

4th Year Results Summary

Projecto LIFE Biodiscoveries

A. Framework:

Starting on the 1st of July, 2014, the LIFE Biodiscoveries Project funded by the LIFE+ Community Program, aims to promote public participation as a means of control and removal of invasive species in the Local Natural Reserve (RNL) of Mata da Machada and Sapal do Rio Coima, in municipality of Barreiro. The target invasive species are the acacia (7 species present) and the ice plant which occupied respectively 44 and 26 hectares, at the beginning of the project, in a total area of 380 hectares of the RNL.

The target audience includes individuals - individually or in an informal group - families, groups of retired citizens, companies, the school community and associations, which are part of the project, both in sporadic actions and regularly, by adopting work plots.

The development of the work allowed us to verify that the strategy of management of volunteers and, consequently, of communication, implies adjustments in response to the initial predictions, and the project is more open to the informal public, families and individuals. On the other hand, a great effort is being made to maintain the interest of volunteers, rather than investing in attracting them.

The motivation of volunteers may include the reinforcement of communication and proximity, with actions to recover the natural systems, which is seen as positive, rather than the negative actions of "killing" trees and the natural frustration of dry years that make it difficult to bark.

There has been a progressive increase of the importance of the recovery of the Zebro stream within the project, as a motivation of the community regarding the forest management and the need for control of invasive species, in addition to be a unique opportunity for the expansion of hygrophilous habitats.

B. Results of the work and its evolution:

As mentioned in the previous reports, the plots may have different dimensions and characteristics, but the presence of the target invasive species was identified. It should be noted that there are plots assigned to volunteers and others that are the responsibility of the technical team of the project. This team is still formed by prisoners of the Montijo Prison, as a result of the established protocol between this entity and the City Hall of Barreiro.

The **technical team** carries out a fundamental work in the initial cleaning of the plots, so that volunteers can easily access the acacia trees and the ice plant. This team also performs acacia ring-barking, but in large

individuals, where other material is needed and also in plots that present isolated trees, which is a fundamental procedure to contain the invasion.

Regarding the **management of invasive species with volunteer work**, it is important to note that this is the central pillar of the project. The plot is assigned according the number of people in a group, the preference of species, area and location. The project team takes special note of the characteristics of each group, as follows:

- Seniors – The posture required to remove the ice plant and/or acacias shoots causes unnecessary effort and discomfort.
- Children up to the 6th grade – To make the ring-barked, the use of knives is required, which is not advisable for these children. Thus, their work is transferred to the removal of ice plant and acacia shoots.

So far, it has been possible to involve **7211**, considering that some of them had very sporadic performances and a small group of less than three dozen people, work continuously, at least once a month.

Regarding the results on the field, after a gradual decrease in the invasion of the RNL in the previous years, more expressive in the case of the ice plant than in the acacia trees, there is a decrease in the rate of retreat of the area invaded by acacia.

On one hand the initial option was to control the invasion from outside to the inside, intervening in large areas, but with few people, which resulted in a faster initial decrease in the invasion area. On the other hand, the bark difficulties during the drought decreased the work effectiveness, requiring more time for the treatment of the same area. In addition, more follow-up interventions have been needed to control seed germination and the regrown from stool, which reduces the resources available to increase the barked area. Finally, there are some areas of invasion expansion, as expected.

Resuming, the decrease in the area of invasion of acacia has been slower, but centered on nuclear and dense areas of acacia trees, being expected until the end of the project that at least five hectares of a central area of the densest nucleus of acacia will be considered as without invasion, as an example of the usefulness of the continued efforts of volunteers, even in areas of strong density of invasion.

C. Monitoring of project results

MONITORIZATION OF THE RESULTS OF REMOVAL OF INVASIVE SPECIES

The aspects covered in this monitoring are:

- **Evolution of invasion:** This monitoring refers to the overall assessment of the invasion, that is, which area of invasion, distinguishing acacia and ice plant.
- **Work intensity:** it is intended to evaluate the intervention made on each plot, that is, the evolution of the work performed.
- **Work outcome:** it is intended to evaluate the results of the interventions, whether the work is producing the expected effects or not, on each plot.

Regarding the **evolution of the invasion**, the annual results of the invasion can be found in the table below, which reflects the area of annual invasion by species (in hectares):

	2012	Δha	Sep 2014	Δha	Sep 2015	Δha	Sep 2016	Δha	Sep 2017	Δha	Sep 2018	Δha	Sep 2019
<i>Acacia</i> sp.	30.5 ha	+13.6	44.1 ha	+1.44	45.54 ha	-16.12	29.42 ha	-2.86	26.56 ha	-1.05	25.51 ha	-0,61	24,9
<i>Carpobrotus</i>	19.7 ha	+5.9	25.62 ha	+2.4	28.02 ha	-24.17	3.85 ha	-3,22	0,63	-0,45	0,27	-0,11	0,16
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The **work intensity** refers to the amount of work performed on the plot, that is, observation the plot, an evaluation of the intensity of work that was done by the volunteers, or by the technical team, in it is made.

In 108 of the 139 plots there was a high work intensity (corresponding to 57,21 of the area of invasion, either acacia or ice plant), 13 plots presented an average intensity (corresponding to 4.44ha), 1 presents low work intensity (3.14 ha), and 5 still without intervention (2,48ha), but being the terrain already prepared and clean for the intervention of volunteers.

