

# LIFE+ PROJECT

## Soil stabilisation measures to protect Annex I habitats in the Buskett-Girgenti Natura 2000 site

LIFE12 NAT/MT000182



Acronym  
**LIFE Saving Buskett**

LIFE+ project: Soil stabilisation measures to protect Annex I habitats in the Buskett-Girgenti Natura 2000 site

### Acronym: LIFE Saving Buskett

<b>Project location</b>	Malta
<b>Project start date:</b>	01/07/2013
<b>Project end date:</b>	31/05/2018
<b>Total budget</b>	€ 2,778,772
<b>EC contribution:</b>	€ 1,389,386
<b>(%) of eligible costs</b>	50%
<b>Beneficiary</b>	Ministry for the Environment, Sustainable Development and Climate Change (PARK Directorate)
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<b>Project Facebook page</b>	<a href="https://www.facebook.com/pg/Buskett-LIFE-Project-620389261380818/photos/?tab=album&amp;album_id=1389585257794544">https://www.facebook.com/pg/Buskett-LIFE-Project-620389261380818/photos/?tab=album&amp;album_id=1389585257794544</a>

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## 1. THE CHALLENGE

The project area is a Natura 2000 site classified as being both a SAC and SPA, and is an important bird sanctuary, an area of high ecological importance, and a national monument protected by the Cultural Heritage Act (Article 81). Therefore, it is of European importance for both its history and biodiversity, as well as for the conservation of species /habitat types which are targeted at regional, national and EU levels.

The area has a concentration of Annex I habitats unparalleled in the Maltese Islands.

The habitats targeted by the project include the following:

- 9540 Mediterranean pine forests with endemic *Mesogean* pines
- 9320 *Olea* and *Ceratonia* forests
- 92A0 *Salix alba* and *Populus alba* galleries
- 5230 \*Arborescent matorral with *Laurus nobilis*
- 9340 *Quercus ilex* and *Quercus rotundifolia* forests

Buskett, and the immediate surrounding area, is also important as a concentration roosting point for migratory birds of prey, many of which are of international importance. This has allowed the area to receive designation both as an SAC and an SPA owing to its being an important bird sanctuary, an area of high ecological importance and a national cultural monument.

Apart from the displacement of overhanging rocks, another problem, is that, of soil erosion due to collapsed and neglected retaining rubble walls. The LIFE+ Natura Project for Buskett aimed at stabilising soils so as to protect present Annex I habitats. Moreover, the project focused on the Buskett Woodland area. The following actions related to soil stabilisation in the area included:

- i. 554m<sup>3</sup> along a stretch of 176m of dry stone ashlar wall along the watercourse have been repaired/restored or rebuilt;
- ii. 317 m<sup>3</sup> along a stretch of 176 m of drystone rubble wall along the watercourse rebuilt;
- iii. 49 arched buttresses along the watercourse dismantled and rebuilt;
- iv. Ashlar walls (1,020m long; volume of 4,499 m<sup>3</sup>) repaired, restored/rebuilt;
- v. Rubble walls (6,297m long; volume of 17,149 m<sup>3</sup>) repaired, restored/rebuilt;
- vi. Placing of geotextile material, mulches and dead wood over an area of 15,000m<sup>2</sup>;
- vii. Selective removal of silt/boulders, from a 1,208m section (area 9,023m<sup>2</sup>) of the watercourse, that pose a threat to the targeted habitats;
- viii. Planting of 3,300 trees characteristic of the targeted habitats.



## 2. Revealing the threats:

The project had a number of challenges regarding the protection of the watercourse and its banks which are supporting the Annex I priority habitat \*Arborescent matorral, species *Laurus nobilis*, Annex I habitat *Salix Alba* and *Populus alba* galleries. Other trees characteristic of riparian woodland, such as *Fraxinus angustifolia* and *Ulmus sp*, have also been addressed by the project actions through the repair/restoration or rebuilding of the existing flanking retaining walls. These walls define the watercourse, with waterflow diverted owing to the accumulation of soil and other debris that made its way down to the watercourse from the valley sides. This process caused sedimentation and occlusion of the watercourse.

Another action which was addressed, involved works to protect the stability of the substratum on the valley sides supporting the Annex I habitats; such as Arborescent matorral with *Laurus nobilis*, Mediterranean pine forests with endemic *Mesogean pines*, *Olea* and *Ceratonia* forests, and *Quercus ilex* and *Quercus rotundifolia* forests.

