



LIFE Project Number  
<**LIFE09 NAT/SE/00034**>

**FINAL Report**  
Covering the project activities from **01/09/2010 to 31/08/2013**

Reporting Date  
<**30/11/2013**>

LIFE+ PROJECT NAME or Acronym  
<**MIRDINEC**>

Data Project

<b>Project location</b>	Sweden, Finland, Denmark
<b>Project start date:</b>	<01/09/2010>
<b>Project end date:</b>	<31/08/2013> <b>Extension date:</b> <dd/mm/yyyy >
<b>Total Project duration (in months)</b>	<36> months <b>Extension months</b> <XX> months)
<b>Total budget</b>	€ 5.318.278
<b>EC contribution:</b>	€ 2.659.139
<b>(%) of total costs</b>	50
<b>(%) of eligible costs</b>	50

Data Beneficiary

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## 2. Executive Summary

### General progress

The administrative part of the project has proceeded well. Organisation/co-ordination of the project has been conducted successfully both at the project- and the national levels.

Fighting invasive alien species is difficult and it takes time. Often it is impossible to eradicate the species if the population is connected to other populations and then the focus has to be on containment rather than on eradication, trying to stop the species from dispersing to other areas or to other countries. In our case with the raccoon dog (*Nyctereutes Procyonoides*) in Scandinavia we have come a long way during just a few years.

The technical (conservation) part of the project has proceeded very well and we fulfilled many of our goals several months before the end of the project period. We have set up Early Warning Systems (EWS) in all countries. The EWS has delivered many early warnings of invading raccoon dogs. We have set up citizen science systems in Sweden and Denmark where the public report observations of raccoon dog to the project. This has been very successful and most of our culled animals are today due to reports from the public. It is however often difficult to identify an animal, especially for a layman and even within the project it is impossible to be sure sometimes, so the citizen science system has to be used with some care and be managed professionally. When observations have been confirmed, animals are (optimally) captured using traps or dogs. All captured individuals in Sweden and Denmark (both males and females) are sterilized to prevent reproduction, fitted with ear tags (to minimize the risk of shooting valuable project animals), GPS/SMS transmitters and then released. Due to the social nature of the raccoon dog (they are strictly monogamous and stay with its mate until someone die, then the survivor start searching for a new mate) the animal

will search for and lead us to other raccoon dogs of the opposite sex in the area (i.e. Judas animals).

From the project start, 1 Sept 2010, to 31 Aug 2013, 3234 observations of raccoon dog was reported to the project (only Denmark and Sweden). Out of these, 852 were confirmed as raccoon dog by the project (only Denmark and Sweden). 1401 animals were captured and/or killed (culled by project, hunters, traffic, found dead) (in Finland, Denmark and Sweden). Of the captured animals 170 individuals have been used as Judas animals. No raccoon dog has so far been confirmed outside the area where they were present before the project started.

Our population models show that the populations have not increased and that without our efforts the populations would have been much larger today than what it is at present. The models further show that the situation in 10 to 20 years' time would be very serious if we were to stop the management. Judging from the development of other populations the model is very reasonable. In Finland the hunting bag increased from 818 individuals in 1970 to 172 000 in 2009 (Kauhala & Kowalczyk 2011).

Project animals in Sweden are mainly captured as a result of observations coming in to the project. The experience of the personnel is constantly increasing and due to their knowledge alone many animals have also been captured. Judas animals are very efficient, especially in areas where animals are difficult to spot. The methods for capturing animals are constantly improved. Traps are efficient but traps adapted for raccoon dog capture would make this category even more efficient. Dogs are almost always involved in the captures, if nothing else to find the animals or as a backup if an animal escapes. In this action we have been able to demonstrate that our innovative methods are effective on raccoon dog, but also that at least some of them work on other species with similar behavior. In Denmark we got a raccoon (*Procyon lotor*) on one of our EWS cameras in southern Denmark. Within one day we were also able to cull the newly invaded IAS. Since then we have captured more raccoons, both in Denmark and Sweden.

Local hunters are invaluable for the project. In total there is almost 800 000 hunters in the project area and most of these are very interested in nature conservation. Few, if any, other groups in the society have the knowledge about hunting and about wild animals in general and about the areas where we work as the local hunters. They also spend a lot of time outdoors in these areas which make them more likely to encounter raccoon dogs as well as other species. Especially in the areas where the project activities are the most intense, hunters are often more than willing to help out. Hunters help out with observations, trapping, guiding, capturing of animals in their areas, building of e.g. traps and artificial dens, dissemination of results, spreading the word about getting observations to the project and more. This co-operation, gaining both the project and the hunters by getting rid of raccoon dogs, is very valuable and could probably also be developed with success on a European level in the fight against IAS. Very moderate rewards for their help, such as information evenings and small gifts have paid off in the form of many captured or culled animals, probably in level with the total project budget if they were to be employed. Relying solely on local hunters however, is not possible since there is a need for a professional foundation in the system as described above.

It should be stressed that even though we have not been able to confirm any animal outside the present distribution area it is quite likely there will be found some single dispersers. As seen from our results, raccoon dogs can disperse very long distances and it is important that we follow up any observation also outside the distribution area.

Dissemination of project experiences and results, on the web page, in local communities, in relevant magazines, newspapers, radio and television as well as short courses for hunters and other nature organizations and education from kindergarten to university level are all very important parts of the project. All of these actions aims at a higher awareness and larger knowledge among the public about IAS in general and the raccoon dog in particular, and has

lead to more observations being reported, and a higher quality of the observations which will enable the project to put the efforts where most needed.

The project has been very appreciated by both the public and the authorities in the project countries. The project have put focus on the fight against IAS in the project countries and the fact that it is possible to meet the treat if we act fast and work together over the county borders.

### 3. Introduction

Consistent with the objectives and in alignment with the RIO-convention on biological diversity as well as the Bern- and Ramsar conventions this project has;

- prevented damages on biodiversity.
- prevented the establishment of wild, free-living and viable population of raccoon dog in Sweden, Norway and Denmark.
- limited further increase and dispersal of the target species in Finland.
- used innovative methods to reduce and eradicate invasive species like Raccoon Dogs.
- used tagging with GPS/VHF transmitters for effective culling.
- used innovative methods to learn more about the social behaviour of invasive species.
- spread the results from the efforts in the project among hunters, local communities, ornithologists and international stakeholders of invasive species.
- improved the awareness among public to report presence of Raccoon Dogs

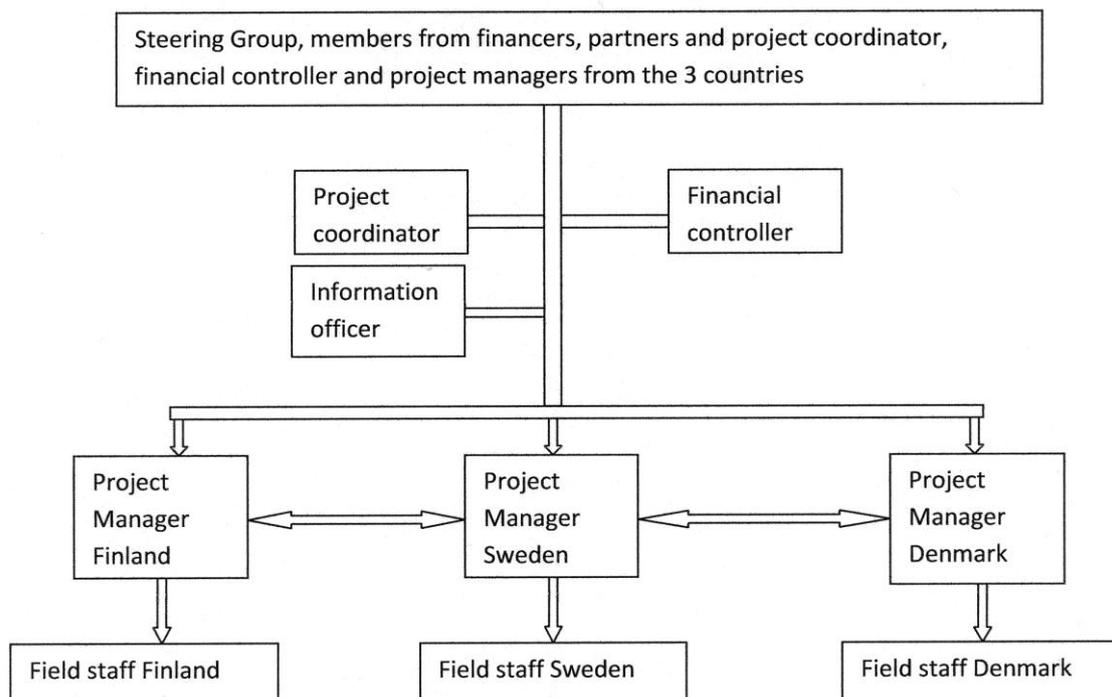
The project has also contributed to the objectives of the Commission Communication COM (2006) 216 final: “Halting the loss of Biodiversity by 2010 – and beyond” where among other it is documented “reducing impacts of invasive alien species”

Using EWS (early warning systems), indicating immigration of raccoon dogs and innovative culling/management methods, we have prevented damages on the local biodiversity, often in wetland areas, but also reduced the risk of infection from the fox tapeworm, trichinellosis and rabies, by eradicating or at least keeping the growing populations of Raccoon Dogs in Nordic countries within bounds.

