

Protected Natural Areas and Renaturation: the Nature Reserve “Grotta di Santa Ninfa” (Trapani, Sicily, Italy)

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ABSTRACT

The Nature Reserve “Grotta di Santa Ninfa” (Trapani, Sicily, Italy) protects an area of geological and naturalistic interest extended for about 140 ha and included in a larger Special Conservation Area. Since its establishment, the Managing Body has started the actions of environmental restoration of the plateau above the chalky slope where the entrance of the Grotta opens, altered before the establishment of the Reserve by widespread discharges of inert waste. This work describes the actions carried out and the results obtained.

KEY WORDS

protected natural areas; Nature Reserve; Mediterranean scrub; nature restoration.

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THE NATURE RESERVE “GROTTA DI SANTA NINFA”

The “Grotta di Santa Ninfa” Nature Reserve (Trapani, Sicily, Italy) was established by the Sicilian Region in 1995 (Act of the Regional Councilor for Territory and Environment n. 289 of 16/05/1995 and n. 526 of 11/08/1995) for the protection of an area of geomorphologic, speleological and hydrogeological interest (AA.VV, 1989), including both the underground environments of the Grotta and the Biviere Valley, corresponding to a portion of its feeding basin. The protected area, falling within the municipal territories of Santa Ninfa and Gibellina (Trapani), has been entrusted to Legambiente Sicilia, which has the task of promoting scientific research, safeguarding natural environments and disseminating knowledge about natural assets (Casamento, 2001).

The studies carried out in the area and promoted by the Managing Body since the establishment of the Nature Reserve have also highlighted a significant naturalistic value linked to the aspects of flora, vegetation, fauna (La Mantia & Pasta, 2001; Pasta & La Mantia, 2001; Casamento et al., 2009).

The Nature Reserve falls within a Site of the Natura 2000 Network, the Special Conservation Area ZSC ITA010022 “Complesso dei Monti di Santa Ninfa – Gibellina e Grotta di Santa Ninfa”, extended 783 Ha and regulated by “Complessi gessosi - Santa Ninfa” Management Plan (Casamento et al., 2009) approved by the Territory and Environment Department of the Sicilian Region with decree D.D.G. n. 860 of 11/15/2010 and by the Ministry of the Environment and Protection of the Land and Sea with Ministerial Decree dated 12/21/2015.

Among the various management actions promoted by Legambiente Sicilia, particular

importance has assumed those relating to the dissemination of environmental and naturalistic knowledge and environmental awareness and education.

THE RENATURATION ACTIONS

The subject area, extended almost 5 Ha and falling in the south-western portion of the Nature Reserve (Fig. 1) includes the chalky side where the entrance to the Grotta of Santa Ninfa opens and the plateau above it parallel to the State Road 119 (Fig. 2). Due to its easy accessibility, the slope has been subject from the 70s until the early 90s to repeated and widespread spills of stones and inert waste consisting mainly of the ruins of the earthquake of 1968 (Figs. 3, 4), and at the establishment of the Reserve its typical aspects of vegetation - scrub garrigue and prairie at *Ampelodesmos mauritanicus* (Poir.) T. Durand & Schinz - were compromised by the intense grazing activity and the recurrence of fires; the plateau was subsequently filled with vegetable soil and was used for agricultural purposes (wheat and forage crops) (Fig. 5).

This area is one of the main access points to the protected area, by its location and visibility, and therefore several actions of environmental restoration have been implemented since the establishment of the Reserve, initially consisting in: acquisition of the small area above the entrance to the Grotta, realization of the first interventions to remove debris, planting of some species of the Mediterranean maquis, arrangement of the access path to the Grotta, seeking the involvement of volunteers, local community and schools.

With the project "Acquisition and renaturalization of the area surrounding the Santa Ninfa's Grotta" financed under the Sicilian Regional Operational Programme 2000–2006 (Community funds) designed and implemented in close collaboration with the Regional Forests Company - Office of Trapani, the following aims have been pursued:

1) to protect the area and reduce the impacts of an anthropic nature, through its acquisition of the entire area to the Regional Property (Territory and Environment) and the reclamation of the rocky slope;

2) to increase the biodiversity of flora and fauna;

3) disseminate the environmental and natural values of the site and the nature reserve, promote educational activities and naturalistic fruition "for all".