The project consisted of intensive works for the removal of alien invasive species, namely *Ailanthus altissima*, *Vitis sp*, *Agave spp.* and *Ricinus communis* that compete with targeted habitats, as well as the planting of new trees characteristic of the targeted habitats.



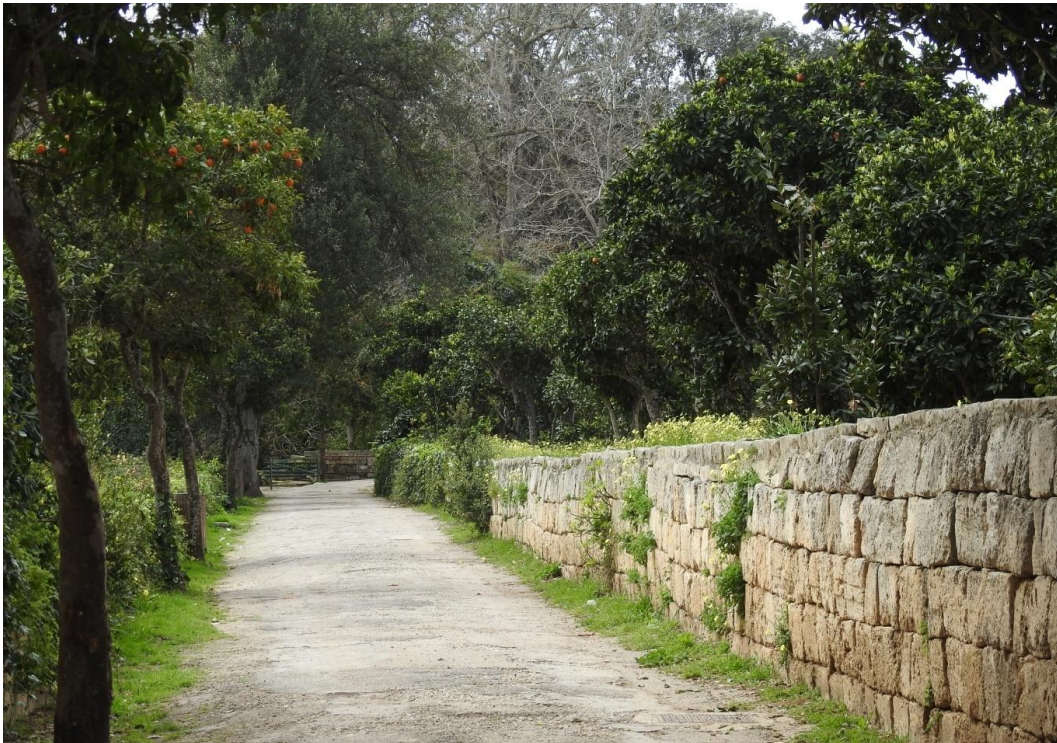
## 3. MAJOR ACHIEVEMENTS OF THE PROJECT WHEN CONSERVATION BRINGS ACTUAL BENEFITS TO THE SPECIES AND HABITAT CONSERVATION

The state of the supporting structures for these habitats—that is the historic 17th and 18th century walls built during the stay of the Order of Saint John in Malta—serving as soil retaining structures, required repairs/restoration and reconstruction to varying degrees. The watercourse at the valley bed which provides the water supply to the *Populus alba* galleries was at risk if its supporting retaining walls, including the remaining arched buttresses, collapsed.

Although the area of each of the Annex I habitats proposed for concrete conservation actions seems low (5230 - 4,231m<sup>2</sup>; 92A0 - 14,076m<sup>2</sup>; 9320 - 7,441m<sup>2</sup>; 9340 - 2,330m<sup>2</sup>; 9540 - 76,478m<sup>2</sup>), it should be borne in mind that, over the whole national territory, these habitats are highly fragmented. Each of these habitats is likely to be structured as a broad metacommunity with limited exchange of propagules or individuals as a consequence of their fragmentation. As such, conservation and consolidation of community structure in one patch of the metacommunity (such as Buskett) would implicitly, in spite of its restricted coverage, contribute to conservation of other patches of the same habitat in other parts of the national territory. Additionally, although such habitats occur in other sites and with greater coverage than in Buskett, the ecological quality of these habitats may be inferior to those at Buskett owing to higher intensities of disturbance in other areas which are not subject to the same level of protection as Buskett. As such, if the coverage of intact habitat that still functions as an integral ecosystem is considered, then the proportion contributed by the habitats at Buskett is probably much higher than the mere percentage of the area of the targeted habitats over that of the whole country.