The results of the project has shown that the methods are directly transferrable to other invasive species as well (i. e.Raccon).

### 4. Administrative part

The organisational structure of the project is the same as when the project started (figure 1).



**Figure 1.** Organisational structure of the project.

Organisation/co-ordination of the project has been conducted both at the project- and the national levels. The project co-ordinator has organised steering group meetings every six months where the project participants and supporting organisations of the steering group have taken turn in hosting the meetings. In these meetings the project has informed the steering group members about the progress and has discussed current topics related to the project work. Project managers from the different countries have had several meetings to discuss and solve common problems and possibilities. Within each country national meetings have been held when necessary, usually by telephone. Every two weeks the project co-ordinator has invited project managers and administrative personnel to a transnational phone meeting to get updates on the work progress in different areas and countries and to inform each other on upcoming events.

Two of the initial associated beneficiaries in the project, Hunter's Central Organization in Finland and the Danish Forest and Nature Agency have undergone organizational changes since the contract day and have new legal status (now; Finnish Wildlife Agency and Danish Nature Agency). This was adjusted in Amendment Request dated 2012-08-31 and has not affected the project negatively in any way.

In Amendment Request dated 2012-08-31 we also suggested that the former Co-financier, Swedish Environmental Protection Agency, should be converted to an Associated Beneficiary instead. Their active participation in the project, organising and managing a management database for raccoon dog, similar to their other databases for large predators, has greatly enhanced our possibilities to analyse and disseminate our data, thus making the project even better.

A misjudgement in the allocation of the economic resources for some actions in the application have resulted in a suggested adjustment (Amendment Request dated 2012-08-31) of the budget (no change in total sum).

Apart from the described adjustments the administrative part of the project has proceeded well, as well as the technical part.

## 4.1 Description of the management system

### Presentation of beneficiaries

Coordinating beneficiary: Swedish Hunters Association (Sweden's largest conservation organization), formed in 1830, organizes about 180 000 of the 300 000 hunters annually solves hunting license. Since 1938 the government has mandated to the organization to manage parts of the Swedish hunting and game management, in general the work has been very successful. Through the long-term and systematic efforts to promote viable wildlife populations, large parts of Sweden today are more wild than ever.

Associated beneficiary; The Finnish Wildlife Agency promotes sustainable game husbandry, supports the activity of game management associations, and sees to the implementation of wildlife and game policy. The Finnish Wildlife Agency also manages the public administration tasks laid down for it.

Associated beneficiary; Danish Nature Agency is an organisation under the Danish Ministry of Environment. The Nature Agency implements the government's policies concerning nature and environment. The Nature Agency aims to secure clean water, protecting and securing nature, planning for cities and landscape, outdoor activities and information to the public about nature, forestry and land management of the state forests, gaming and wildlife management.

Associated beneficiary; Swedish Environmental Protection Agency is the public agency in Sweden that has an overview of conditions in the environment and progress in environmental policy. It also has the task of coordinating, monitoring and evaluating efforts, involving many agencies, to meet Sweden's environmental objectives.

The project phases has briefly been; Preparation, EWS, Management, Evaluation/Monitoring, Information and Reporting.

### Preparation

Management plans for the species has been produced in all involved countries by their own conditions and status.

Purchasing of consumables such as cameras, traps, collars etc were done.

Employment of project managers and field staff were done and education of them and their dogs were held.

### EWS

A grid of camera sites were determined in each country and all cameras were then mounted on the sites and the pictures were collected continuously during the project period.

### Management

Involvement of local stakeholders such as hunter to hunt raccoon dog, and the public to find and report animals to our citizen science system. Capturing and tagging

animals in order to find more animals (Judas animals). Sterilization of tagged animals to minimize the risk of reproduction if lost. Culling of animals using traps and dogs.

#### Evaluation/Monitoring

Collecting data from EWS and management in order to construct models and evaluate the efforts in the project.

#### Information

Courses and information on many different levels, everything from kindergarten to hunters to students and international experts.

#### Reporting

Produce reports to describe the proceeding in the project.

## 4.2 Evaluation of the management system

- a) Our hypothesis regarding methods used in the project has been kept very well.
- b) To realize the ambitions we had at the start, it was imperative that all parties worked together and this has worked very well. In addition, we have had very good support from Swedish and Norwegian Environment Agencies to build and manage our important database for managing Raccoon Dogs.
- c) We have shown during the project period that the methods are both technical and commercial applicable. Costs incurred due to individual invasive species establishment in various parts of the world, far exceeds the costs incurred to prevent establishment.
- d) All project-objectives are reached several months before the end of the project period.
- e) To get a work like this to be successful, it requires the involvement of the public and local hunters in the work. Through our information and training at different levels and through different media, we have been very successful in this.
- f) In this stage, it looks like the authorities in the Nordic countries will continue to support the work against the IAS. See also “After LIFE conservation plan”, annex 1.

## 5. Technical part

### 5.1. Task by task - description

#### Action A1, Management plans

Swedish and Finnish management plans are published and are available on our website: <http://www.jagareforbundet.se/PageFiles/22666/Svensk%20F%c3%b6rvaltningsplan%2020110531.pdf> and [http://www.jagareforbundet.se/PageFiles/22666/supikoira\\_raportti\\_2011\\_6.pdf](http://www.jagareforbundet.se/PageFiles/22666/supikoira_raportti_2011_6.pdf)  
Danish management plan is available at <http://www.naturstyrelsen.dk/NR/rdonlyres/27B7BFE5-3285-4067-AB13-32E08DE3C07A/122757/Indsatsplanmodmrhundrapport1.pdf>

The Finnish and Danish plans are adopted by responsible authorities. The Swedish plan is a “working document”. Action 1 has been completed. The plans were also attached as annexes under Deliverables, annex 1, 2 and 3 in Mid Term Report.

### **Action A2, Purchase, delivery and training with the equipment**

Training activities among field staff were completed in an early stage. In Mid term report annex 4, 5 and 6 there are participant lists, information material and pictures from the training activity in Åland January 2011 and Denmark March 2012. All the transmitters planned to be purchased are bought and are in use, in total 80 transmitters.

Approximately 500 traps are in work today, they were either purchased as ready to use, 250 units or constructed by frame work suppliers, 250 units. In Sweden we use 100 purchased and 125 constructed traps, in Finland we use 75 purchased and 125 constructed traps. In Denmark we only use purchased traps, 75 units. Furthermore the Danish field staff also use fixed pots built earlier (not in the project) to catch foxes in. By building own traps we have got more value for money than planned in our application where 400 traps was budgeted. We have bought approx 150 Soft-Catch Paw hold traps to test if this new trap, used for fur trapping in North America, is effective in raccoon dog eradication, see annex 2.

We have purchased 100 additional cameras to replace broken and stolen cameras, in addition to the 500 budgeted cameras bought in the beginning of the project. 70 of these cameras are financed outside the project. The cameras can send pictures via MMS or e-mail and have been bought to evaluate the effectiveness of this new technique for the project.

		GPS transmitters	Receivers	Cameras	Traps
Planned n:o due to the revised proposal	Sweden	40	4	200	110
	Finland	30	3	150	75
	Denmark	30	3	150	75
Purchased	Sweden	30	4	300	100+150
	Finland	25	3	150	75
	Denmark	25	3	150	75
Manufactured	Sweden				125
	Finland				125
	Denmark				

Table 1. Consumables bought in the project.

### **Action A.3. Organization of the project.**

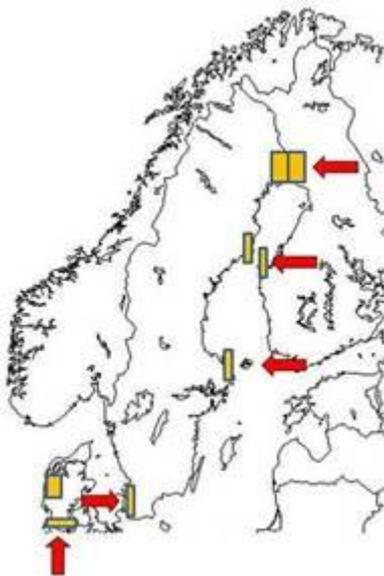
The project were organized during sept 2010 as planned. A project coordinator was nominated, 1 project manager were nominated in each of Finland and Denmark. In Sweden we have nominated 3 project managers who also participate in the actions C1 and C2. The 3 managers have a little bit different tasks, responsibility for the field staff, responsibility for the scientific part and the design of EWS-system in the project and responsibility for the methods in culling and tagging the animals. Furthermore three financial officers are nominated, one in each country. An information officer also was nominated, responsible for all the information activities in the project.

To facilitate the work of the project we use two web applications. The first one is called “Member Portal” where we can publish all short news that happens in the project. Examples of these short news could be such as “A raccoon dog killed by car close to Esbjerg in Denmark”. Other facilities at this Portal is that all our document archive is placed here, including pictures, presentations etc. The other one is a database, called “Predator Portal”, where we register all quality assured observations, all tagged animals, all cameras and all placed traps on a map engine. Some of the information at the “Predator Portal” is public ([www.mardhund.se](http://www.mardhund.se)).

