POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Sustainable Architecture
Honors theses

Cinque Terre: ordinary preservation and extra-ordinary risk. A proposal of a geo-spatial database for the landscape heritage in Vernazza (SP)
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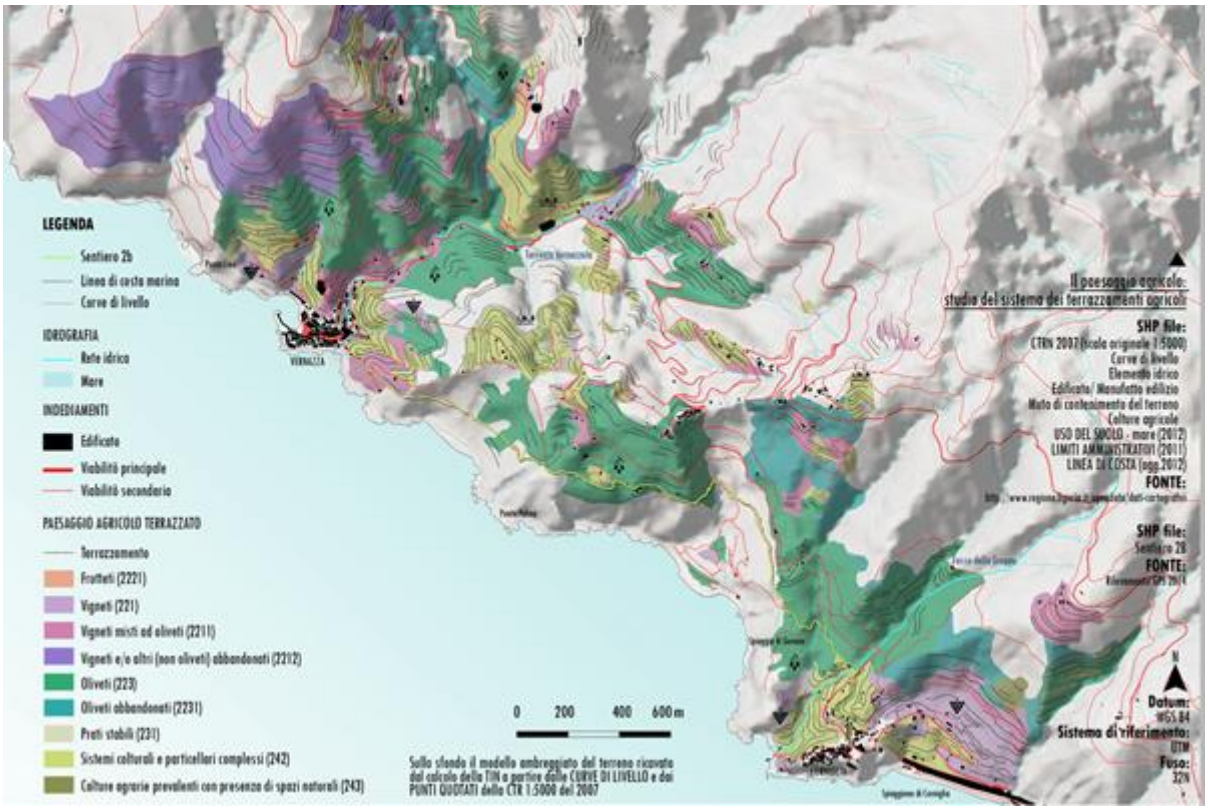
The thesis, from the subtitle "*Design, update and applicability of quick survey by GPS integrated camera in environmental risk.*
Spatial information monitoring and state of conservation evaluating of landscape heritage", is part of a process of research and innovation in the field of geomatics and GIS, aimed at providing digital tools to support the understanding, conservation and monitoring of cultural heritage, in particular for landscapes assets, result of an evolutionary process of human society developed there. The project stems from the outcome of a "DIRECT" (Disaster Recovery Team)'s initiative funded by the Politecnico's funds of 5x1000, in July 2012. The test-site of the thesis project was the territory of Vernazza (SP) located in the Cinque Terre National Park, appointed in the World Heritage List by UNESCO in 1973.

There has been facing the problem of widespread agricultural landscape of the terraces with the dry stonewalls and its trail network, as fundamental characteristics of the landscape values of the Park itself. Vernazza, along with La Spezia province and *Lunigiana* have suffered the effects of the flooding that occurred in 2011.

Vernazza, photographed on June 20, 2012 a year after the flood

The hydrogeological instability had serious consequences in terms of human lives and damage to the values of architectural and environmental heritage, amplified by the response given by highly unstable territory of the Cinque Terre to the thunderstorms. A fundamental cause of the slides and collapse of the surface soil is attributable to the human morphogenesis of mountain slopes, modeled with agricultural plots on terraces and dry stonewalls, now phased out and no longer constantly maintained.

