



LIFE Project Number
LIFE09 NAT/IT/00095 EC-SQUARE

FINAL Report
Covering the project activities from 01/09/2010 to 31/03/2015

Reporting Date
30/06/2015

LIFE+ PROJECT NAME or Acronym
EC-SQUARE

Project Data

Project location	Italy
Project start date:	01/09/2010
Project end date:	31/08/2014 Extension date: 31/03/2015
Total Project duration (in months)	55 months (including Extension of 7 months)
Total budget	€ 2.001.113
Total eligible budget	€ 1.958.971
EU contribution:	€ 890.000
(%) of total costs	44,48
(%) of eligible costs	45,43

Beneficiary Data

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2.1 Summary

The problem of species conservation

The main objective of the project is the conservation of the native red squirrel (*Sciurus vulgaris*) and forest ecosystems, through actions to prevent a further expansion of the invasive alien species, the Eastern grey squirrel (*Sciurus carolinensis*), which has its native range in North America. The presence of grey squirrels in Italy is a major threat for the long-term survival of red squirrels in Italy and in the rest of Europe. Interspecific competition for food resources causes extinction of the native species in areas colonised by the alien congener (so-called replacement competition). Actions of this project have been carried out in 3 regions, Piedmont, Liguria and Lombardy, where large and numerous populations of grey squirrels occur. Total area covers 54687 km².

Primary objective of EC-SQUARE was the eradication or control of populations of grey squirrels and the only population of Pallas's squirrel (*Callosciurus erythraeus*) present in these regions, in order to reduce the risks connected to the presence of these invasive alien species (IAS) for Italian ecosystems. One of its major challenges was achieving the goal to change the generally negative public perception towards management actions of alien squirrels, and alien species in general, into a more positive opinion.

Short description of expected results on the long term

EC-SQUARE has been the first project in Italy to tackle the management of an abundant and widely distributed IAS in a multi-disciplinary, organised way. Actions initiated during the LIFE project have resulted in the near complete eradication of the alien species in Liguria at Genoa Nervi and in at least two areas in Lombardy and Piedmont. Moreover, intensive control, which will continue also after the LIFE project, will secure the persistence of red squirrel populations in the areas interested by the project. The ongoing removal of *Callosciurus erythraeus* will reduce the risk of expansion of this species in Italy and Switzerland avoiding further negative effects on the red squirrel.

Project management and organisation

After an early re-organisation of the partnership with a first amendment to the original Grant Agreement, project beneficiaries were the three regions: Lombardy, Piedmont and Liguria; three universities, one for each region, respectively Insubria, Turin and Genoa and a private Institute, Istituto Oikos. A second amendment to the grant agreement was necessary to review the budget and obtain an extension of 7 months of the end date of the project, in order to obtain some of the results foreseen in the project. The project management structure was organised (E5) with a *Field operations staff* who supervised fieldwork, in particular the control actions of the IAS (C1-C3), the *Project Manager* who coordinated all the actions, the *Task Force*, composed of members of all beneficiaries, which verified all the project actions and their progress and intervene to resolve critical issues. The *Supervising Team* (coinciding with *Task Force*) verified whether at the end of each year all the objectives were met, evaluate possible delays and propose actions to re-enter in the planned time schedule. The *Project Steering Committee*, which included also representatives of MATTM and ISPRA, allowed direct contacts, updates and collaboration with the Minister and with the national scientific institute responsible for wildlife management.

Section 5.1 contains the technical report on the preliminary monitoring actions and on the conservation/control actions.

In actions **A1-A3** the distribution of the IAS in the three regions was studied. In Lombardy the initial monitoring conducted in action **A1**, revealed that in comparison with the 10 sites with grey squirrel presence known when the project proposal was submitted, no less than 29 sites of presence were discovered (amounting up to 36 during action C1). A1 also allowed the project to determine the IAS occurring in the North of the province of Varese as *Callosciurus erythraeus*. Action **A2** gave an updated picture of the distribution of the largest grey squirrel meta-population in Piedmont and confirmed the occurrence of new, small nuclei of individuals outside the previously known

range. The current range, in the provinces of Turin and Cuneo, is estimated at more than 2000 km² (about 900 km² in 2000). Monitoring in Liguria (Action **A3**) revealed presence of grey squirrels at S. Ilario (Genoa) and at Bogliasco, beyond the Nervi parks. Using Distance Sampling, the Genoa Nervi population was estimated in 2011 in 197 individuals (range 132-294; in 2002: 181, *range* 115-286), indicating a very high squirrel density (18-20 ind/ha), mainly due to large-scale supplemental feeding by park visitors.