The **work result** refers to the effects of the developed work on the acacia and the ice plant.

It was verified that o a total of 57.21 hectares, 50.8 hectares showed high results, that is, the work carried out resulted in the death of trees and ice plant, or very deep allocation, 3.75 hectares showed average results, 1.84 hectares showed few results and 0.67 have not yet shown results, mostly due to the recent intervention.

MONITORING THE RECOVERY OF HABITATS IN THE INTERVENED AREAS

Regarding the recovery of **habitats in the intervened areas**, the monitoring work shows that there have been minor non-significant changes. Even at the level of specific wealth, where there were significant changes (great ascent followed by a little less accentuated descent) it is thought that the cause is related to the differences of precipitation between springs and not with the project. This means that the elimination of acacia and ice plant still has little impact on conservation of habitats, both positively and negatively.

Recently, the plots in which the habitats with the highest conservation value, which are the ones that are most closely monitored, have been intervened more consistently. But adverse weather conditions advise some caution in interventions, and it is wiser to wait for wet years, with lower risk of loss of hygrophilic values, to test interventions that may influence soil moisture. Also for this reason, the project has sought to create new areas with conditions to evolve into hygrophilic habitats, rather than interventions at the periphery of the existing ones.

The recovery actions of the Zebro stream are being reinforced, and it is expected that it will translate, in the long term, into new areas with hygrophilic habitats, which will certainly not be subject to evaluation on the horizon of the project. These actions are expected to progressively renaturalize the stream, with the replacement of the acacia trees by the banks for willow trees, changing the river bed's profile, from forest drainage ditch to a more naturalized profile, in addition to the diversion of water to surrounding areas of the stream whose topographic conditions are favorable to accumulation.

A second nucleus of *Euphorbia uliginosa* was discovered, in addition five new autochthonous species, *Centaurea melitensis* L., *Danthonia decunbens* (L.) DC., *Deschampsia stricta* Hack, *Euphorbia terracin* L. and *Hypericum elodes* L., were found, and *D. stricta* should be highlighted for being a lusitanian endemism.

Regarding the coverage of exotic species, there has been a significant generalized decrease. This happens because eradication actions continued to be carried out.

MONITORING THE SOCIO-ECONOMIC IMPACT OF THE PROJECT

The **monitoring of the socio-economic impact of the project** is carried out through surveys of the population, in three distinct phases: in the beginning of the project, in order to have a reference situation; in the middle, in order to detect possible deviations from the normal development of the project and its objectives; and at the end of the project.

The third survey will only be made closer to the end of the project, the reason why there are no changes to the previous report.

D. Environmental awareness and dissemination of results

Regarding the awareness raising, it was created the initiative **Invasion on Sunday**, on the third Sunday of each month, in order to support all those who wish to make their contribution to the control of invasive species and to encourage participation. Thus, between 9:30 am and 11:30 am, a project technician is on site, available to receive and accompany volunteers who have already adopted plots and who feel the need for some support, or other participants who want to try the bark technique. This action began in July 2017.

After promising initial actions, the joint initiatives with **Plantar1árvore** and **ASPEA** didn't have a relevant follow up, although there are results occasionally.

In addition, contacts were made with **companies**, so that they can join the actions of the project. This effort has resulted in the participation of some companies in different initiatives, either through direct contacts, either through GRACE, a business association linked to social responsibility, or through QUERCUS.

The **Subida do Rio Coina (Up the Coina River)** is another initiative that is already included in the annual program, and it is a more informal way to reach the general public and communicate the role they may have in the development of LIFE Biodiscoveries.

Throughout the project, a number of public awareness initiatives were promoted on various topics such as seed sowing, nature walks, natural engineering and identification of the flora and fauna of the RNL. In the last year, the availability of buckets of acorns in a main trail of the forest, allowing anyone to contribute easily to the expansion of the cork tree area.

Regarding the dissemination of the project and its initiatives, it is used the contact database of the Mata da Machada and Sapal do Rio Coina Environmental Education Center (CEA), and other databases project-specific were created, which include:

- Volunteers
- Individuals who have already been involved with the Project but have no adopted plot
- ONG's
- Universities
- Companies

– Municipalities

– Media

Every month is sent to everyone a newsletter of the project. Press releases are also sent to the media. Since the beginning of the project, several promotional material has been produced, such as posters, flyers and brochures, in digital and printed editions. The Municipality of Barreiro publishes the "Folha Viva" magazine, with information about the activities carried out in the Environmental Education Center, which always includes information about the actions carried out for the Biodiscoveries Project. CEA's Facebook page is also a platform that is often used to announce Biodiscoveries initiatives.

The initiatives of the project are also published on the website and in the newsletters of this municipality.

TECHNICAL SEMINARS:

An effort was made to organize seminars covering diverse topics and different target audiences, while serving as a strategic change in communication and recruitment of volunteers.

For this reason, for the first time, it was held a seminar organized together with another organization, allowing to cross different networks of influence.

– "Machada: What future?" Seminar

It took place on February 9th and was attended by 45 participants. The aim was to discuss the role of ordinary people in the management of public spaces such as Mata da Machada and the Local Nature Reserve. We have joined experiences of people and organizations working directly with the mobilization of communities in the management of the natural spaces that concern them.

– Seminar "Ecosystem Restoration"

This seminar took place on May 11th, and was held together with MONTIS - Nature Conservation Association, and had 34 participants. Examples of territory management and tools that enable the development and recovery of ecosystems in a more sustainable way have been presented.

