GEOGRAPHICAL INFORMATION SYSTEM FOR THE CULTURAL HERITAGE AND PROTECTED LANDSCAPE OF REGIONE TOSCANA

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ABSTRACT:

LaMMA Consortium, with collaboration of Regione Toscana and Ministero per i Beni e le Attività Culturali (MiBAC), has created the web Geographical Information System for Cultural Heritage and Protected Landscape of Regione Toscana. This system now makes it possible to access the digital maps and the digital archives of archaeological, architectural and landscape related restrictions over the entire region. In order to continuously update the realized system for maintaining its utility and validity, Regione Toscana together with MiBAC signed a protocol agreement (2004), according to which every new restriction measure issued is sent as a copy also to the regional offices and then to LaMMA Consortium, that attends to update the digital archives and the digital maps. Thanks to this agreement, the system counts today over 18,000 measures, with an average yearly increase of almost 250 measures, that determine restrictions for 9,000 areas.

1. INTRODUCTION

In the period 1999-2001 Regione Toscana, in cooperation with the Laboratory for Meteorology and Environmental Modelling (now LaMMA Consortium), took part, together with other Italian regions and the Istituto Centrale per il Restauro (ICR) branch of the Ministero per i Beni e le Attività Culturali (MiBAC), in the European Project INTERREG IIC Medoc named Risk Map (Costantini, 2001a; Costantini, 2001b).

The experience gained, thanks to the project, drew attention to the fact that the archives of the several Soprintendenze’ are not easily and quickly accessible and it is not always possible to exactly locate the assets because of the enormous quantity of documentation produced in more than one century of activity (the oldest protection act refers to law number 364 in 1909), and because of the cadastral and toponymy changes that took place in this period (Costantini, 2001c).

In this context a follow-up regional project Carta dei Vincoli was realized (2001-2003), evolved into the Geographical Information System for Cultural Heritage and Protected Landscape of Regione Toscana. This system gives today the possibility to access the digital maps and the digital archives of archaeological, architectural and landscape related restrictions over the entire region.

In agreement with MiBAC, in order to obtain a homogenous product able to give unambiguous information”, the survey was focused on Cultural Heritage with explicit conservation measures, postponing the examination of all other assets filed or registered, in the second instance. This made it possible to create a tool directly usable by the local administrators, to access and locate all measures with legal effectiveness that are subject to specific governmental discipline.

1.1 Short Historical Excursus on the Conservation Cultural Heritage Normative in Italy

In Italy during the Risorgimento, almost all states had issued more or less homogenous laws for the conservation of the antiquities, works of art and archaeological areas.

The State of the Church was the one that could boast the oldest tradition concerning laws, for example it had edicts for police control on conservation and trade of antiquities and works of art with the purpose of preventing masterpieces destruction and dispersion. In the broad group of laws of the Papal State it must be highlighted a particular measure issued by Cardinal Pacca in 1820, under Pio VII Pope. This was the first homogenous measure to protect the cultural and historical heritage and was the inspiration for similar measures in Naples Kingdom, in Tuscany and in the Kingdom of Lombardy-Venetia.

In contrast in Piemonte there were not important normative interventions, with the unique exception of the Giunta di Antichità e Belle Arti founded in 1832 for proposing conservation measures for antiques and works of art.

Almost everywhere in Italy there was a consciousness raising about the artistic and historic heritage but, with the exception of the State of the Church and Kingdom of Naples, the other states limited their laws in order to avoid the works of art escaping from the state. After Italian unification, the Kingdom of Italy completely disregarded cultural heritage. With the Statuto Albertino, that
In 2001, with the European project ending, Regione Toscana decided, with the collaboration of the Direzione Regionale per i Beni Culturali e Paesaggistici della Toscana (as a department of MiBAC), to fund the “Carta dei Vincoli” project, commissioning LaMMA to realize the first and as exhaustive as possible, Cultural Heritage Censust, that consists, as showed in Figure 1, of:

- a database of all assets and all measures for archaeological, architectural and landscape related restrictions;
- a digital cartography of all constraint areas;
- a catalogue of all scanned documented constraints existing in the Soprintendenze archives.