## Layman's report

Therefore, the conservation actions undertaken, primarily the work on the retaining walls (rubble and ashlar walls) that define the watercourse and the arched buttresses over the watercourse, were an important element in the conservation of the biodiversity since with the collapse of these walls the resultant effect would be the occlude alteration of the flow of the water. Hence, through these works consolidating the definition of the watercourse itself, the deposition and sedimentation of soil and debris from the valley sides into the watercourse was reduced. This would otherwise have been of detriment to the targeted habitats and water-associating species, thus affecting negatively the Annex I priority habitat \*Arborescent matorral with *Laurus nobilis* and the *Populus alba* galleries and other trees characteristic of riparian woodland, such as *Fraxinus angustifolia* and *Ulmus sp.*





Through the project intervention, Park and Initiatives Directorate managed to rehabilitate a Natura 2000 site, working on nature conservation to further assist with species and habitats protection.

These achievements were accomplished through the following works:

- Retaining walls and arched buttresses along the watercourse have been repaired, restored and/or rebuilt. This action was fundamental as these walls served as the main soil stabilisation measure, apart from consolidating the definition of the watercourse itself which reduced the deposition and sedimentation of soil and debris in the watercourse flowing down from the valley sides.
- Signs to guide visitors in proximity to the watercourse have been fixed on site. These also include signs to inform and educate visitors on the targeted areas.

Soil stabilisation measures included the repairing, restoring/rebuilding of soil-retaining walls along the watercourse, the placing of biodegradable geotextile material and mulches over exposed areas, as well as dead wood serving as obstruction structures.

- The actions at the upper sides of the valley have complemented the interventions along the watercourse since the downslope movement of soil and debris has been addressed at various levels on the sides of the valley.
- Selective removal of silt and boulders from various areas of the watercourse. This accumulated material was negatively affecting the targeted habitats, and as such was completed with works mostly done by hand in order to minimise damage to the existing flora and fauna.
- Removal of alien species that were competing with native species was undertaken and followed by the planting of new trees characteristic of the targeted habitats.





#### **4. SOCIAL AND ECONOMIC IMPACT OF THE PROJECT**

A study on the social and economic impact of the project was also commissioned to highlight the benefits for the people and the local communities. This study kept both the present and future perspectives in mind.

It is projected that this project will contribute to improved regulation, habitat, information and production functions, all of which are components that form part of the totality of ecosystems functions, which can be replicated in other areas of ecological importance. By reducing the risk of degradation and improving habitat restoration, the project has enhanced the potential of the area to regulate essential ecological processes and life-support systems, that is, systems which provide a variety of services that have direct and indirect benefits to humans, including clean air, water, soil, biological control and health. The project is also expected to contribute to the process of carbon sequestration. Life Saving Buskett has also contributed to essential habitat functions, including the conservation of biological and genetic diversity, and evolutionary processes.

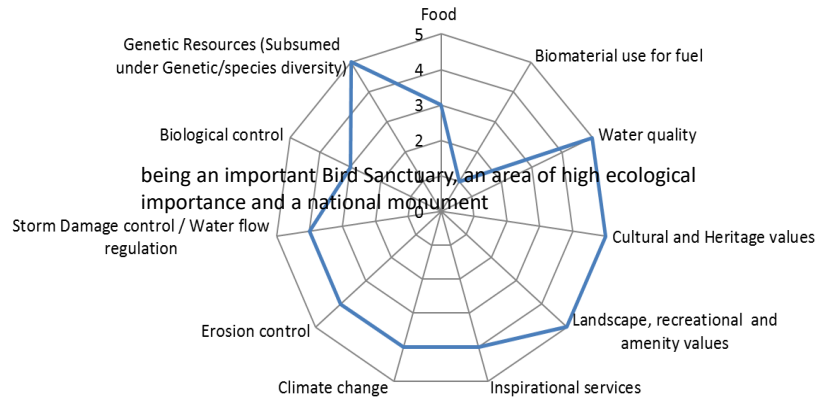
Through the restoration and protection works undertaken, the project will not only improve (or mitigate against the loss of) the ability of the area to provide important production functions such as photosynthesis nutrient uptake and conversion, but also to create a larger variety of living biomass, including genetic material. Another key benefit that shall be derived from the ecosystems' functions will contribute to the dissemination of information, including contribution for to opportunities for recreation, tourism, spiritual enrichment, cognitive development, as well as educational and aesthetic experiences.