Networking:

Biodiscoveries was in different initiatives, which allowed to make on the one hand the dissemination of results, but also the exchange of experiences and networking with other project and realities.

The following stand out:

– Universidade Católica - September 2018

A group of 120 students from the Faculty of Humanities of the Universidade Católica, who organized several volunteering and personal enrichment actions to celebrate the start of the school year. Thus, they had the opportunity to get to know the problem of invasive species management and working methods.

– Closure of the LIFE National Training Project - December 2018

As part of the closing event of the LIFE National Training Project (LIFE14 CAP/PT/000004) of the Portuguese Environment Agency, a field trip was held in the Machada woods. The 22 participants observed life the results of the project, the recovery of Ribeira do Zebro (stream), emphasizing the importance of the technical team

and the motivation of volunteers through complementary actions, such as plantations and natural engineering.

– **Câmara Municipal de Torres Vedras - January 2019**

Part of the Life Volunteers Escapes project, a technical coordinator and three volunteers who will work in the control of invasive species in the municipality of Torres Vedras visited the Biodiscoveries. During this visit they were able to observe the interventions and methodologies performed, as well as the conditions of success or failure of these.

– **Escola Secundária de Casquilhos - March 2019**

The Escola Secundária de Casquilhos carried out an awareness-raising action for volunteering. The LIFE Biodiscoveries project presented some of the volunteers' work in the management of invasive species of the Machada wood, by the ice plant pluck and acacia bark.

– **Instituto Superior de Agronomia - March 2019**

Sixteen students and two professors of the Forest Engineering and Forest Resources degree of Instituto Superior de Agronomia came to the Local Nature Reserve for a route, focusing on the results of the ice plant plucking, particularly regarding the balance of the salt marsh ecosystem.

– **Controlled Fire Action - January 2019**

Two hectares of land in the Machada Forest were the target of a controlled fire action. This action aimed at controlling acacia trees by reducing the number of viable seeds in the soil. It was attended by the ICNF, the firefighters and the Technical Forestry Office of the Barreiro City Hall, insuring that all the safety procedures necessary to carry out this action were assured and, above all, it was a very important moment of dissemination of the project and dissemination of its results.

E. Summer camps

For the fourth consecutive year, questionnaires were conducted for the children who participated in the five fortnights of the Summer Camps in Mata da Machada. The questionnaires were conducted at two different moments: on the first and last day of each fortnight.

In 2019, the Mata da Machada Environmental Education Center also promoted a Summer Camp for adolescents. Aged between 13 and 15 years, with activities that fit the objectives of the LIFE Biodiscoveries project. Thus, surveys were conducted in this group of young people.

Participants answered the following questions:

- *Do you know what invasive species are?*
- *Can you name some invasive species?*
- *Do you think invasive species are harmful to nature?*

Since many of these children attend the Summer Camp in consecutive years, we chose to include one more question:

- *Is this the first time you've participated in the Summer Holiday Camps of Mata da Machada?*

This question allows us to assess whether the knowledge acquired in the previous editions remains in the following years.

From the analysis of the surveys it was possible to verify that the knowledge, on the Invasive Species subject, is easily apprehended by children and that better results are obtained with more practical actions.

F. Conclusions:

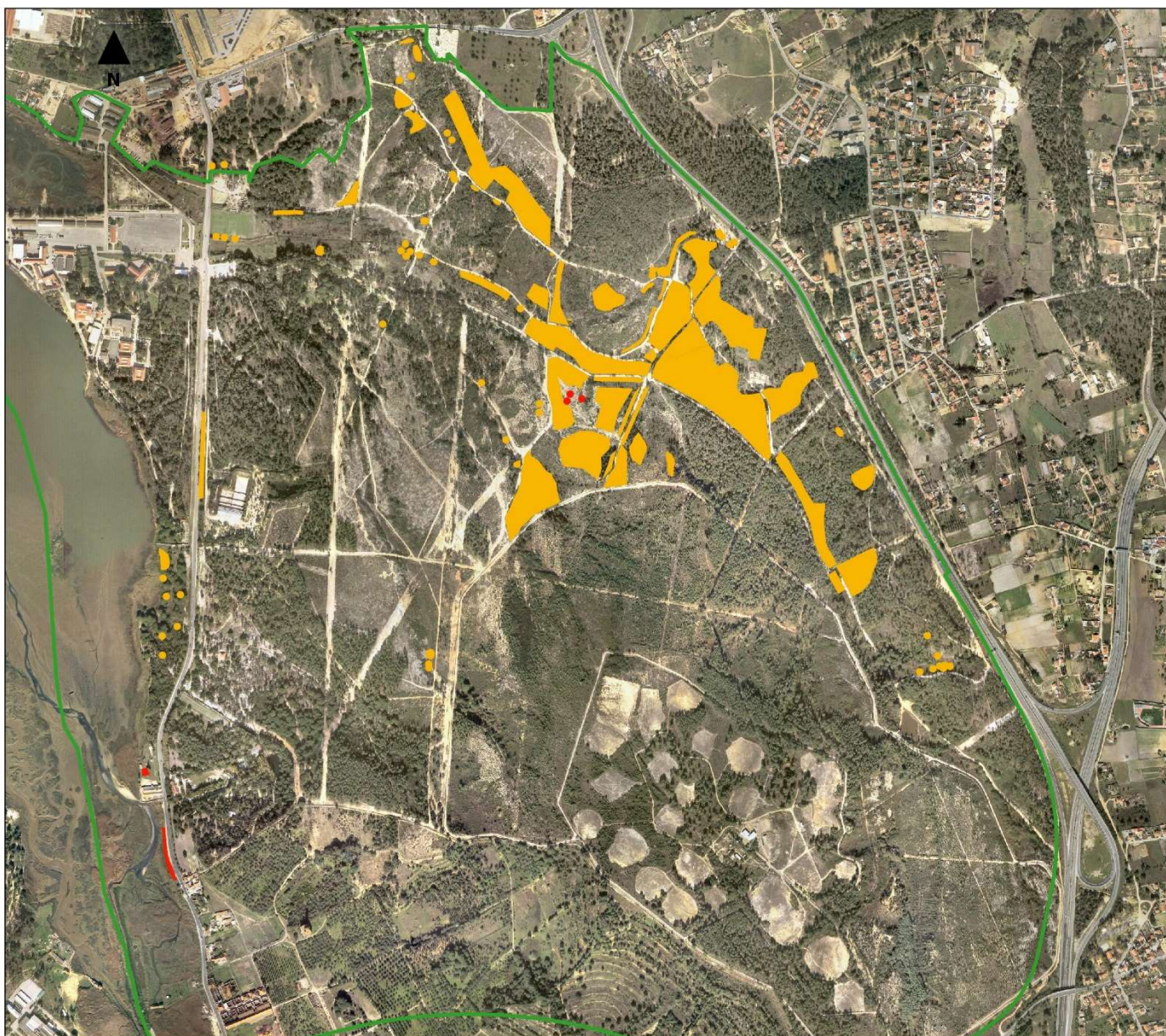
The main result, which will be certainly projected beyond the end of the project, is the way the City Council, as a whole, but more specifically in the departments most directly involved in the management of public space, took in the concerns with the management of invasive species.

