7% of the Czech Republic’s territory.

<sup>2</sup>The authors are going to deal with elaboration of small-size Specially Protected Area Management Plans in some of next Ochrana přírody/Nature Conservation Journal issues.

<sup>3</sup>A new discipline – conservation planning – aims at setting priorities in species, territorial and ecosystem protection/conservation/management (Margules & Pressey 2000, Pressey 2004, Hurford 2017).