The main works carried out in 2008 and 2009 were the following:

- reclamation from the waste present in the chalky slope and on the summit plateau, paying particular attention to the protection of the chalky outcrops (Fig. 6).

- Fencing the whole area to protect it from any subsequent spillage of waste and unauthorized grazing.

- Creation of bumps on the summit plateau, using techniques of naturalistic engineering, to create a green filter and separation with the adjacent state road, reducing the visual and acoustic impact (Fig. 7).

- Planting on the summit plateau of 2000 specimens of the following shrub species (*Pistacia lentiscus* L., *Rhamnus alaternus* L., *Phillyrea* sp., *Chamaerops humilis* L., *Myrtus communis* L., *Spartium junceum* L., *Teucrium fruticans* L., *Crataegus monogyna* Jacq., *Rosa* sp., *Pistacia terebinthus* L., *Laurus nobilis* L.) and 75 specimens of the following tree species (*Olea europaea* var. *sylvestris*, *Quercus ilex* L., *Ceratonia siliqua* L., *Ulmus minor* Mill., *Quercus pubescens* Willd., *Fraxinus ornus* L.) (Fig. 8), according to the studies on the potential vegetation and using germplasm certified by regional origin. Plants of suitable height have been used (minimum height 50 cm for the shrub species, 170 cm for the arboreal species). For three years from the end of the work have been carried out suitable actions of soil preparation and plant care, summer irrigation and control of ruderal species. In some areas have been re-constituted natural vegetation aspects related to the habitat of community importance cod. 5330 "Thermo-Mediterranean and pre-desert shrubs", disappeared from the area for decades due to past anthropic activities.

- Realization on the summit plateau of a visitors area accessible "for all", with paths also by wheelchair, information and disclosure tables, shade, aromatic plants points (Fig. 9).