### **Action C.1. EWS (early warning system)**

#### *Description of activities*

The EWS system had two purposes in our project; 1. To detect and confirm raccoon dogs in areas likely for immigration and 2. To monitor the population density and development during the project. This action was planned more precisely for each country at the first project meeting in Åland 30/1-3/2 2011. Areas where immigration was considered possible in each country were evaluated and areas for setting up an early warning system were decided upon. The areas were divided into two different categories. 1. Those where it was likely that we would detect a number of animals during the project, boiling down to the areas closest to the largest known immigration routes in Sweden and Denmark, and the major emigration route over to Sweden in Finland. 2. Those where it was uncertain but possible that we would detect any, or only a few, raccoon dogs.



**Figure 2.** Layout of the early warning system of permanent game camera systems in the project area at the raccoon dogs potential invasion routes. Larger systems allows for calculation of population estimates through capture/re-sight techniques when enough raccoon dogs have been captured on picture, and to follow up the development of the population through catch per unit effort estimates over time.

In the second category (secondary EWS) cameras (10-20 on each area) were to be put up only to detect new immigrants. If we had got a picture in such an area we would have intensified the management effort in that area. In the first category (primary EWS) a larger number of cameras were set up systematically to be able to not only detect and confirm animals, but also

to calculate the density and follow the population trend over time. The distance between cameras was based on home range sizes from Finnish research studies. We used the diameter of a mean home range as distance between cameras, to be certain that all stationary raccoon dogs would have at least one camera within its home range. Home ranges in northern Sweden and Finland were suspected to be larger than in the research study, while similar in Denmark. The same distance between cameras were however used in all countries until we achieve better knowledge, if anything we would end up with denser system than needed in the north, which would rather improve our estimates than causing any risk for the monitoring function. GIS maps over the camera points were produced as a support for the field work of setting up the camera systems. The cameras should be set up within 1.75 km from each grid point, but not less than 800 m from the next camera to avoid that several cameras were set to close to each other.

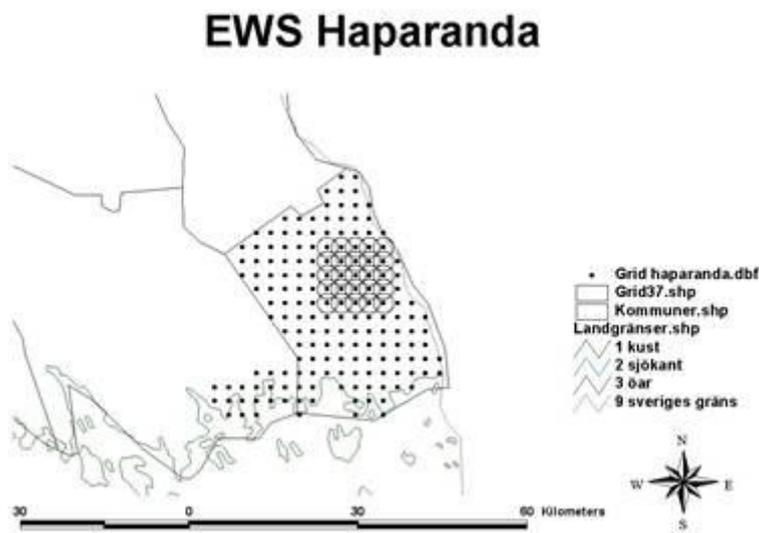


Figure 3. Camera places in the primary EWS system in northern Sweden.

Exactly where within this area the camera should be placed was up to the field personnel, but it should be placed on a likely spot to be found by a raccoon dog based on their habitat requirements.

In Sweden a total of 150 cameras were set up in the primary EWS system, in Denmark 65 cameras were set up and in Finland 96 cameras. The rest of the cameras approx 200 cameras were set up either in secondary EWS systems or used as flexible EWS/management cameras when investigating interesting areas (see action C2).

In front of each camera a scent lure was placed to attract predators such as raccoon dogs. The scent lure we used (Hawbakers grey fox 100) had previous been confirmed to work to attract raccoon dogs, in our own project preceding the LIFE project as well as in Finnish studies.

In total we have captured 46 animals on picture in the Swedish EWS, 35 in Finland, and 29 in Denmark during the project.

### *Research*

To further improve the efficiency of the EWS system, as well as the function of flexible management cameras we have made several evaluations of different scent lures and food lures to find out if there are more efficient attractants to use (annex 3, 4, 15 and 16). So far Hawbakers grey fox 100 is still one of the very best, but some combinations of scent lures and

food lures have proven to be as efficient or even more efficient seen over the whole year. We have also started the process of producing our own scent lure based on the anal glands from our culled raccoon dogs, to get a more species specific lure, which may be advantageous at times.

The camera systems have delivered many indications of raccoon dog presence. We have however learnt that it is important to be on place shortly after the raccoon dog have been confirmed to be efficient in the capture/culling of the animal. We have therefore tested a new technique, MMS cameras that are sending the pictures to the field staff as soon as they are taken, to find out if we can improve the EWS system further. So far, this new technique has been very successful leading to approximately 40 captured or culled raccoon dogs of which the field workers estimate that less than half would have been captured without the new cameras. The testing of the MMS cameras has been made with the flexible management cameras not to disturb the stationary EWS system.

#### *Comparison with planned output*

The EWS system has been set up and used in all countries.

#### *Expenditure for action*

Approx 1.3 mill €

#### *Indicators used*

No specific indicators were planned, but all systems planned, both primary, secondary and flexible cameras have been set up and used during the project.

#### *Problems/drawbacks encountered*

We found that it was not as easy to put up our EWS system in all countries as planned. In Sweden and Finland with large and few land owners it was not too bad, but in Denmark with many small landowners it was more of a challenge. We did get both primary and secondary systems up also in Denmark after some time, but had to adjust both the number of cameras and placement of the systems in some cases. This in turn resulted in worse data for Denmark than for the other countries, especially affecting the density estimation for Denmark, but still good enough to be able to tell something about the population development over time (see Action E4).

In northern Sweden we also had a problem with cameras being stolen in one part of the EWS system, in all about 30 cameras. Since we had a dense camera system to begin with, this did not affect the efficiency of the system to much, but we still had to buy new cameras for this area.

We have also learnt that our Early Warning System did not work well for rapid response using our first manual cameras. These had to be manually checked for new pictures, which as it turned out could take weeks. By implementing the new technique with MMS cameras that are sending pictures to the field workers mobile phones however, we will be able to respond immediately to new early warnings. After LIFE we will change entirely to MMS cameras, and adjust the camera numbers and areas according to gained experiences from the LIFE project.

#### *Progress*

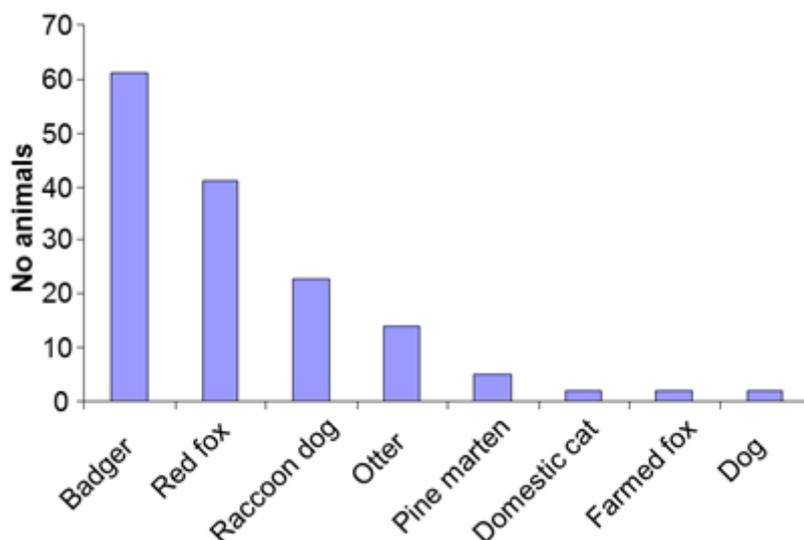
This activity was as planned performed in period IV 2010-III 2013. All cameras could not be set up at once however, and especially in Denmark it took some time before all cameras was out in the field. The EWS will continue in "After LIFE", see After LIFE Conservation plan.

## Action C.2. Management, culling and tagging

### *Description of activities*

#### **Citizen science system.**

Raccoon dog observations by the public was followed up with IR/motion triggered game cameras directed at scent lures and by tracking by professional personnel to try to confirm or dismiss the observations. The citizen science system based on the public reporting's of observations of raccoon dogs has been one of our most important tools to find new raccoon dogs, especially in areas outside the core areas which the project personnel do not have time to cover at all times. Reporting is done to a telephone hotline or via email. The contact information is distributed on the project home page ([www.mardhund.se](http://www.mardhund.se)) and in the press in connection to articles or information about the project in nature/hunting magazines and newspapers/radio/television. It is however often difficult to identify an uncommon species, especially for a layman and even within the project it is impossible to be sure sometimes, so the citizen science system has to be used with some care and managed professionally. The project never confirms observations that we are not 100% sure about and that have not been thoroughly controlled by our professional managers, not even pictures which can (and have) been forged. The risk with confirming observations that are not 100% safe is that we then would already "have" raccoon dog over all of Scandinavia, that is, animals that are believed to be raccoon dog but that in fact are something different. This in turn would be a serious threat against our work with trying to stop the raccoon dog since the authorities might then take the decision that the battle is a lost cause and stop the funding. We know by previous experience that most observations of likely raccoon dogs are in fact other species (figure 4).