The Buskett project sought to protect and restore its ecosystems. which comprised of ecological, socio-cultural and economic values. This unique complexity, which encompasses diversity, and rarity of the ecosystem found in Buskett, is frequently rated as one of the areas most meritorious of protection by the Maltese public.

Cost methods to assess the value of availability/improvement or loss of ecosystems goods and services were carried out, and the project's contribution to life-support/carbon sequestration has been estimated through the replacement cost method, whilst habitat and recreational/education functions have been estimated through the willingness to pay for studies.

## Ecosystem Services

Summary of the importance of the socio-economic benefits of the Buskett Girgenti area



1: Least Important  
5: Most Important

Based on an assessment of literature and expert assessment.

The Life Saving Buskett project also generated direct benefits through other deliverables such as the direct employment growth and income. Through this project 2 administrative officials, 12 rubble wall builders and other subcontracting works were engaged to implement the actions stipulated in the grant agreement. This was coupled also with indirect contributions through multiplier effects such as the procurement of equipment, materials and machinery. Additionally this project contributed to the an increase of publicity and dissemination of information for the Parks and Initiatives Directorate.

## Provisioning services

Ecosystem Services	Score: 1 to 5*	Short description on the service	Methodology			Who are the beneficiaries of the service?	What is the current status of the service?	Is the importance of this service likely to increase in the future?	Is the importance of this service likely to increase in the future on account of the interventions?
			Qualitative	Quantitative	Monetary				
Food	3	This site includes fruit bearing trees and 149 hectares of mostly irrigated agricultural land, i.e. 62% of the entire SAC including livestock farms.	Area of agricultural land within the Natura 2000 site and agricultural produce with value based on published NSO data. Buskett - Number of fruit trees, produce in kg/agricultural output	Kg of output produced x Market price	Local community	Agricultural activity within the SAC is historically considered to be important from a socio-economic perspective and is a main land use of the SAC.	Potentially through the rehabilitation of spent quarries in the SAC which will be re converted back to agricultural land but its importance its not expected increase in terms of the Buskett area.	No	
Biomaterial use for fuel	1	Reeds which is available due to its harvesting in the past.	Area of Reeds		local population, farmers	Not currently extensively exploited. Harvesting of reeds was more prevalent historically locally, it is no longer a widespread practice, contributing to one of the reasons why this species has increased in dominance in the riparian habitats at this site.	No	No	
Water quantity	5	The Natura 2000 site includes three permanent watercourses running through it. The source of water used for irrigation of agricultural land is almost entirely from local sources being extracted either directly from the groundwater or channelled from the watercourses.	Ensuring water abstraction methods are regularised and sustainable. Ensuring water channelling is sustainable and does not disrupt downstream habitats and/or needs of farmers located downstream.	Rainfall, volume of reservoirs and m3 of water (annual); volume of water abstracted from groundwater	Consider the relative reliance of rainwater harvested to groundwater abstracted.	Farmers	Threats to groundwater quality, watercourse contamination, siltation of the watercourses due to soil erosion, obstruction of the watercourse from large boulders and stones.	The importance of this service is likely to remain high.	The importance of this service remains high. The interventions are likely to assist improved management of this ecosystem service.

## 5. ACTIVITIES AND RESULTS IN NUMBERS

A series of activities were carried out as part of the actions under this project, with the target of controlling threats to this site namely:

### Targeted Habitat

- 4,231 m<sup>2</sup> of habitat 5230
- 14,076 m<sup>2</sup> habitat 92A0
- 7,441 m<sup>2</sup> of habitat 9320
- 2,330 m<sup>2</sup> of habitat 9340
- 3,432m<sup>2</sup> of habitat 9540

Through the following works which were undertaken.

- 1) 554m<sup>3</sup> along a stretch of 176metres of dry stone ashlar wall along the watercourse was repaired/restored/rebuilt.
- 2) 317m<sup>3</sup> along a stretch of 176metres of dry stone rubble wall along the watercourse was rebuilt.
- 3) 49 arched buttresses along the watercourse that had collapsed or were in danger of collapsing have been rebuilt.
- 4) 2971m<sup>2</sup> of habitat 5230 and 12,629m<sup>2</sup> of habitat 92A0 safeguarded from the danger posed by the state of the walls.
- 5) 17,149m<sup>3</sup> in volume along stretches of 6,297 metres in length of dry stone rubble walls along the watercourse and further up the valley sides have been repaired/restored/ rebuilt.
- 6) 4,499m<sup>3</sup> in volume along stretches of 1,020 metres in length of dry stone ashlar walls along the watercourse and higher up the valley sides repaired/restored/rebuilt. Geotextile material, mulches and dead wood added on site.