Action **A4** carried out an opinion poll on public perception on the threats posed by grey squirrel and possible management actions. The results revealed that citizens had a very limited knowledge about the two squirrel species (native reds and alien greys) and about the negative impacts caused by the introduced species. Also little knowledge about the phenomena and the general problems associated with IAS. Different percentages of the citizens that were contacted were in favour of the various management options that were proposed (euthanasia, sterilisation and neutering), with a more pronounced positive response to eradication actions if these are supported by the Regional Authorities, EC, and environmental associations. Results of the poll have been used to define the GMP and communication strategies (Action **D1**). The *General Management Plan (A5, GMP)* has been produced in three different documents, one for each region. The GMP described in detail the possible options for control and eradication of the two alien squirrel species. The scientific unit of the *Task Force* has produced *Pest Risk Assessments (PRA)* for the alien squirrel species introduced in Italy (**A6**). The Task Force collaborated with MATTM (Ministry of Environment) in preparing the Interministry Decree on trade ban of the grey squirrel and other two alien squirrel species published in the official GU on 02/02/2013.

Management of alien squirrels in Lombardy was carried out under action **C1**. The unexpected expansion of grey squirrels in Lombardy made it necessary to redefine the objectives of C1. Based: (i) on the priorities formulated in the Decision Support System (DSS); and (ii) on positive contacts with stakeholders and private estate owners, active support by staff of regional parks and/or provinces and distribution of squirrels in areas with little public disturbance, controlling grey squirrels started in 3 macro areas in the eastern part of the distribution range. Moreover, to avoid colonization of Switzerland, the removal of *Callosciurus* in the province of Varese, where monitoring revealed a population at only 5 km of the Swiss border, started. Thus, Uninsubria in collaboration with local authorities responsible for wildlife management, carried out trapping and euthanasia in 4 out of 8 macro areas identified in the GMP: Alto Varesotto, Lambro Settentrionale, Adda e Triangolo Lariano. Trapping success was calculated as the ratio of number of animals removed on original population size, estimated using *Catch Per Unit Effort (CPUE)* method. The animals killed were sent to Milan University for analyses on micro- and macroparasites and subsequent handling of the carcasses. Trapping of the IAS has resulted in a marked decrease in population size and halted any further expansion in the macro areas where control was carried out. In some trapping sites, complete eradication was achieved. Moreover, most sites where grey squirrels were strongly reduced, were recolonized by native red squirrel. Eradication/control of IAS will continue after the LIFE project, following priorities defined in *Grey squirrel permanent control plan* for Lombardy. For the *Callosciurus* population, the Task Force and Servizio faunistico of Varese province have developed a technical protocol for a 5-year management project which will directly involve the staff of provincial police and trained personell.

In Piedmont, due to the wide distribution and large population size of grey squirrels, action **C2** was limited to experimental control aimed to test the possibility to stop further expansion of the IAS and save vital populations of native red squirrels. Based on an analysis of habitat characteristics, connectivity, grey squirrel abundance and the occurrence of local or nearby populations of red squirrels, the Task Force decided to concentrate efforts along the southern and western limits of the colonization front. Control was carried out in three types of habitats: 1) private parks with high quality woodland and a local grey squirrel population at high density (source area); 2) large lowland mixed deciduous forests with residual red squirrel populations at risk by recent colonisation of grey