**Figure 4.** Distribution of species out of 150 public observations of "raccoon dogs" in Sweden after control by the project (data from the Swedish raccoon dog project 2008-2010).

It should be added that most observers in the cases in figure 4 are experienced hunters in the core area of the raccoon dog in Sweden, would it have been the public in general or outside the core area the confirmed observations of raccoon dog would have been much lower, very fast approaching zero the further away from the core area you get. An undecided observation

will therefore never be officially confirmed, it will however be followed up until being confirmed, dismissed or considered gone from the area. Figure 5a and 5b show an example of the difficulty of identifying the species from a picture sometimes. The first picture could have been a raccoon dog but since you do not see the face it is impossible to be sure and the picture cannot be confirmed. In picture b there is no doubt that it is a badger and the observation could be dismissed. Had it not been a second picture however the observation would have been unconfirmed. A sight observation from the car at night is of course even more difficult to be sure about, even if the observers almost always are 100% sure about what they have seen.



**Figure 5a.** Unidentifiable animal.

**Figure 5b.** Badger.

Photo: LIFE09 NAT/SE/ 000344 (2010-1013) project.

Our Citizen Science system is in practice in Sweden and Denmark. In Finland the raccoon dog is a very common animal and an official citizen science reporting system is not considered functional. It would be similar to the public in Europe reporting red fox, a lot of reports would come in, but most people would not bother since it is no big deal to spot a fox. In Finland the professional managers and engaged local hunters in the project area know better than anyone else where raccoon dogs are likely to be found, hunters report directly to the responsible manager. In all countries the local hunters are very important for the project success and are apart from reporting observations also helping out with finding and capturing animals. Professional managers in all countries are apart from following up citizen reports of course also constantly searching for raccoon dogs in their areas with the help from the same tools as when trying to confirm an observation; cameras, hunters, traps, tracks and dogs (figure 6).



**Figure 6.** Ebba (the dog) putting a raccoon dog at bay. Photo: LIFE09 NAT/SE/ 000344 (2010-1013) project.

### **Capture and culling of raccoon dogs**

When observations have been confirmed, animals are (optimally) captured using traps or dogs. All captured individuals in Sweden and Denmark (both males and females) are sterilized to prevent reproduction, fitted with ear tags (to minimise the risk of shooting valuable project animals), GPS/SMS transmitters and then released (figure 7). In Finland where raccoon dogs are plentiful the sterilization is not practiced.



**Figure 7.** Raccoon dog fitted with ear tags and GPS/SMS collar. Photo: LIFE09 NAT/SE/ 000344 (2010-1013) project.

Due to the social nature of the raccoon dog (they are strictly monogamous and stay with its mate until someone die, then the survivor start searching for a new mate) the animal will search for and lead us to other raccoon dogs of the opposite sex in the area (figure 8). When

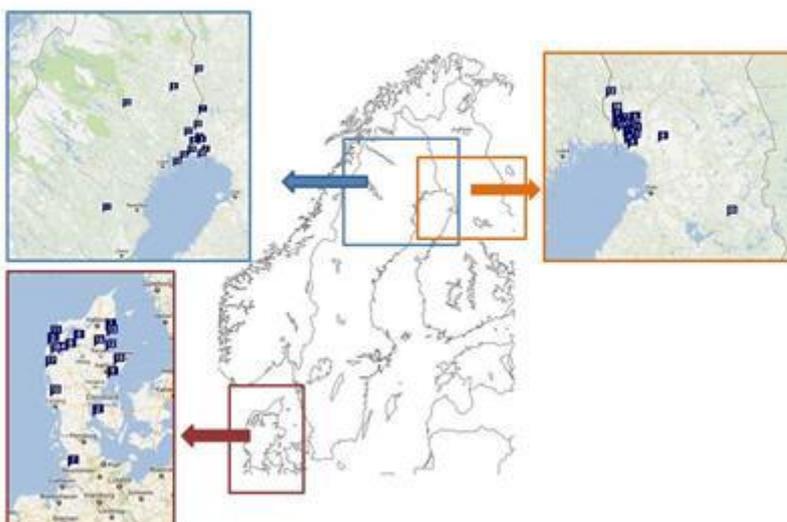
the transmitter animal (Judas animals) stop dispersing it is an indication that it may have found a new mate and we go in and capture the mate (if there is one).



**Figure 8.** A GPS collared and sterilized female raccoon dog photographed by one of the project game cameras showing that she has found a new unmarked male. This was the third male this female delivered to the project.

Photo: LIFE09 NAT/SE/ 000344 (2010-1013) project.

When a critical number of Judas animals have been built up all new unmarked individuals that are found is killed. The critical number depends on how many animals that can be effectively managed in an area, approximately 15-25 animals simultaneously depending on field staff resources (figure 9).



**Figure 9.** Active Judas animals in the project area in January 2012 (Data from the LIFE09 NAT/SE/ 000344 (2010-1013) project).

Hunting of raccoon dog is allowed all year around according to the project countries national legislations since it is an invasive species (an exception exists in Finland during the breeding period). Local hunters are however encouraged to capture the raccoon dog for the project if possible since single animals left behind will disperse and try to find a new mate, sometimes very long distances (figure 10).



**Figure 10.** After losing its mate this raccoon dog dispersed 400 km in two months' time in search for a new mate. It was then shot in Kautokeino in northern Norway (the position furthest north) (data from the Swedish raccoon dog project 2008-2010).

Thus, general hunting may induce dispersal and hurry up the spread of the species. When a raccoon dog is killed during hunting, hunters are therefore also encouraged to immediately report the kill and hand in the carcass to the project to confirm the animal. If it is likely that there are more animals in that area, and especially if the killed raccoon dog was one of a pair, the project places cameras and if necessary a Judas animal in that area to find other animals.

During the project we have culled or sterilized over 1 400 raccoon dogs (table 2).

**Table 2.** *Citizens observations to the project, confirmed raccoon dogs, captured (and sterilized) or killed raccoon dogs during the project (01092010 – 31082013).*

Country	Reported observations	Confirmed animals	Captured or killed animals	Judas animals used
Sweden	2272	364	319	80
Denmark	962	488	402	46
Finland	N/A	N/A	680	44
<b>Total</b>	<b>3234</b>	<b>852</b>	<b>1401</b>	<b>170</b>

Due to our progressive communication (education and dissemination) strategy we have involved the public and the hunters in our work, and by doing so we have reached very good results. About 70-75% of the animals captured in the project in Sweden and Denmark has been a result of observations (observed animals that were captured, new captures in places of old observations, animals killed during private hunting or trapping, road kills) and 25-30% has been found by our Judas animals.

In Finland they do not practice the citizen science system, they have instead involved the local hunters a lot more than in the other countries and they have stood for 85-90% of all raccoon dogs found and culled in the management area. About 10-15 % has been found by Judas animals. The fewer animals found by Judas animals in Finland was expected, since the density of raccoon dogs is higher in Finland and Judas animals are getting increasingly efficient the lower the population is. When there are lots of animals it is easy to find and hunt them, but when there are few animals it is very difficult. Con-specifics will however still find each other very efficiently, so the proportion captured by Judas animals will increase the lower the density get.

Since we did not have MMS functions on our EWS cameras (it took several days before we became aware of new animals) it is difficult to tell if an animal captured in the camera area was the one we had earlier seen on the EWS picture. In total we have however captured 46 animals on picture in the Swedish EWS, 35 in Finland, and 29 in Denmark during the project. After-LIFE we have started replacing the old cameras with MMS cameras for more efficient captures of new animals confirmed by the EWS systems. The field personnel estimate that 50% of the 41 raccoon dogs that have now captured with help of the MMS cameras (flexible cameras set at tips ) would never had been captured before.

When it comes to the actual trapping about 75-80% of the captures in all countries have dogs involved and 20-25% is captured in traps.