The first consequence of this change (the application itself initially had to overcome internal resistance due to lack of awareness of the problem) is the integration of components related to the management of invaders in the general environmental awareness and management actions of Mata da Machada, an aspect that will hardly fail to be held in the future.

The implementation of the Biodiscoveries project made the technical team meant that the technical team had to adapt several times, since the application was carried out based on assumptions that did not always take place. Nevertheless, it is considered that on the field, it is possible to verify the very positive results, such as the reduced area of existing ice plant and the significant reduction of the invasion of acacia trees.

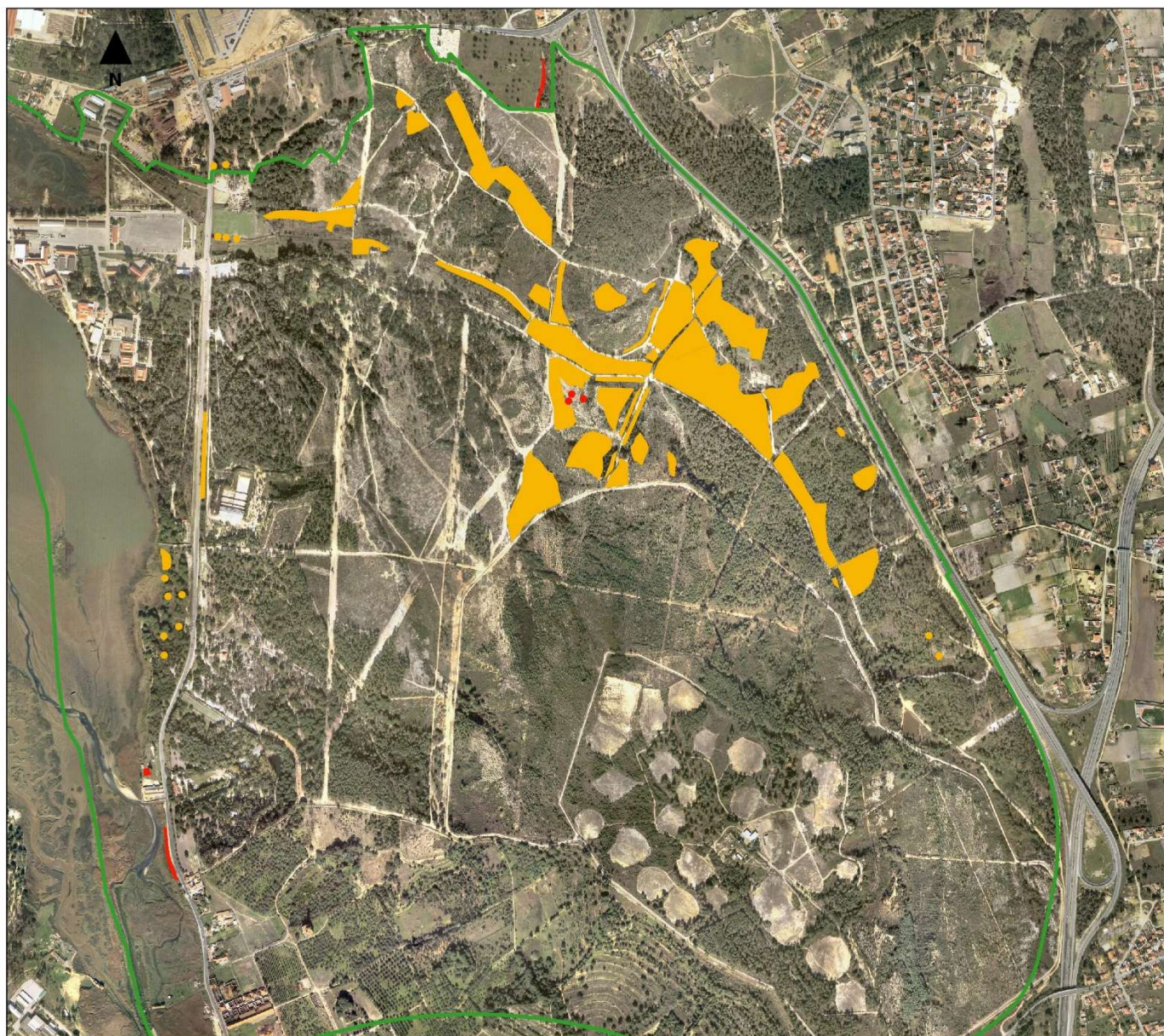
During this period, an effort was made to involve several target audiences, through initiatives to raise public awareness and recover the intervened areas. The latest were not foreseen, but have proved fundamental for attracting new volunteers and maintaining the motivation of older volunteers.