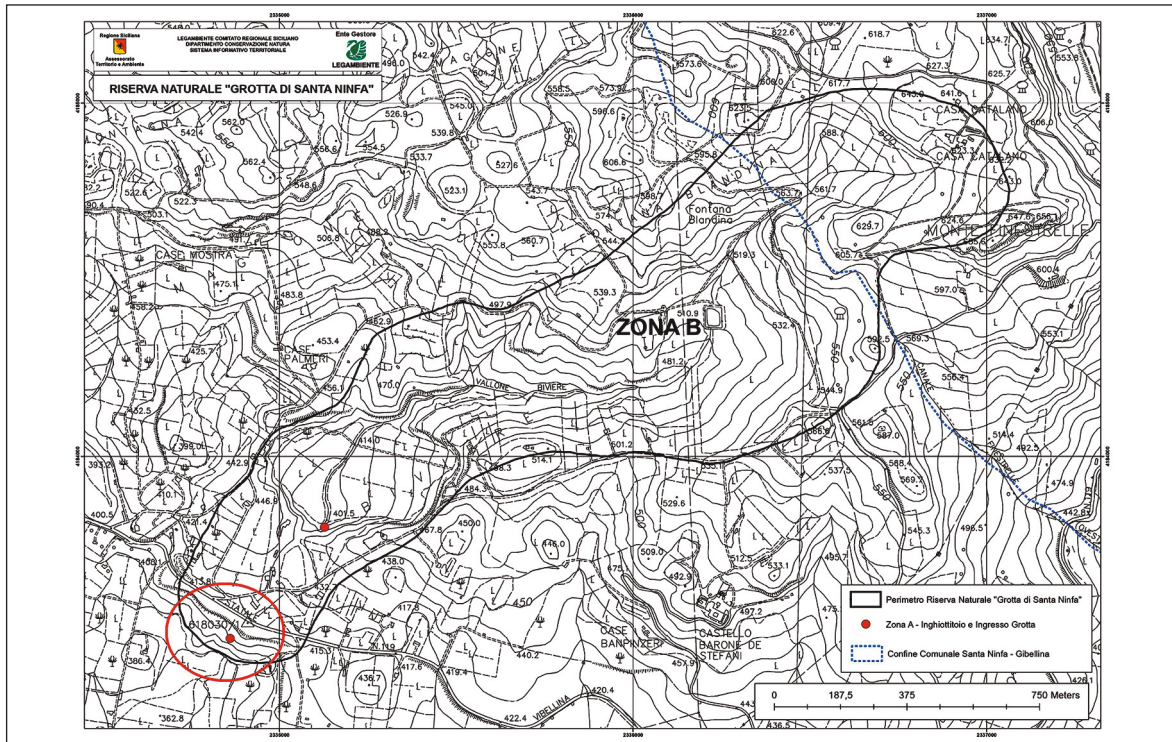


Figure 1. Location of the intervention area: The Nature Reserve “Grotta di Santa Ninfa” (Trapani, Sicily, Italy).



Figure 2. Location of the intervention area: aerial photo.



Figure 3. Spills of stones and waste, dating back to the period before the establishment of the Nature Reserve.



Figure 4. Spills of stones and waste, dating back to the period before the establishment of the Nature Reserve.



Figure 5. The summit plateau before the start of works.



Figure 6. The waste reclamation on the chalky slope and on the summit plateau.



Figure 7. Creation of bumps on the summit plateau.



Figure 8. Planting of tree and shrub species.



Figure 9. Information and disclosure tables and accessible paths.

RESULTS AND CONCLUSIONS

The works were completed in 2009, and already in 2011 the general layout of the area was profoundly changed in a positive way (Fig. 10). In the following years the Nature Reserve has taken care of the maintenance of the areas (crop care, fire prevention works, replacement of faults, etc.) and on the current date (March 2024), after 15 years from the conclusion of the plant works, it is possible to say that the renaturalization interventions have been a clear success, as evidenced by the development and the size reached by the tree species (which in some cases reach the 8 m), by the continuous coverage of the Mediterranean scrub areas (dense and impenetrable and with up to 3.5 m of height in certain points) (Fig. 11), by the intense fructification of the species. Positive effects are also observed on the evolution of the soil and on the colonization and the use of the area by numerous fauna species previously absent, also thanks to the important trophic role played by some plant species. Finally, the interventions have increased the biodiversity of

the area, also useful for information and communication purposes.

It seems useful to list some factors that in our opinion have determined such positive results and can therefore be configured as general criteria for the interventions of renaturalization of an area, as also provided for in AA.VV. (2005):

- the choice of plants has been made on the basis of specific studies on the potential flora and vegetation of the area, seeking to ensure an adequate composition of floristic species, in qualitative and quantitative terms, for the creation of groups of natural vegetation capable of evolving autonomously and with a high degree of resilience to fires, demonstrated by the fire response that in subsequent years occurred in some portions of the area without producing significant damage;

- the planting phase was preceded by a suitable action of preparation of the soil and was followed by specific plant care for the following 3 years, with particular regard to emergency irrigation in the summer;



Figure 10. The summit plateau two years after the end of the renaturalization interventions.



Figure 11. Height and development of the Mediterranean scrub and tree species in 2024.

various social actors present on the territory have been involved, from the staff of the Regional Forestry Company that has guaranteed specific expertise and experience during the execution of the work, up to the local school community for the subsequent activities of environmental education, in order to ensure the necessary bond of the local community and the long-term success of the actions carried out.

At the same time, it is clear from this experience that for such interventions should be guaranteed adequate economic resources for the maintenance of works and also to promote, through collaboration with universities and experts, specific research and monitoring actions in the redeveloped areas.

In conclusion, such experiences show that the aims of the protection of Protected Natural Areas must be pursued not only through the direct protection of sites of considerable natural interest and integrity, but also through environmental recovery and restoration of fragmented, degraded or disappeared habitats, which constitute quantitatively a very widespread reality in Sicily.

This is an action of fundamental importance not only on the environmental and natural level but also on the "cultural" level, as it conveys a positive and strong message about the necessity and the possibility of "reversing the course", as also foreseen today by the European objectives contained in the Restoration Law and in the Nature Solution Based Law.

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