## Research

The raccoon dog project is very adaptive in its approach. Both within the LIFE project and in cooperation with several research projects, we have simultaneously been doing applied research to improve the knowledge and methods. Typically, data from the LIFE+ project have been used in cooperating research projects. We have improved our knowledge of the raccoon dogs dispersal in the dispersal front and about habitat use and selection, and about the genetic diversity among Nordic raccoon dog populations. All of this to better meet the challenges of the management. We have compared dispersal and movement of raccoon dogs after losing its partner in northern Sweden with southern Finland. The movement and dispersal, and thereby the expansion speed proved to be many times larger in the north, which make the

management harder. Normal hunting may actually induce dispersal if there is not a professional project involved that can find and cull the dispersing partner. We have also evaluated the GPS data from our Judas animals and found that the schedule can be much improved to lower the cost of the method. Raccoon dogs are mainly active at dusk and dawn, most contact from these times will deliver a position, while few (night) and very few (day) will deliver a position. In practice this means that we can likely go from 8 position attempts per day to 1-2 attempts per day. This will save a lot of money, but with little effect on the management efficiency. We have also evaluated new traps that will enhance the efficiency of trapping considerably without any negative effects on the animals. Soft catch traps are 7 times as efficient as the best raccoon dog trap. If used according to our recommendations to check the trap within one hour from capture (using trap guards or MMS cameras for notice) we found no difference in injuries compared with other traps. It is however prohibited to use in Europe and this is very unfortunate for the work with invasive predators. If we are to act efficiently there has to be a possibility to use the most efficient tools, at least by professionals! Annex 2 soft catch.

All research work has immediately been adopted in the LIFE+ management project.

#### *Comparison with planned output*

We have set up citizen science systems, EWS systems and Judas animals in all countries as planned.

More traps are used than planned, due to own production.

#### *Expenditure for action*

Approx 2.5 mill €

#### *Indicators used*

Our monitoring system will tell if our actions have effect, see Action E4.

#### *Problems/drawbacks encountered*

We found that it was not possible to keep more than 15-25 Judas animals active simultaneously due to field staff resources.

GSM transmitters have generally worked well, however in remote areas there may be problems with contact to the GSM network. The new generation satellite transmitters will be used after LIFE.

#### *Progress*

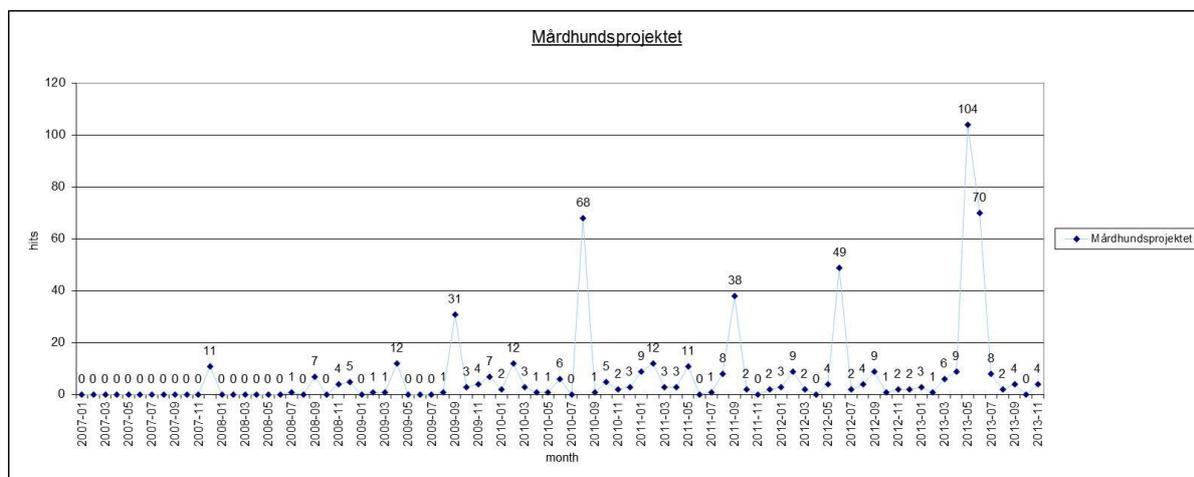
This activity was as planned performed in period IV 2010 - III 2013.

## **Action D1, Information activities**

Information activities from the project experiences and results, on the web page (<http://www.jagareforbundet.se/Mardhundsprojektet/>) with more than 10.000 hits since it started, in local communities, in relevant magazines, newspapers, radio and television as well

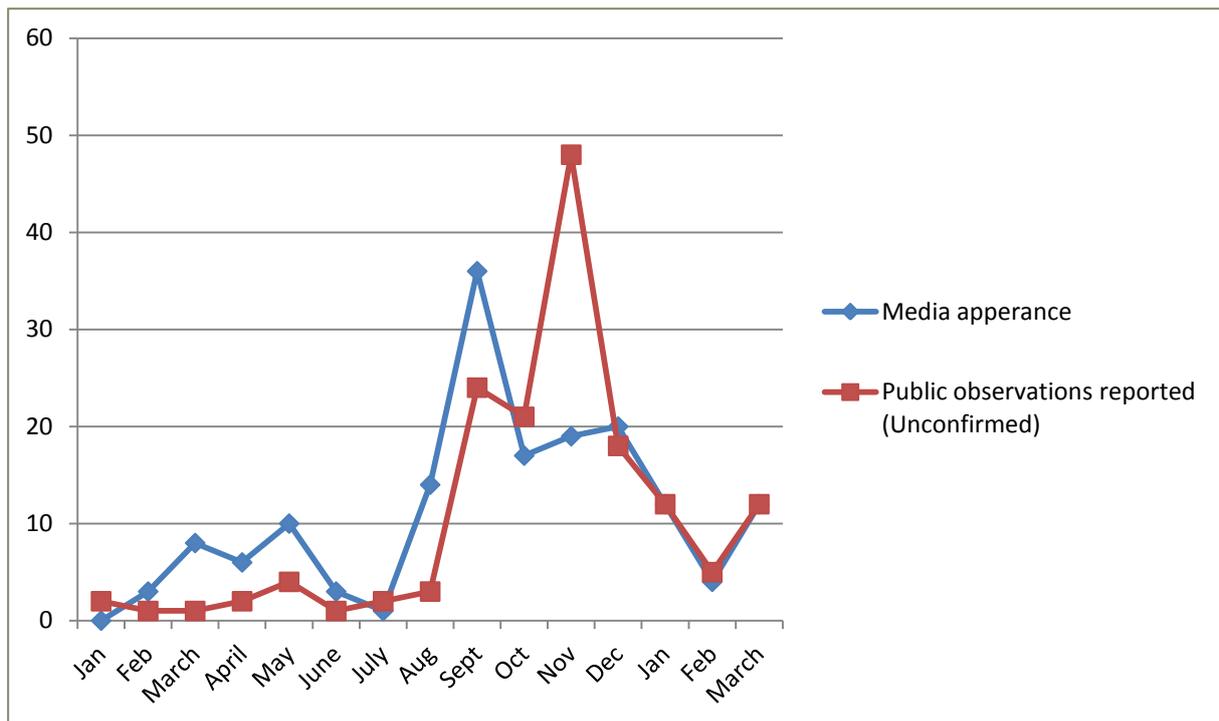
as short courses for hunters and other nature organizations and education from kindergarten to university level are all very important parts of the project. All of these actions aims at a higher awareness and larger knowledge among the public about IAS in general and the raccoon dog in particular, and will lead to more observations being reported, and a higher quality of the observations which will enable the project to put the efforts where most needed. While actions directed towards e.g. local hunters will give a direct effect in the form of more animals culled, actions directed at small school children and university students will give an effect in the longer term since those persons are to take over nature management in our countries. To analyse the media interest in the raccoon dog and the project in Sweden more specifically we have used the Meltwater software, which scan the internet for published articles including the word raccoon dog. The software only includes internet based hits such as newspapers, magazines, radio and television home pages (usually writing about the programs they sent). Some media cannot be reached with this software, such as paper newspapers when nothing is written on the web about it, thus the figures presented is an underestimate, but still give an interesting picture about the media interest and published articles about the raccoon dog and the project.

Media has shown great interest in the project (figure 11). The start of the first national Swedish project can be clearly seen in August 2008, before that very little attention was directed at the raccoon dog. The start of the LIFE+ project in September 2010 can also be seen as an increase in media interest. Since then approximately 13 articles per month has been about the raccoon dog project in the Swedish media. See also our After-LIFE communication plan (Annex 1).



**Figure 11.** Raccoon dog media hits in Sweden per months from 2007 – 2012. The first national raccoon dog project started in August 2008, the LIFE+ project started in September 2010. Peaks show larger press releases, articles or events. The analysis does not include paper newspapers, only internet based publications.

The large media interest, often following press releases, own articles or large events also affects the interest to report observations to the project (figure 12). It is therefore important to constantly inform the media about any project happenings.



**Figure 12.** Example of how the public observations follow media attention of the raccoon dog. At all project media occasions the reporting system and contact information to the project is mentioned specifically.

The project has disseminated its results with information activities, training sessions and education of hunters, students and the public in all countries. All countries have produced mobile notice boards and both a common and country wise home pages has been produced. Nine public appearances (exhibitions) has been made reaching several thousand persons, and about 200 university students has been educated about IAS and raccoon dog (Mid term report, annex 55, 56, 66, 67). Students have also produced five thesis. See annex 57-58 in Mid term report.

In Finland over 1000 persons, both hunters and other public citizen's has been educated in raccoon dog management and IAS. Three appearances have been made in national television and over 10 appearances in local newspapers. Over ten presentations have been made directed to the public for example at national hunting fairs. The project has been cooperating with the rural wetland LIFE+ project (LIFE09 NAT/FI/000563) regarding trapping and information. The Finnish project also co-operates with the Finnish forest and park service and some private companies in the area that have built own traps for the project.