ATTACHMENTS



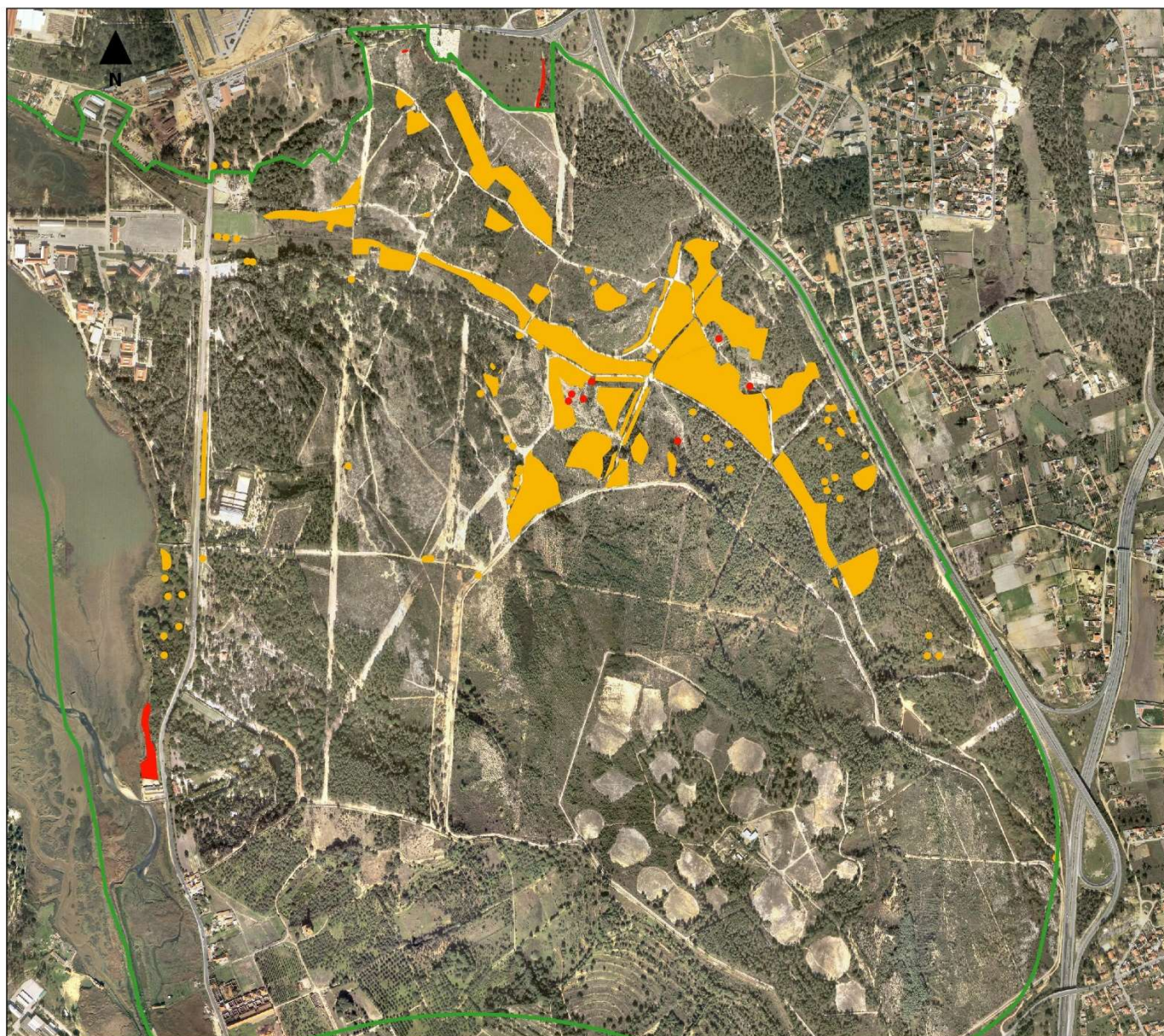
Legenda

- Reserva Natural Local
- Acácia sp.
- Carpobrotus edulis



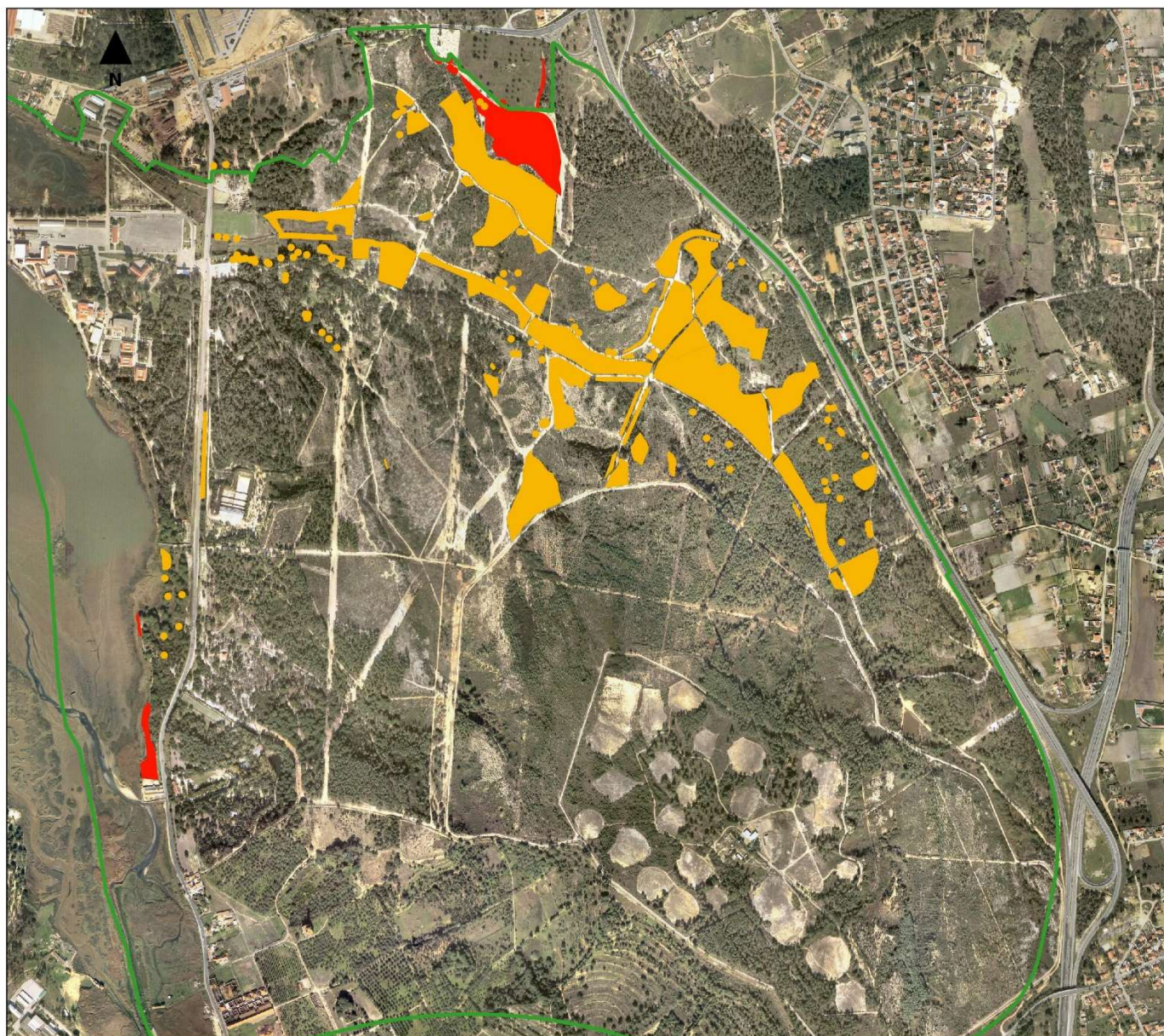
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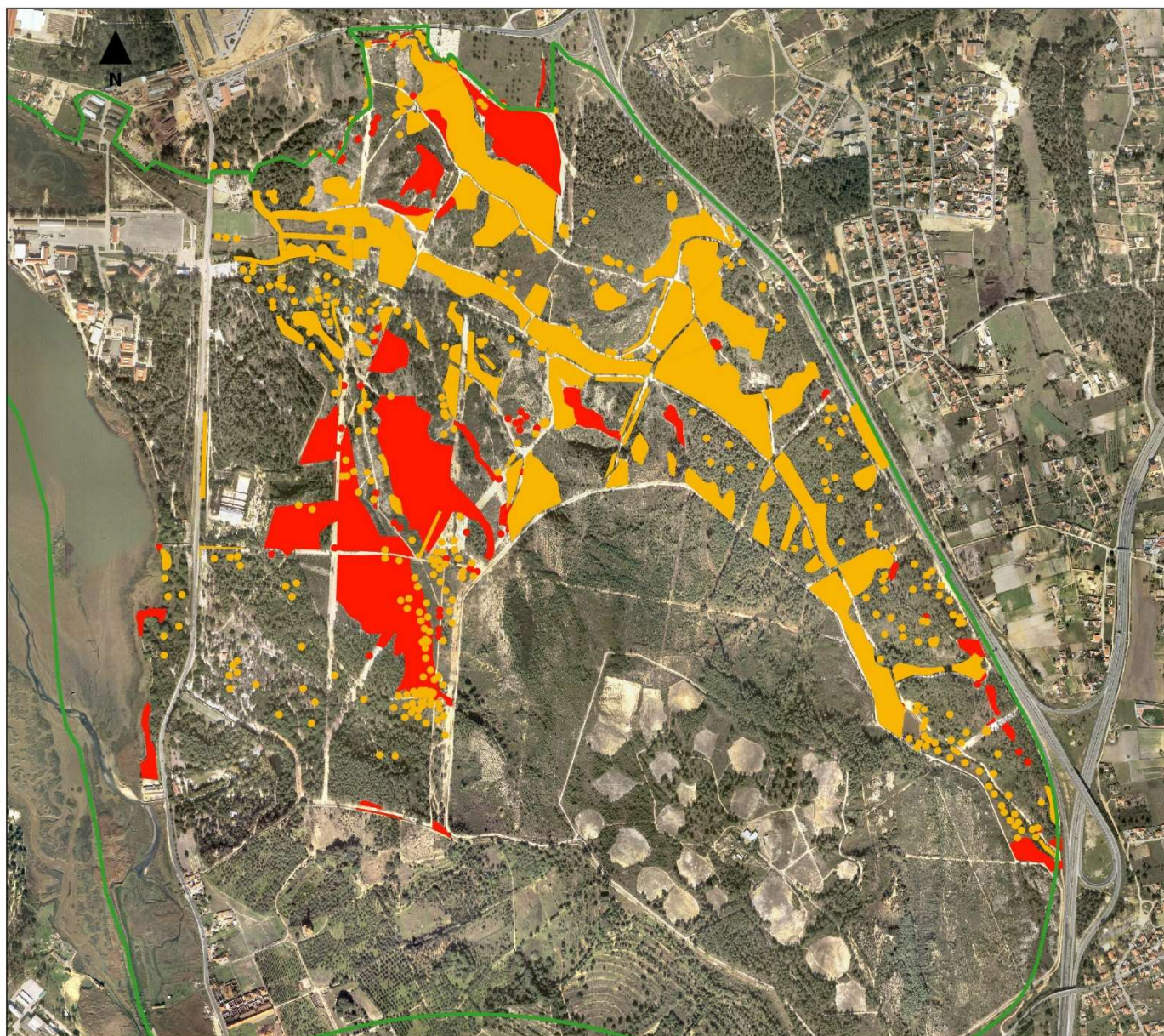