squirrels; 3) riparian woods acting as dispersal corridors. In Piedmont, the start of action C2 was delayed because of three problems: 1) 3 appeals by animal welfare groups against the regional
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authorization to proceed with control of grey squirrels; 2) the regional law on hunting and wildlife management was cancelled; 3) problems with communication and level of decision taking between DG Environment of Region Piedmont and the Provinces involved. Once these problems were resolved, trapping started experimentally in 2013 followed by a continuous and more intense trapping program in 2014: 10 areas in Cuneo province and 6 areas in Turin province. The animals killed were sent to UniTO for analyses on micro- and macroparasites and subsequent handling of the carcasses. UniTO collaborated with La Mandria Regional Park (Turin province) to eradicate a small population of grey squirrels. This park contains the largest lowland forest of Piedmont. Removal of the IAS has allowed the conservation of a healthy red squirrel population. Overall, C2 actions in Piedmont have resulted in strongly reducing grey squirrel numbers in the control sites, thereby saving red squirrel populations in three large lowland forests (La Mandria and 2 woods at Staffarda). Moreover, conservation of red squirrels through removal of greys has started in two other areas in Cuneo province. Grey squirrel control should continue after this LIFE project. Initially with the collaborations of staff of the provinces of Turin and Cuneo, as done during the project, and at a second stage, a new regional law on wildlife management should regulate how and by whom this control must be carried out.

Action C3 planned the eradication of grey squirrel population present at Genoa Nervi and surrounding areas through live-capture and surgical sterilization. The GMP Liguria had planned to keep the sterilized animals in captivity, but this option received a vast amount of criticism by local groups that were against the project which obtained support of badly informed journalists from local newspapers. Therefore, the *Task Force* adjusted the GMP, applying the option to release the sterilized animals in other urban parks in Genoa (Villa Gambaro and Valletta Cambiaso). Sterilized animals were checked for parasites and diseases and biological samples were taken and sent to IZS of Piedmont, Liguria and Valle d'Aosta or other veterinary institutes. At the end of the project, 324 grey squirrels have been trapped and removed with no cases of accidental death during trapping or transport to veterinary clinic. 23 animals died while at the clinic, mainly due to complications during or post-surgery. Problems were encountered during trapping activities such as vandalism and intimidation of staff involved in the actions. A continuous and patient information to people visiting the park resulted in a slow but marked change in the attitude of most of the public towards the project from hostile to sound criticism. To tackle this problem, with modifications approved with the second amendment of the grant agreement, specific resources were allocated to establish a press office in Liguria, with the collaboration of the environmental NGO Legambiente, which offered information to journalists, veterinarians and animal shop keepers and organized a social network page. The strategy was to shift the discussion from a purely emotional and ideological level (preferred by the extreme animal welfare groups) to one based on scientific evidence and ecological principles. Monitoring and removal of the few grey squirrels remaining in the area has continued after the end of the project's fieldwork. Only 4 animals were trapped in 4 months. It is therefore possible to conclude that the eradication of grey squirrels at Genoa Nervi is nearly complete and that this is the first eradication conducted using trapping, surgical sterilization and subsequent release of sterile animals in non-target areas.

Action C4 has provided the Guidelines for habitat improvement for red squirrel conservation (LGF). The implementation of LGF was conducted in two protected areas, using extra-LIFE regional funds dedicated to the creation of a regional ecological network. The project also included the possible reintroduction of red squirrels in areas where the alien species was removed; however, this part of the project has not been implemented. This is because reintroduction was not necessary: in fact in many areas where the alien squirrels was removed, live-trapping of red squirrels increased, indicating a natural re-colonization following the removal of the limiting factor (the presence of alien squirrels). Action C5 provided for a test on the efficacy of special feeding hopper

prepared by the Forest Commission (UK) and considered "red-only" as it would allow for the additional food supply of red squirrels even in the presence of grey squirrels. The feeding hoppers proved to be not sufficiently selective, and were widely used also by grey squirrels. Therefore, it was considered unnecessary to use them to provide additional food to the red squirrel in the control

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areas. Moreover, given their non-selectivity, they specific guidelines for their use were not produced. Action **C6** was aimed to verify the suitability of urban parks in Genoa for the red squirrel. Parks were monitored for the presence of the native species, gathering information also on different types of vegetation. The presence of the red squirrel was confirmed in many of them. In 2012 activity to support the red squirrel started with the placement of feeders, nest boxes with camera traps and information boards about the project. The action also included the possible reintroduction of the red squirrel in the parks of Genoa Nervi, as 'social compensation' to the removal of grey squirrels. However, it was not possible to have support from the Municipality of Genoa, which owns the area, and therefore the reintroduction was not conducted.