**Figure 13.** Lesson for school kids on raccoon dog management in Finland. Photo: LIFE09 NAT/SE/ 000344 (2010-2013) project.

In Denmark the short courses have been divided into an intensive course for 15 hunters, a more extensive course for around 45 hunter and 4 information meetings for approximately 200 hunters and others interested in raccoon dog management.

There has been a great interest in the project which has led to several appearances in national and local television. Beside television, national and local newspapers, hunting magazines and other media have written numerous articles and in periods the LIFE+ project and raccoon dog management have been mentioned in articles every week.

The project has also been represented on national hunting fairs, where staff members gave short oral presentations.

During the project period 12 electronic newsletters

<http://jagareforbundet.se/vilt/Mardhundsprojektet/Nyhetsbrev/>

have been produced and distributed to supporting organizations, financiers, authorities and project staff. The number of recipients on the mail-list is 85 recipients.

See also section 5.4 Dissemination issues below for an overview.

#### *Comparison with planned output*

More than planned activities have been done.

#### *Expenditure for action*

Approx 50.000 €

#### *Indicators used*

See table 5 in chapter 5.4.

#### *Problems/drawbacks encountered*

We have had several information activities in TV and Radio where we don't have any influence on the outcome and thereby the LIFE+ logo is missing sometimes.

#### *Progress*

This activity was as planned.

### **Action D2, Short courses, guidance and educational material**

Sweden has held eleven courses (annex 5). Denmark has held two courses on Jylland 24:th-26:th of Oct 2011, 2:nd-4:th Dec 2011 with 60 participants together (annex 11 and 12 in Mid term report). Finland has held four courses, 25:th of May, 9:th of June, 30:th of June and 3:rd of Aug 2012 with total 201 participants (annex 13 and 14 in Mid term report). Guidance and educational material has been produced. Finland has educated at least 200 hunters. We have produced 1500 each of the leaflets and tracking guide within the project, additional to these, there are 500 more printed in Sweden and 1000 more in Denmark. These additional were financed by other resources than from the project budget. They are distributed on courses, fairs, lectures etc. Leaflets and tracking guide are in annex 15 and 16 attached to the Midterm report and the Finnish one in annex 6. The digital app is downloadable at <http://jagareforbundet.se/vilt/viltappen/> and it has been downloaded more than 100 000 times. All these efforts have resulted in more than 300 well trained raccoon dog hunters. The program, power-point presentation and instruction film during the courses are attached in annex 7. You can see many examples of this in form of tips, captured or killed Raccoon Dogs by local hunters all over the project area.

See also our After-LIFE communication plan (annex 1).

#### *Comparison with planned output*

We have educated more people than planned.

#### *Expenditure for action*

Approx 40.000 €

#### *Indicators used*

Number of educated people.

#### *Problems/drawbacks encountered*

None.

#### *Progress*

This activity was as planned performed in period IV 2010 - III 2013.

### **Action D3, International Conference on invasive species in general and Raccoon Dog in particular**

The conference was held in June 2013 in Luleå, Sweden and was very much appreciated by the 100 participants from 13 countries of which 42 were local citizens/hunters. Several other LIFE projects were invited and presented their projects. Pictures, programme, participant lists, abstracts and presentations of speakers etc are shown in the Conference Report in annex 8.

#### *Comparison with planned output*

Participants were a little less than planned.

*Expenditure for action*

Approx 200.000 €

*Indicators used*

Participants.

*Problems/drawbacks encountered*

Many potential participants couldn't afford the costs to go far up north in Europe.

*Progress*

This activity was as planned performed in period III 2013.

**Action E1, Steering Group Meeting**

Six meetings, as planned, are held during the report period, first in Stockholm at first of Sept 2010, second one in Denmark at 21:st-22:nd of March 2011, third one in November 2011 9:th-10:th in southern Sweden close to the border of Denmark, fourth in April 2012 25:th-26:th in Vasa in Finland, fifth in Öster Malma (head quarter of SAHWM) at 11:th-12:th of Oct 2012, sixth in Luleå 19:th June 2013. Memory notes and participant lists are attached from the meetings (see annex 23-27 Mid term report and in annex 9).

**Action E2, Project coordination**

Action E2 is has been in progress during the whole project period and has proceeded according to plan.

Every second week there has been a phone meeting where project managers from all countries participated. The meetings were held to inform all participants from the work in the countries and to plan activities, both common and those that are carried out in individual countries.

Memory notes from the meetings are sent out to all participants and supporting organizations.

**Action E3, Financial control**

Action E3 has been in progress the whole project period and has proceeded according to plan.

**Action E4, Monitoring.**

One of the most important tools in the project is the Predator Portal (database for Raccoon Dog). In this database most management and monitoring data from the project is gathered and used to follow progress of tips from the public as well as fate of project animals. Parts of the database is open to the public

.

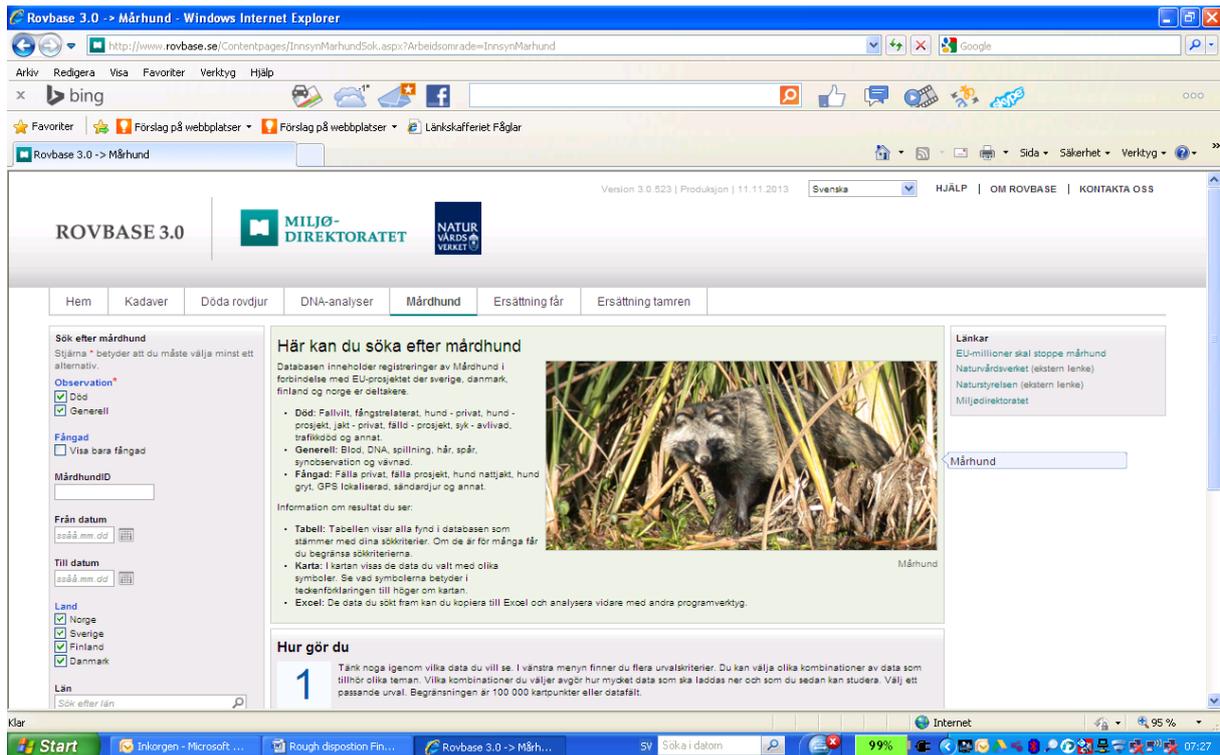


Figure 14. Predator portal.

See further:

<http://www.rovbase.se/Contentpages/InnsynMarhundSok.aspx?Arbetsomrade=InnsynMarhund>

See also information:

<http://jagareforbundet.se/vilt/Mardhundsprojektet/forvaltningsverktyg-management-tools/mardhundsdaten-management-database/>

The database will be continuously updated and managed by SEPA and SAHWM, see also After-LIFE conservation plan (Annex 1).

### Population estimates

We have been monitoring the raccoon dog population during the project by systematic stationary setups of game cameras baited with scent lures. Some of the EWS camera systems are larger and allows for a capture/re-sight estimate of the population to be done (and also a catch per unit effort index), while other smaller systems solely aims to get an early warning if new animals immigrate. The capture/re-sight estimate builds on capture-recapture theory (White & Burnham 1999). By knowing the proportion of marked animals out of all sightings, the number of total animals in the population (N) can be estimated according to  $N = n_1 * n_2 / m_2$ .

- $n_1$ =number of marked and released on the first occasion
- $n_2$ =total number captured on the second occasion
- $m_2$ =number of marked found on the second occasion

The estimates given below are the most likely estimates taken into account among other things difficulties of knowing if several pictures in the same place are of the same animal or not and difficulties to judge species from certain angles. Another assumption that we have had to handle with some care is the closed population assumption, since our transmitter animals

are moving a lot more than expected. A very low sample size will further affect the quality of the calculations.