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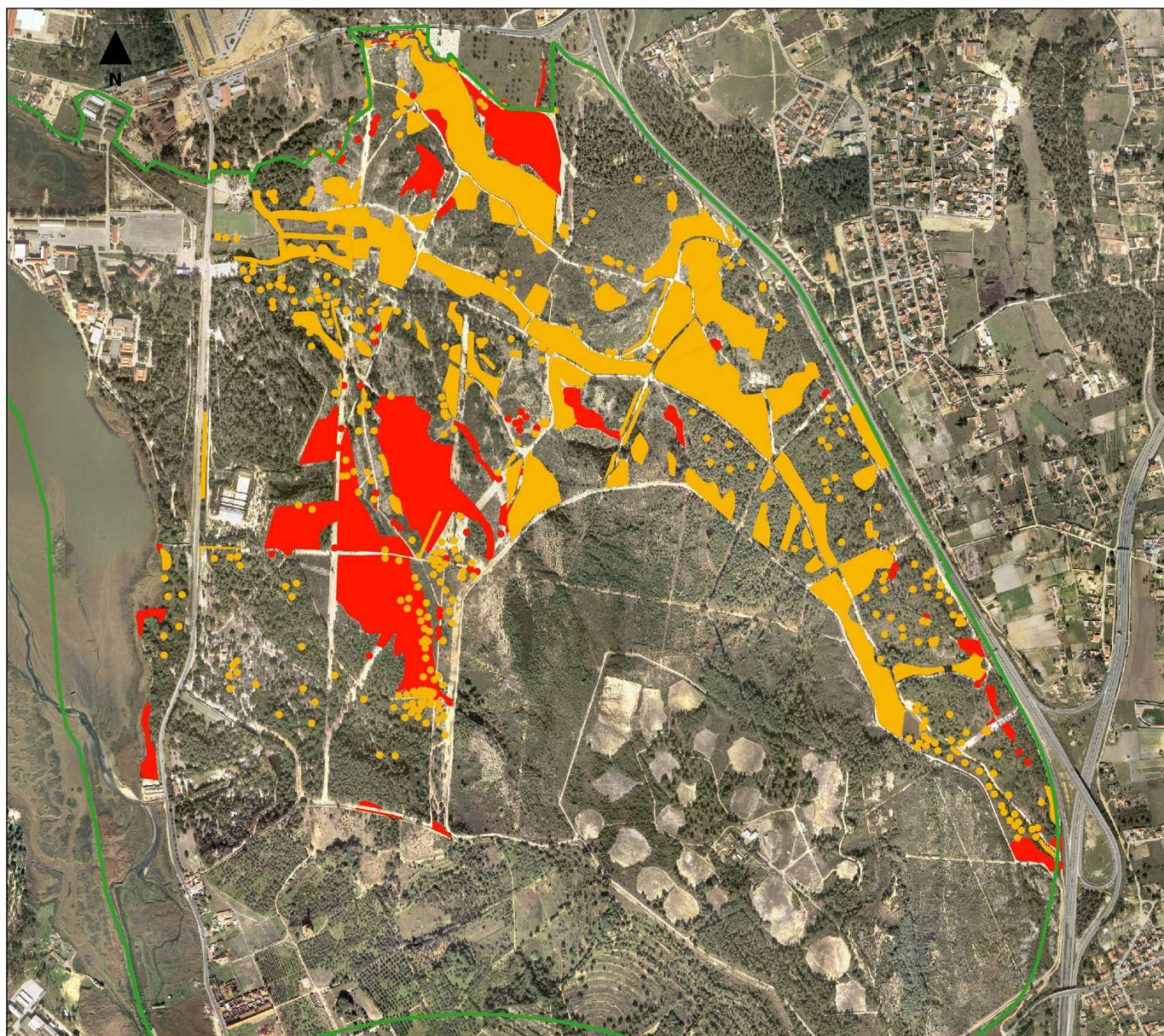
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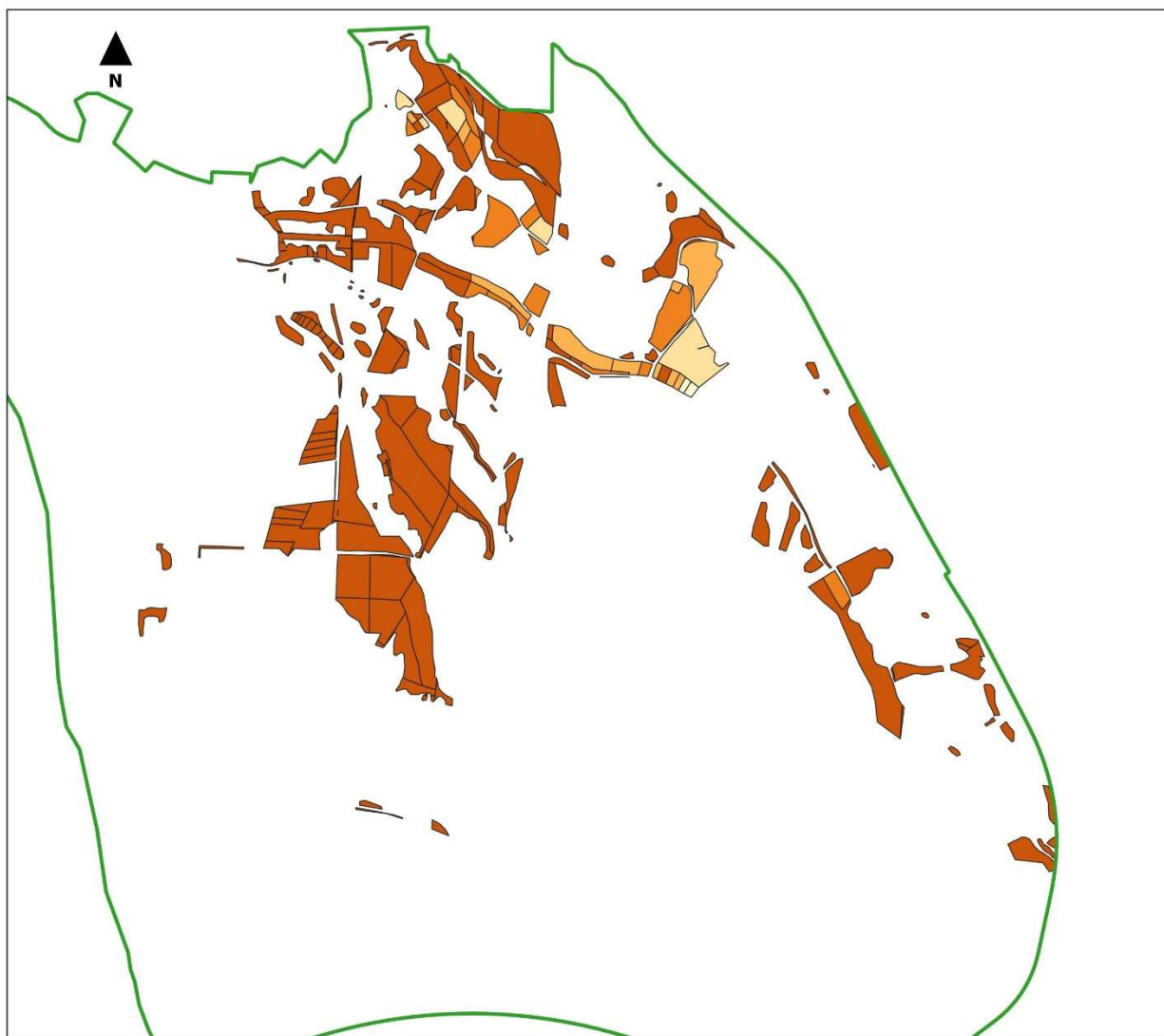
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Legenda

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- Acácia sp.
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Legenda

— Reserva Natural Local

Intensidade do trabalho

□ Não avaliado

□ Sem avaliação

□ Intensidade baixa

□ Intensidade média

□ Intensidade elevada

□ Invasão não trabalhada

Centro de Educação
Ambiental



Reserva Natural Local
Mata de Machado
Sapal do Rio Cova



Life Biodiscoveries

Intensidade do trabalho - Março de
2019



Legenda

— Reserva Natural Local

Resultados do trabalho

□ Não avaliado

□ Sem efeito

□ Resultado baixo

□ Resultado médio

□ Resultado elevado

□ Invasão não trabalhada