The thesis studied the process of design and applicability of a quick survey method in situations of environmental risk for cultural heritage; thanks to the project of an Information System, we provide the due knowledge on natural or man-made phenomena, obtained through two surveys in situ in 2012 and 2014 on N°2b path between Vernazza and Corniglia.

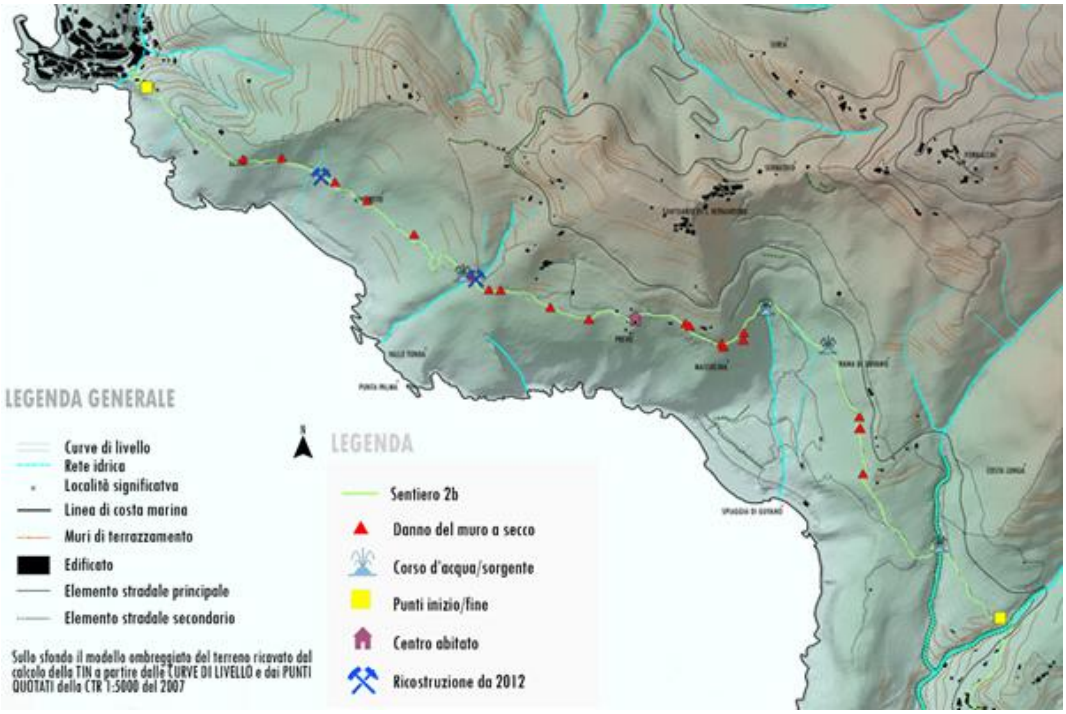


GIS analysis of Vernazza agricultural landscape and terraces and dry stone walls system

The GIS is helpful to manage and integrate information about landscape features, with more targeted information to the consistency of the status quo and the preservation of the rural architecture. The GIS has allowed the complex processing of spatial phenomena, and the transformation of phenomena in geo-referenced digital information data, potentially multidisciplinary managed, with the aim of monitoring the state of conservation of architectural and landscape cultural heritage.

We decided to concentrate the survey information to the path, damaged by flooding in 2011. Even other substantial data have been surveyed, concerning risk, instability and landscape conservation aspects, in compliance with the PTCP (*Piano Territoriale di Coordinamento Paesistico*) proposals guidelines, in order to strengthen the trails net. The information concerning the accessibility, distance, durability, safety and enjoyment of architecture that walk through the terraced landscape, come from 2D video by GPS integrated camera useful for accurate data georeferencing.

This project enabled to achieve the structuring of a geo-spatial database containing information about the trials area. Firstly spatial data have been organized for documentation of the Vernazza landscape, focusing some GIS mapping analysis, which are critical starting point of knowledge approach. Then, the products of the test survey, the GPS data of the path, were generated. Such data, after being processed and compared, reveal the landscape qualitative information perceived by the path through the video images. Their intrinsic value space (GPS track of the video) have been geo-referenced in GIS by object-entities and their non-spatial attributes, organized in a relational database. We have finally developed, from these, two approaches about some proper readings and assessments of the heritage: the path geometric consistency documentation and the landscape values conservation status assessment.



GIS analysis and updating of information database about state of conservation of Vernazza agricultural landscape and trail network

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