### Targeted Habitat

- 2,971m<sup>2</sup> of habitat 5230
- 14,076 m<sup>2</sup> of habitat 92A0

Through the following works which were undertaken.

- 1,208m (area 9023m<sup>2</sup>) of the watercourse cleared of silt/boulders.

### Invasive species

- 241,742m<sup>2</sup> Identified invasive species namely *Ailanthus altissima*, *Vitis* sp, *Agave* sp and *Ricinus communis*), have been removed in their totality to protect:
- 4,231 m<sup>2</sup> of habitat 5230
- 14,076m<sup>2</sup> of habitat 92A0
- 7,441m<sup>2</sup> of habitat 9320
- 2,330 m<sup>2</sup> of habitat 9340
- 76,478m<sup>2</sup> of habitat 9540

### Newly planted trees

- 3,300 trees characteristic of the targeted habitats were planted which include the following species:
- *Populus alba*, *Ulmus canescens*, *Fraxinus angustifolia*, *Salix alba* and *Salix pedicellata*, *Ceratonia Siliqua*, *Olea europaea*, *Pinus halepensis*, and *Laurus nobilis* and *Pistacia lentiscus*, *Rubus ulmifolius*, *Hedera helix*.

**Other activities included:**

- Meetings with national stakeholders;
- Monitoring of actions with respect to the works on the retaining walls;
- Monitoring of silt/debris flows in the areas covered by works;
- Monitoring of silt/boulder removal;
- Monitoring of the removal of invasive alien species;
- Monitoring of the planting of new trees;
- Assessment of socio-economic impacts of the project;
- Provision of public relations services to disseminate the project works;
- Project website created;
- Project Facebook page created;
- Printing and distribution of 20,000 informative brochures which have been distributed to visitors and to neighbouring local councils;
- Production of a short 10-minute film produced to show the importance of the project for the conservation of the targeted habitats at Buskett, the situation at the beginning of the project, works being carried out during the project's life, and the situation at the end of the project;
- Meetings with local stakeholders, namely farmers (and their families) who have fields adjacent or close to the area of interventions of the project, as well as residents of Rabat and Dingli, the two communities closest to the project area, were held;
- Awareness of the project among visitors to Buskett, reaching 13,600 of visitors;
- Networking with other projects, namely The University of Molise and Province of Matera - Italy;
- 10 directional signs and 2 signs to explain the vulnerability of the wall, were fixed;
- 40 directional signs which explain the importance of the species found on site placed.

**6. THE FUTURE - BENEFITS FOR THE PEOPLE AND THE LOCAL COMMUNITIES – PRESENT AND FUTURE**

With an investment of €2,778,772 in the economy of Malta, of which 50% (€1,389,386) was contributed by the EU LIFE+ Programme, the project will not be concluded and forgotten, because the Parks and Initiatives Directorate will continue conservation works as part of the After-LIFE conservation plan. Through constant monitoring of the repaired/restored and/or rebuilt sections of the retaining walls, in the future any detected section that requires maintenance will be attended to immediately so that it does not fall in disrepair. In order to consolidate the results of the project and therefore ensure that the planned actions under the project continue to improve or directly halt and reverse the decline of the conservation status of the targeted habitats, Parks and Initiatives Directorate's operational staff, stationed at Buskett, will carry out frequent monitoring works of all reinstated retaining walls at regular intervals. This is considered, to be a fundamental action, necessary as a follow-up to the project so that any maintenance works are immediately undertaken, thus preventing further damages to the historic 17th century infrastructure.

Other soil stabilisation measures and visitor signs will be monitored periodically for any corrective action (including replacement of damaged signs) that may need to be taken.

The selective removal of silt from the watercourse is not expected to take place for many years, given that the whole project is aimed at preventing silt/boulders accumulation, transported directly down towards the watercourse. Periodic checks and necessary action will be carried out following project termination for any alien invasive species growth that will need to be removed as part of the project follow-up actions. Such species will be totally removed in accordance with local and international legislations, using the same procedures adopted for the removal of invasive alien species during the project. Indigenous species will be planted in their stead.

The trees that have been planted as part of the project will be constantly monitored for their growth progress, especially during the hot dry seasons. If the negative factors affecting the growth of such trees are observed, appropriate action will be taken as required.