**Swiss-Estonian cooperation programme (Environment Agency)**

**Temporary jobs for the Environment Agency**

General Project Coordinator (full-time, period 2024-2027) – responsible for the project team management and the implementation of the actions, preparation of the public procurements, documentation and budget, organizing study trips, communication and translation of the documents.

Monitoring specialist (full-time, period 2024-2027) – responsible for the development, testing and implementation of new monitoring methodologies, including contribution to the preparation of the acquisition of mobile 3D bird radar and responsible for the implementation and integration of the equipment into the national monitoring methodologies. In cooperation with scientists and technical experts, map possible novel methodologies, solutions (eDNA) and equipment (night observation equipment, transmitters, remote sensing solutions, etc.) to be used in the wildlife and ecosystem monitoring. Arrange testing of mapped novel monitoring methodologies, equipment, and solutions. Also, monitoring specialist will be responsible for the involvement of volunteers and organization of the campaigns.

Monitoring assistant (full-time, period 2024-2027) – additional employee, who will help to implement the new REM (Random Encounter Model) methodology, contributes to the collection of data through track cameras, data management and training of the artificial intelligence (AI) to be created. It is more cost-effective to hire a person than outsource the service. It also ensures operational efficiency and better control of the work.

Development of new methods, technology, and approaches, like REM and eDNA methodologies for example, are especially important regarding climate change and cost efficiency because of the demand for more and higher quality data. Some of the field works (e.g., track counting) is currently done in winter and the presence of snow cover has been always essential for data collection. Due to the climate change, there are winters with poor snow cover and some areas might be entirely snow-free. Alternative solutions are necessary to adapt with new conditions and for that REM is one methodology to be tested. Also, high-quality data on species and ecosystems distribution is necessary for the transition of green energy and preparation of the developments of wind farms. For that reason, eDNA analysis has potential and should be tested. Since collecting more data means more work, we need to find solutions to do it more cost-effectively. Also, as the number of experts is limited, we need to develop alternative solutions that could reduce human work. These are the main challenges in wildlife monitoring, but this is also an opportunity to take wildlife monitoring to the next technical implementation level.

IT specialist (part-time, workload 0.5, period 2024-2027) – contributes to the compilation of the initial IT tasks: advises the IT developer, tests and introduces the results. A person with the same load will start working in the IT Centre of the Ministry of the Climate in the period 2024-2027.

Data specialist (full-time, period 2024-2027) – organises the entry and updating of data in Estonian Nature Information System (EELIS) collected within the framework of inventories ordered by the Environmental Board. Also contributes in the development of IT systems.

TOTAL: 4 temporary jobs for the period 2024-2027 and one person from the Environmental Agency with a workload 0.5 will be dedicated to the project.

**Project activities and results**

Acquisition of mobile 3D bird radar – due to the geographical location of the country, being on the conversion area of the migration routes of many bird species, there is a very topical need in Estonia to develop a monitoring capability based on modern mobile 3D bird radar technology, for which there are no alternative solutions (e.g., weather radar). Improving our monitoring capabilities will give us better and more comprehensive knowledge of the use of migratory corridors by different bird species, including their flight altitudes, which will help to ensure their protection in the development of wind farms and other possible large scale construction developments. Radar will be used for national monitoring, as well as for studies of major national importance. Device it is necessary for the collection of operational and high-quality data, which ensure better knowledge, for example, when making decisions and approving plans. Details of the technical requirements for the radar will be set up with experts during the first year of the programme, including study trip (2-3 persons) to country in Europe, where device provider and/or most relevant type of usage has been appearing. Most likely it will be Netherlands, where radar usage for bird migration monitoring as well as solutions for wind farms, but also one of the top radar producers are present.

As an alternative, it is possible to rent the system for a minimum period of 1 year, the cost of which is 250 000 euros without a maintenance contract. The closest country where it could be rented is Poland and waiting lines could be 2-3 years, which doesn`t ensure sufficient operational efficiency in collecting data to meet Estonia's needs. The expected lifetime of the system is 10-15 years. After that, the system is morally obsolete and should be replaced. Considering the rental costs and expected lifetime, the purchase of the equipment pays off in 3-4 years and it could be used at least 6-10 more years if purchased.

Results: acquisition of mobile 3D bird radar, the use of which has been integrated into national monitoring methodologies.