It must be underlined that the project was strongly hindered by some animal welfare groups and other local groups, in all regions involved in the project, but particularly in Genoa, where activities in an urban park increased the media coverage and the initial aversion to the management of the grey squirrel population. In particular, we can highlight: three appeals to the Administrative Court and two appeals to the State Council of Piedmont and Liguria, interpellations to the Government in the House and Senate, queries to the Regional Councils of Lombardy, Piedmont and Liguria, discussions at the Environmental Commission of the Province of Milan with interviews of the Project Manager and the representative of RLom, requests for access to documents in the three regions, provinces, parks, University of Insubria, collecting of signatures at the local and national level, a petition to the European Parliament, mail bombing against email addresses of UniGE and RLom. The project was also the object of widespread vandalism and intimidation (e.g. photo of Task Force members and other operators on web sites with indication of their role as 'exterminators of squirrels'). All these opposition activities have been addressed by the Task Force, changing the actions when possible and increasing the communication with stakeholders, the public and the media. This has resulted, in time, in a more civil discussion with most of the groups that originally opposed the entire project and meetings between Task Force members and local animal welfare groups have been organized, in order to discuss possible joined solutions to the grey squirrel problem in some key areas.

Section 5.2 describes the communication activities, with the following general objectives:

- Spread information at the local and national level about the effects of the competition between the introduced grey squirrel and the native red squirrel, in order to increase the social acceptance of the management activities.
- Reducing the negative perception of control activities among authorities and others 'Policy makers' and citizens in general.
- Explain aims of the project and raise awareness about the importance of forest biodiversity, leading to a broad support for the objectives of EC-SQUARE.
- Disseminating information on the impacts on species and ecosystems caused by alien species, in particular, the negative effects of the grey squirrel.

Information and awareness activities have been developed as part of the actions **D.1-D5**, which had the following objectives

D.1: communication strategy

Objectives: to produce a communication action plan (CAP) and an information campaign, in order to change the attitude of the public and stakeholders on the control of the grey squirrel and raise awareness on the importance of the red squirrel in forest ecosystems. The CAP included the contents of the public survey and identified the themes and key messages of the project, renamed as '*ROSSOSCOIATTOLO*', developed a logo and a graphic line for all materials, identified main stakeholders, proposed a communication strategy. A total of 88 meetings were held with

stakeholders, authorities and citizens in general. During the project, the resources allocated to communication have been increased in order to intensify activities aimed at reducing the opposition

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to alien squirrels management. This allowed us to recruit specialized companies and associations for their support to communication.

D.2: environmental education

Objectives: improving knowledge in primary and secondary school children, the general public and stakeholders on the role of the red squirrel in forest ecosystems and the impacts produced by the grey squirrel; in particular, the activities with pupils have the aim to reach also their families, thereby expanding their effectiveness. The activity involved the preparation of an Educational-kit including an interactive game 'What happened to Mr. Red'. In the school year 2012/2013, 131 classes have been involved in environmental education activities, including a Contest between classes. Additional activities with the involvement of other classes were held in the two following years. The action also provides for the production of prototypes (6 in Lombardy, 4 in Piedmont and 2 in Liguria): innovative structures designed to facilitate the observation of red squirrels in nature and therefore aimed to increase the public's perception of direct contact with squirrels and other animals.

D.3: website

Objectives: to put online the website of the project as the main tool for the dissemination of information on EC-SQUARE activities; making available to stakeholders and the general public, information, educational material, scientific reports. The project website has been the focus of the communication and was greatly followed: over 57,000 hits, more than double than expected; it has been continuously updated with news, newsletter, documents, photo and video materials. Linked with the website, two Facebook pages were activated: one on the project in general and the other specific for Liguria.

D.4: producing a video on the project

Objectives: to produce a professional documentary and another one more technical on the project activities, the scientific approach to the management of alien species with particular reference to the grey squirrel and its impacts, the need to preserve native species as a key element of local biodiversity and part of ecosystems. The two videos were produced and the movie of the project was shown at public meetings when possible.

D.5: international networking

Objectives: to promote networking activities with other European experts on squirrels and on the management of introduced species; disseminate information related to the introduction of the grey squirrel and the conservation of the red squirrel, the methods developed and the results achieved by EC-SQUARE. The networking action was very intense; the PM and other members of the Task Force have participated in 15 events (national and international conferences and congresses) presenting the results of the projects and methods developed; 16 researchers and managers were invited to visit the project for a discussion on techniques and results. The Task Force produced 6 papers published in international peer-reviewed scientific journals; others are in preparation. In **section 5.3** an assessment is made of the project progress. Actions C1-C3 have adopted standardized methodologies for the capture of animals. Within the actions C1-C2 guidelines on squirrel euthanasia has been developed, which will be the reference for similar projects; in C3 the eradication of a population with the surgical sterilization of animals was achieved for the first time. In this section (5.3.1.1) a table is reported with a summary of main results. Communication activities have been a key component of the project (5.3.1.3) and required a considerable effort of staff and an increased budget.