The population estimate indicated approximately 37 animals in the Swedish EWS in Haparanda in March 2011 (0.037/Km<sup>2</sup>). The following 6-month estimates were similar or somewhat lower (in January 2012 the data was too poor to make an estimate) (Table 3). The average population in the Swedish EWS system was recalculated for the whole Swedish distribution area by using the assumption that density of confirmed observations is a reflection of population density in the area. Adult population for all of Sweden would with this assumption have amounted to about 130 animals during the project period. In total 46 animals has been detected by the EWS system during the period 1 Sept 2010 to 31 Aug 2013.

**Table 3.** Population estimates and density in the Swedish EWS system in Haparanda.

Column1	Pop estimate Sweden EWS	Density/km2
March-June 2011	37	0,037
July-Dec 2011	22	0,022
Jan-June 2012	No Data	No Data
July-Dec 2012	29	0,029
Jan-Aug 2013	23	0,023

In in the Finnish (Torneå) EWS system (which is about half the size of the Swedish) the population estimate was approximately 32 animals (0.06/Km<sup>2</sup>) in July 2011. The following 6-month estimates were similar (in March 2011 and Jan 2013 the data was too poor to make an estimate) (Table 4). In total 35 animals has been detected by the EWS system during the period 1 Sept 2010 to 31 Aug 2013.

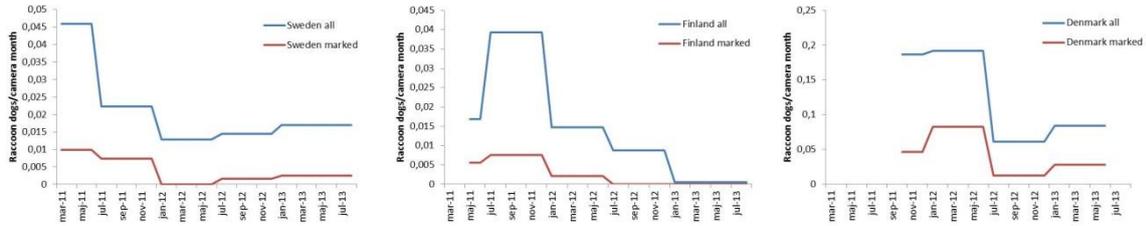
**Table 4.** Population estimates and density in the Finnish EWS system in Torneå.

Column1	Pop estimate Finland EWS	Density/km2
March 2011	No Data	No Data
July 2011	32	0,064
January 2012	49	0,098
July 2012	19	0,038
Jan-Aug 2013	No Data	No Data

In Denmark the data has been too poor to do any population estimate to date. In total 24 animals has been detected by the EWS system during the period 1 sept 2010 to 31 Aug 2013.

#### Population development

The number of unique individuals captured in the camera systems per time unit has been used as an index of the population development, i.e. a catch per unit effort index (CPUE). All countries CPUE show a decrease in photographed individuals per camera month. The populations are thus according to our population index decreasing.

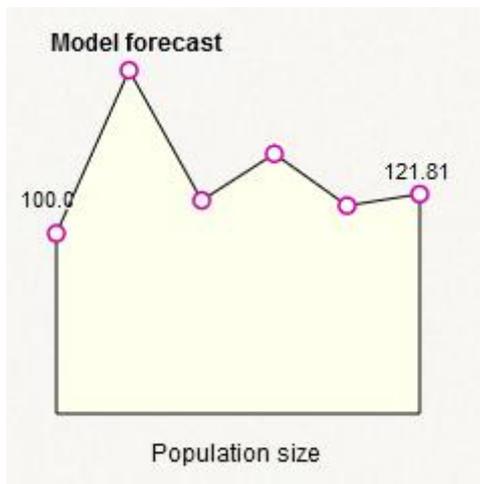


**Figure 15.** Population development in the Swedish, Finnish and Danish primary monitoring areas during the project. The change in population is shown as an index (number of raccoon dogs captured on picture per camera month over time). The indices cannot be used to compare density between countries.

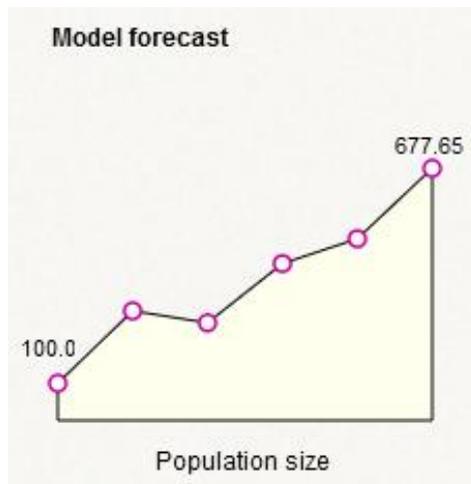
### Population model

We have constructed an individual based population model for the raccoon dog. The model has been demonstrated in Sweden where we have sufficient knowledge of the population dynamics of the population to use it properly. A capture-recapture estimate (based on the camera systems and the proportion of marked animals in the pictures) in Sweden gave an approximate number of 100-150 raccoon dogs in winter population in Sweden during the project. A population estimate of a rare and elusive species like the raccoon dog in its expansion range is very difficult to perform with any certainty. The limited data makes the estimates to fluctuate randomly, especially at very low population densities. The population density is therefore not a suitable way to monitor the development of the population; if reasonably stable it will however tell something about what size the population has on average during our project time. To say something about the population trend, the more stable CPUE index above is therefore better.

By using 100 individuals as initial population size (i.e. approximately the size of the adult population in Sweden during the project) and the parameter estimates estimated from the project data in Sweden our population model suggest that the population will be kept at a constant size during the first five years after applying our management actions and thereafter it will start decreasing (figure 16a and 16a). So far this prediction seems close to the real outcome according to our results. However, if no effort had been done to limit the population there would have been well over 650 individuals after five years according to the model (figure 16b).

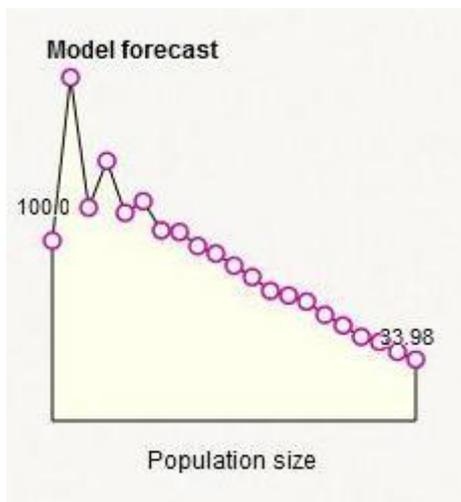


**Figure 16a.** Population development during five years including our efforts in culling and sterilisation.

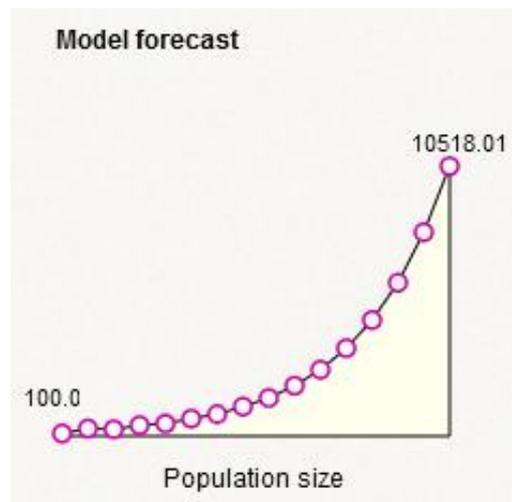


**Figure 16b.** Population development during five years without our efforts in culling and sterilisation.

Continuing the management with the same intensity, given that the input data reflects the reality reasonably well, would mean that the population start decreasing after about five years, and within 10-20 years only a few raccoon dogs remain (figure 17a). On the contrary, stopping the management would mean that we would have at least 2500 raccoon dogs in Sweden in ten years' time and over 10 000 in 15 years' time, i.e. the population would increase exponential as it has done in Finland and other countries invaded by the raccoon dog (figure 17b). In Finland they shot 800 raccoon dogs in 1980, when the hunting statistics started. In year 2000 they shot 85 000 individuals and in year 2011 they shot close to 180 000 raccoon dogs.



**Figure 17a.** Population development during 20 years including our efforts in culling and sterilisation.



**Figure 17b.** Population development during 15 years without our efforts in culling and sterilisation.

### Action E5, Networking with other projects.

This action has been in progress during the whole project period. We have participated in the following workshops, seminars and conferences:

- LIFE Platform Meeting 20-21 Sept 2010, Fyn Denmark. Project coordinator Jan Swartström presented "Management of the invasive Raccoon Dog in north-european countries"
- LIFE 09 Regional Kick-off Meeting 11:th Jan 2011, London UK. Financial officer Ewa Flood and project coordinator Jan Swartström presented "Management of the invasive Raccoon Dog"
- Conference Invasive Species 23 March 2011, London UK. Information officer P-A Åhlén presented a poster MIRDINEC
- EC, Invasive Alien Species working group 30 March 2011, Brussels Belgium. Project manager Fredrik Dahl participated
- EC, Invasive Alien Species working group 30 May 2011, Brussels Belgium. Project manager Fredrik Dahl participated

- Norwegian Directorate for Nature Management 5 May 2011, Trondheim Norway. Project manager Fredrik Dahl gave a lecture on the topic “Management of the invasive species Raccoon Dog”
- LIFE Platform Meeting 12-13 Sept 2011, Västerås Sweden. Project manager Trine Jensen participated.
- LIFE Platform Meeting 17-18 Sept 2012, Zealand Denmark. Project manager Marie-Louise Simmelsgaard Platz participated
- Joint boarder Raccoon Dog meeting 18 april 2013, Svanhovd, Finnmark, Norway. Project manager Fredrik Dahl gave a presentation of MIRDINEC. Annex 10.