Wider deployment of REM methodology and training of Artificial Intelligence (AI) – The Environment Agency has tested the REM method to collect data in a small area using track cameras and created a prototype of AI that can identify different animal species from track camera photos and assess their abundance. The prototype will be further developed, and 700 track cameras have been procured (financed from the European Union Cohesion Fund), allowing them to be installed all over Estonia. So, it is a very good timing to start implementing Swiss-Estonian cooperation programme from the beginning of 2024 as the main fieldwork period for REM will be spring and autumn. New cameras will be placed in the nature with the help of new specialist (monitoring assistant) first time in Spring 2024. It is a good example, how to use two different funding mechanism to create synergy and increase the impact of the investments and accelerate the progress. In order for the new methodology to justify itself and replace currently used traditional methods - excrement and animal track counting - it is necessary to apply the new and old methodologies in parallel. A prerequisite for the introduction of the new methodology is to train AI more intensively, as well as to collect training material. Over the next years, the number of track cameras and photos they take, will increase at least by 7 times, which means more workload to install and maintain them and to work through the photos cameras automatically take. It is temporarily necessary to hire a person to introduce a new methodology and train AI, which would allow replacing the old methodology with a new one. Use of new, automated methodology ensures better quality of data and decisions, a decrease in subjectivity and data will no longer depend so much on weather (currently used method, animal track counting takes place in winter and it is very important to have snow cover, but because of climate change, winters in Estonia have become milder and there are fewer snow-covered days, which also directly affects the quality of the data).

The activities are under the responsibility of a monitoring assistant. It is more cost-effective to hire a person than outsource the service. It also ensures operational efficiency and better control of the work.

Output: AI trained, REM fully developed and tested.

Result: The REM methodology has been applied all over Estonia. Alternative method for monitoring of the game species developed and time-consuming photo-analysis automated with usage of AI.

Acquisition and testing of new technologies for wildlife biodiversity monitoring – the aim is to map and test new technologies and solutions in wildlife monitoring to increase the quality and reliability of data. More specifically, the ambition is to create remote sensing solutions for mapping the spread of forest losses and reeds, automatic renewal of the maps of ecosystem services completed in previous projects, acquiring modern technology and testing them in wildlife monitoring (new night observation equipment for monitoring e.g. Western Capercaillie (*Tetrao urogallus*) and Great Snipe (*Gallinago media*), drones with thermosensors, binoculars measuring height and distance for bird monitoring, etc.). Technologies and solutions must be mapped in cooperation with the experts in the field, which is why the list of activities is left open. It is foreseen that at least 2 study trips (each at least for one project specialist and/or one expert) will be arranged in order to get experiences of best practice of different technologies in use in wildlife monitoring in Europe. Countries and relevant institutions, where these study trips will be arranged will be selected during the first year of the programme in discussions with monitoring experts, in order to get best experiences needed. If possible, one study trip (for on specialist) will be organized to United States to learn best practices how to monitor and catch wolves using most efficient and novel methods. Wolf related conflicts are increasing and more accurate data is demanded by different stakeholders (farmers, hunters, decision makers, wolf protectors). Estonia has one of the best systems in Europe for monitoring protecting wolves, but this is still insufficient, but unfortunately there are no countries in Europa whose methods suits us and from whom we could learn. US is the leading country in the world regarding monitoring and protecting wolves and they have the long-term experience how to reduce conflicts and at the same time maintain the good status of the species.

The activities are under the responsibility of a monitoring specialist. It is more cost-effective to hire a person than outsource the service. It also ensures operational efficiency and better control of the work.

Output: new methodologies/solutions have been tested and integrated into wildlife monitoring programme.

Result: These new methodologies/solutions can supplement or replace existing ones. Data volume and quality improved.

Environmental DNA (eDNA) testing in wildlife biodiversity monitoring – use of eDNA in biodiversity monitoring is a rapidly developing field, but its potential has not yet been tested in Estonian national biodiversity monitoring. It is a method that would provide additional important information about the distribution and abundance of species in a habitat (e.g., in a water body) without disturbing them. In addition, DNA analysis should be used for a species of non-favourable state (e.g., flying squirrel, European mink, etc). Potential species or species groups will be mapped, pilot areas will be selected and eDNA usability will be tested for biodiversity monitoring. For best practice purpose at least one possible study trip within Europe is foreseen for at least 1 person in order to get overview of the cases when eDNA has been used successfully in wildlife monitoring. Most relevant destination in Europe for that study trip will be set up during discussions with experts within the first year of the programme.

The activities are under the responsibility of a monitoring specialist. It is more cost-effective to hire a person than outsource the service. It also ensures operational efficiency and better control of the work.

Output: usability potential of eDNA is evaluated, method is tested and where appropriate it is integrated into wildlife monitoring methodologies.

Result: Data volume and quality is improved, cost-efficiency is increased.

Promoting citizen science and creating network of volunteers – use of citizen science and involvement of volunteers in environmental monitoring is an increasingly important topic around the world. It creates new opportunities to engage people, collect more data and improve the quality of data, promote cooperation between different parties, involve civil society organisations in policymaking, prevent and solve problems as well as increase environmental awareness in society. Among other things, it helps pay greater attention to emerging environmental problems, prevent loopholes both in legislation and monitoring data as well as improve data collection process.