The long term benefits of the project (**section 5.4**) are many.

The direct environmental benefits include:

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- The removal of alien squirrels from about 3,000 ha of forested areas and the re-colonization of

these areas by red squirrels.

- The almost complete eradication of the grey squirrel population at Genoa Nervi and in neighbouring areas (trapping of the last animals is underway in the post-LIFE).
- The implementation of activities aimed at eradicating alien squirrels in four macro areas (out of eight in total) in Lombardy; one a few km from Switzerland.
- In Piedmont, activities began to control the largest Italian grey squirrel population; a small population of grey squirrels has been eradicated in the largest lowland forest of the region, a habitat of great importance to preserve lowland forest biodiversity and for red squirrels.

The positive effects of the removals are evident by the ongoing process of re-colonization by red squirrels in areas where grey squirrels were removed. The risks for the red squirrel conservation is still present, since only the complete removal of the grey squirrel or an extended control of the remaining populations, will ensure the maintenance of viable populations of the native species in the long term.

At Genoa Nervi the project conducted the first eradication of an alien species through capture and surgical sterilization of the animals. The project is characterized by a strong innovation compared to more traditional methods of eradication.

In Lombardy, where the grey squirrel is present with many populations, a Decision Support System (DSS) was produced, in order to help to identify priority areas for the grey squirrel management. The guidelines to improve the forest suitability for the red squirrel have been implemented in three regional parks; it is expected to be used in other forest management plan promoted by RLOm in partnership with ERSAF.

The project has generated economic benefits; others are expected in the long term. In particular:

- 12 'prototypes' were made in the three regions to promote the observation of squirrels in nature.
- Two companies were responsible for carrying out environmental education activities in the three regions; another two in Lombardy and Liguria were appointed for communication activities and education.
- Universities have recruited a full-time Project Manager and 5 *Junior Technical Project Assistants* and 1 *Wildlife Manager* with *part-time* contracts for actions A1-A3 and 7 *Junior Technical Project Assistants* and 1 *Wildlife Manager* with *part-time* contracts for actions C1-C3.
- The vets contracted in Genoa were able to sterilize over 300 squirrels, acquiring a unique professional experience in Italy and developing a clinical protocol that will be proposed as a reference.

The social effects of the project have gained a greater awareness at the local and national level of problems related to the introduction of alien species and the impact that these exert on ecosystems and biodiversity. From this point of view EC-SQUARE was a pilot project, because it treated the management of an exotic and 'charismatic' species with a strong emotional impact on the audience. The dissemination activities focused on different levels, from the public and local stakeholders to national, as well as children in the primary and secondary schools and their families. The high media coverage of the project, with a press article on average every week for four years, testifies the critical nature of the topics addressed by the project.

Section 6 provides a statement of the financial situation of the project. The total cost of the project was € 2,001,113.17 representing approximately 103.7% of the estimated budget after the amendments. Significant differences are due to a greater commitment of staff (+ 14.9%) and a considerable saving of consumable material (-22.2%, in particular bait) and 'other costs' (-54%). The project involved a significant commitment from the staff, both for activities in the field and need for ongoing relationships with a number of parties who for various reasons were interested in the project, to continuously adapt the overall strategy during the follow-up of the actions and to implement an effective proactive communication. In the original project there was an

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underestimation of the budget needed in terms of man-hours. The extension of the project for seven months has also resulted in a further commitment in terms of personnel, but it was essential for

achieving some of the project goals.

Under-spending in consumables is due to savings on budgeted expenses and a change in the quality and quantity of bait used for traps. Savings were also made in the purchase of the traps and the material for euthanasia.

The savings in the 'other costs' category are mainly due to lower expenses for participation in conferences and seminars and for the invitation of experts. The saving is mainly related to a careful evaluation of the costs during the trips of the project staff and the hospitality of experts, with the widespread use of low-cost airlines and hotels.