The planned study tour to Portugal was not implemented because the project we planned to visit, were closed in 2012.

Networking with other projects:

- LIFE+ “Return of rural wetlands” (LIFE09 NAT/FI/000563) Research projects
- -The Swedish raccoon dog research project, Dahl, Thulin, Arnemo & Åhlén, funded by the Swedish Environmental Protection Agency
- -Modellering av spredning hos mårhund, Melis and Herfindal, funded by the Directorate for Nature Management, Norway
- -Synergies between management and research - new knowledge from raccoon dog management data, Dahl 2012, funded by the Swedish Environmental Protection Agency

#### **Action E6, Documentation (Progress reports)**

The Inception Report was delivered in May 2011. The Midterm Report was delivered in Nov 2012. It was delayed because we have requested for amendments in the budget and these must be approved first. The final report is delivered in Nov 2013.

#### **Action E7, After LIFE Communication plan.**

The document is attached, annex 1.

### **5.2 Evaluation**

Task	Foreseen in the revised proposal	Achieved	Evaluation
EWS national grid	EWS will deliver indications of raccoon dog presence which give us the information where and when actions of culling and tagging should be deployed.	As planned in proposal	Weather conditions can give some technical problems in the cameras. Expensive equipment located alone in the forest is covetous for people who can't distinguish between yours and mine. New generation MMS cameras will improve the early warning function of the system considerably.

	EWS will also give us information about changes of the population size and distribution due to looking at the proportion of marked animals of all photographed animals which give us basic information to calculate the population size, using capture/recapture techniques		
Tagging the animals with GPS collars	The tagged animals should help field staff to find new individuals of RC	As planned in proposal	Technical difficulties with the equipment according to weather conditions in the start time of the project and natural obstacles for the GSM-network. New generation of satellite transmitters will improve their function in remote areas.
Capture animals with traps or dogs	Train field staff to use the equipment in an effective way	As planned in proposal	Training dogs for the purpose is extremely valuable for the success to capture animals. More efficient traps exist but cannot be used due to EU regulation.
Information activities to public and local hunters	Give lessons, short courses and local information.	As planned in proposal	Without the engagement from local hunters and the public, the project work would not have been as successful as it has been.

### **5.3 Analysis of long-term benefits**

Our population models show that the populations have not increased and that without our efforts the populations would have been much larger today than what it is at present. The models further show that the situation in 10 to 20 years' time would be very serious if we were to stop the management. Judging from the development of other populations the model is very reasonable. Stopping the management would have serious effects on both biodiversity, economy and possibly on human and animal health.

#### **Long-term sustainability**

See After-LIFE conservation plan (appendix 11).

#### **Long-term / qualitative economic benefits**

Costs associated with management of invasive species are substantial. Our project is seemingly rather expensive with a budget of 5.3 million Euros over three years for our three countries. However, given the alternative of 10 000 raccoon dogs to start manage in Sweden in 15 years' time this cost is in fact rather modest. The difficulty is to comprehend that even though the species is doing very little harm at low densities the costs associated with a neglected management will also increase exponentially with time if nothing is done right from the start. In Finland they are today trying to stop new outbreaks of rabies, which were essentially found in raccoon dogs in their last outbreak in the late eighties. The cost of this preventive management in the form of medicating immigrating predators from Russia and vaccination of dogs cost approximately one million Euros per year. The cost of management (predator control) of valuable wetlands (bird recruitment areas) cost 3.3 Euros annually per hectare, and then the work has to be done voluntarily. Neither the cost for general hunting of raccoon dogs are reimbursed, the cost for culling 180 000 raccoon dogs per year would be tremendous.

#### **Long-term / qualitative social benefits**

If we get a dense population of raccoon dog in Scandinavia diseases like rabies will spread very fast if we get it introduced in the country. In the latest outbreak of rabies in Finland in 1989, 78% of all cases were found in raccoon dog.

#### **Replicability, demonstration, transferability, cooperation:**

We have demonstrated a very successful transnational management system for the invasive alien raccoon dog. The methods and tools that we have used have been successful from northern Sweden/Finland to southern Denmark, in a variety of ecosystems and different climate. Not only have the methods worked well for the raccoon dog, we have also demonstrated their use on another invasive alien predator, the raccoon, both in Sweden and Denmark. The transnational cooperation have been very successful and will After-LIFE be

enlarged with Norway. We believe this common management is a key to manage not only the raccoon dog, but also other invasive aliens in the future and we hope other countries will follow our example. See also our Layman report, After-LIFE conservation plan and our After-LIFE communication plan where these issues and more are further described (annexes 1, 11 and 12).

### **Innovation and demonstration value:**

The EU-funding has allowed us to manage the highly mobile invasive alien raccoon dog over several countries, which is absolutely necessary to be able to succeed. We have been highly innovative in our approach, using Judas animals for the first time on an invasive predator and involved both citizens and local stakeholders to participate, with great success. We have demonstrated that by working together over county borders we can stop invasive species in time. See also our Layman report, After-LIFE conservation plan and our After-LIFE communication plan where these issues and more are further described (annexes 1 and 11)

### **Long term indicators of the project success:**

We will continue with our transnational project After LIFE and with our monitoring as well. The monitoring is very important to be able to tell if our management succeed, both in the short- and long term. See also our Layman report, After-LIFE conservation plan and our After-LIFE communication plan where these issues and more are further described (annexes 1, 11 and 12)

## **5.4 Dissemination issues**

The project has been very successful regarding to the objectives of the dissemination plan set out in the revised project proposal which is shown in the table below.

**Table 5.** Dissemination issues.

	Mobile Notice Boards	Press releases	Articles in national press	Articles in local press	Specialised press articles	Internet articles	Tv	Radio	Film	Exhibitions attended
Sweden	10	10	4	10	4	13	6	5	1	5
Finland	10	5		10	3	7	3	2		2
Denmark	10	5		8	1	4	4	2		1
Total	30	20	4	28	8	24	13	9	1	8
Budgeted	6	10	3	10	3	3	5	5	1	3

Annexes 38-54 and 61-65 in Mid Term report and annex 13 are different articles according to the table above.

#### 5.4.2 Layman's report

Layman's report has been produced by Swedish Hunter's Association's professional editorial team and is attached as annex 12 and published on website <http://jagareforbundet.se/vilt/Mardhundsprojektet/>

#### 5.4.3 After-LIFE Communication plan

After LIFE Communication plan is attached as annex 1.

### 6. Comments on the financial report

In the annex 14 "Answers LIFE letters" we have commented details in the Financial Report.

#### 6.1. Costs incurred

PROJECT COSTS INCURRED			
Cost category	Total cost according to the Commission's decision*	Costs incurred from the start date to dd/mm/yyyy	%**
1. Personnel	3 101 310	3 066 025	0,98
2. Travel	741 105	571 479	0,77
3. Outside assistance	350 320	230 449	0,66
4. Durables: total <u>non-depreciated</u> cost			
- <i>Infrastructure sub-tot.</i>			
- <i>Equipment sub-tot.</i>			
- <i>Prototypes sub-tot.</i>			
5. Consumables	434 620	500 708	1,15
6. Other costs	343 000	304 889	0,89
7. Overheads	347 923	327 143	0,94

<b>SUM TOTAL</b>	<b>5 318 278</b>	<b>5 00 693</b>	0,94
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## **6.2. Accounting system**

- We have used electronic time registration systems, ordinary used by the different organizations, together with LIFE+ time-sheets for field staff.
- All invoices are assigned with account codes due to the following:  
37406 (project no) / 8100-8500 (organization) / 9101-9709 (Cost category) / 511-556 (action no).

## **6.3. Auditor's report/declaration**

The auditor's reports is attached in a separate envelope.

## **7. Annexes**

### **7.1 Administrative annexes**

- Attached in the three catalogues “Adm Swe”, “Adm Fi” and “Adm Dk” all administrative documents are placed.

### **7.2 Technical annexes**

- Technical reports, thesis and after LIFE plans are attached as annexes.

### **7.3 Dissemination annexes**

- **Examples of photographs are attached on a separate DVD**
- **Dissemination related products** (brochures, scientific articles, guidelines, books, posters, newsletters) were attached with the Mid Term Report.
- **Video** is attached on a separate DVD.
- **Layman's report is attached as annex 12.**

### **7.4 Financial annexes**

- Types of timesheets used (see above in administrative annexes)

### **7.5 Final indicators tables**

- Annex 17.