One way to improve wildlife monitoring is to combine it with citizen science. It can involve more people and cover a larger area than can be done in the classical context of wildlife monitoring. Wildlife monitoring is costly, as a result of which monitoring points/areas have been selected, but volunteers are able to cover larger areas and more common species. This will increase the volume of data collected and the possibility of improving the quality of the work done (analyses, summaries, reviews, assessments, etc.).

The Environment Agency has created a mobile application called Nature Observation Application, which will be further developed in 2023-2024 (funded by the EU Cohesion fund). This has provided the basis for campaigning and the involvement of volunteers. In addition, it is planned to develop a web form that would allow observations to be entered from the computer, including mass data. It is important to establish a functional network, train trustees and consistently involve volunteers in data collection as well as in analysis and decision-making. It is also important to recognise volunteers and motivate them. The Swiss-Estonian cooperation programme creates opportunities for network expansion, for more campaigns and for bringing citizen science in Estonia to the next quality level. It is important to reach more people and ensure bilateral communication. To involve and recognize volunteers, different actions will be implemented, including several campaigns and networking events over the next four years.

After the end of the Swiss-Estonian cooperation programme, Environment Agency will maintain the results and continue to involve volunteers in wildlife monitoring that will be financed from the agency`s budget. Our experience with involving volunteers in the monitoring of amphibians has shown that it could complement the data of national monitoring and reduce costs. Such way saved monitoring budget could be used in the involvement of volunteers even better way and maintaining the working network.

The activities are carried out under the responsibility of a monitoring specialist. The same person is also responsible for developing and testing new monitoring methodologies. It is reasonable to reconcile the two actions.

Output: a network of volunteers is created. At least 20 campaigns (some campaigns will be repeated every year) have been organised in 4 years: 2 bigger events for volunteers. Voluntary monitoring is integrated into wildlife monitoring methodologies.

Result: involvement of volunteers in wildlife monitoring is improved and data volume is increased.

Development of IT systems – in Estonia national monitoring data is kept in the Environmental Monitoring Information System (KESE) and information of protected species and nature observations is kept in the Estonian Nature Information System (EELIS). Data about the protected species is currently copied manually from KESE to EELIS, which is time consuming and therefore there is a risk, that relevant and updated information is not used in decision making and analysis. Necessary business analysis has been done and according to the analysis, this work can and should be automated.

There are also other information systems and databases in Estonia that collect and keep wildlife data, but do not belong to the Environment Agency. The data of these databases could also be used for analysis and decision-making. One such information system is eBiodiversity Portal (using online and citizen science based database called PlutoF) which is managed by the University of Tartu. It is necessary to ensure an interface between these data systems and set up the exchange of data to ensure that most complete set of data is taken into account in decision-making. This also ensures the convenience of using the data, as the data does not have to be searched from different systems. Often the data is not used because it is not easy to collect it from different databases and it leads to ignorance by the decision makers and analysts.

To this end, the necessary connections and automation of the cross-flow of data need to be established. It is also important to make data interactive, allowing the user to process and visualise it more quickly. As much as possible data must be made public and cross-usable, which, among other things, contributes to increasing environmental awareness.

Also, in order to facilitate fieldwork, it is necessary to create a fieldwork tool that allows the field-workers to enter the monitoring and inventory data directly to the system already in the field. This would reduce the workload of officials and ensure a faster data delivery into system. One of the problems today is the fact that new data does not reach the systems operatively and is not taken into account in decision-making. It is essentially a matter of mobile application for field-workers.

It is also necessary to create a management efficiency assessment tool for the Environmental Board into EELIS. It should help officials assess the efficiency of the management of protected areas. The necessary tool/method is currently being developed, and the next step is to create the necessary IT solutions where it is possible to assess management of the protected areas more efficiently.

IT specialist working in the Environment Agency and IT specialist working in KEMIT will be responsible for the IT developments (developer, contact for the developers).

Output: the necessary connections and tools for the exchange of data between the IT systems have been established; management efficiency tool in EELIS has been created; fieldwork tool has been created.

Results: time-consuming manual human work is decreased, data transfer between different IT systems is improved and quality of the automated analysis is increased. Thanks to this, quality of the environmental decisions is improved.

Procurements:

The Environmental Agency in collaboration with The State Shared Service Centre (RTK) organises the following procurements for the implementation of the project activities:

— Acquisition of 3D radar (international procurement);

— IT procurements (two or more);

— A public procurement for the testing of eDNA;

— Procurement of equipment, if necessary.

Procurements are organised on the basis of the Public Procurement Act and the procedure for conducting procurements of the Environmental Agency.