Figure 1: Workflow for realization of the Cultural Heritage Information System.

This first phase, ending in December 2003, let us know the exact amount of the Cultural Heritage in Tuscany: 7,000 archaeological, architectural and landscape areas with more than 15,000 restriction measurements.

Technically the following actions have been taken (Costantini et al, 2005):

1. Documents investigation and selection from the Soprintendenze.
2. Acquisition, through photocopying, of the whole paper documentation, including plans, historical and artistic reports, kept in the offices of the Soprintendenze.
3. Scanning of all acquired documentation, with the realization of an indexed catalogue, that contains about 60,000 images.
4. Creation of an alphanumeric database (Cultural Heritage archive), containing all identifying information of the assets subject to the restriction measure (name,
address, cadastral reference, type of restriction measure, etc.).

5. Creation of an alphanumeric database (Restriction acts archive), containing indication on all restriction measures for each single area.

6. Realization of digital cartography of areas subject to the restriction measure, congruent with the Regional Technical Map (scale 1:2,000 or 1:10,000).

7. Realization of an Web Portal to access the archives.

8. Creation of an Internet Map Server, integrated with the Web Portal, for Cultural Heritage location on the digital cartography.

3. ARCHIVES ONGOING UPDATING

In order to continuously update the realized system for maintaining its utility and validity (Figure 1), Regione Toscana together with Direzione Regionale per i Beni Culturali e Paesaggistici (MiBAC), signed a protocol agreement (April 2004), according to which every new restriction measure issued is sent as a copy also to the regional offices and then to LaMMA Consortium, that attends to update the digital archives and the digital maps (Costantini et alii, 2007; Costantini, 2009). Thanks to this agreement, since 2004 LaMMA Consortium update the whole Information System monthly.

As a result of the ongoing updating, up to today (December 2011) the system counts over 18,000 measures, with an average yearly increase of almost 250 measures, that determine restrictions for over 9,000 areas (archaeological, architectural and landscape).

4. THE WEB PORTAL

Through the Web Portal of the Geographical Information System for the Cultural Heritage and Protected Landscape of Regione Toscana (reachable from Regione Toscana homepage www.regione.toscana.it or from LaMMA homepage www.lamma.rete.toscana.it), it is possible to consult both the GIS cartography (Figure 2) and the digital archives of Cultural Heritage with restriction measures (Costantini et al, 2007).

The scanned documentation related to restriction decrees is accessible only to the Ministry personnel subject to specific access credentials (Costantini et al 2007; Costantini, 2009).

4.1 Restriction Acts Database

According with MiBAC, a specific table has been designed having each record linked to an unambiguous restriction measure (decree, declaration, recognition letter, alienation authorization) (Costantini et alii, 2005). The fields of the table are:

- Unambiguous ID code that identify univocally the single decree
- Unambiguous ID code that identify the Cultural Heritage subjected to the restriction measure
- Name of the Cultural Heritage like is written on the restriction measure text
- Province where the Cultural Heritage is located
- Municipality where the Cultural Heritage is located
- Address of the Cultural Heritage like is written on the restriction measure text
- Date of the issue of the decree
- Note: particularity that might exist in the restriction measure text

4.2 Cultural Heritage Database

Since an area can have several restriction measures, the relation between Cultural Heritage table and Restriction acts table is one to many.

The Cultural Heritage table in the database is more complex than the decrees one (Costantini et al, 2005). As a matter of fact the area identification data can derive even from many different restriction measures. It is the case where the Cultural Heritage name has changed in time (i.e. Palazzo Gualfonda ex Giuntini), or where the property is constituted by several cadastral parcels with different owners.

The fields of the Cultural Heritage table are:

- Unambiguous ID code that identify univocally the single area
- Name of the Cultural Heritage like is written on the restriction measure text
- Category: it refers to the architectural type (i.e. abbey, fortification, etc…)
- Respect Zone: Direct or Indirect conservation measure enforce to the area
- Province where the Cultural Heritage is located
- Municipality where the Cultural Heritage is located
- Address of the Cultural Heritage on the current toponymy
- Cadastral References: group of cadastral parcels of the restricted area
- Reference Regulations of the first restriction measure issued: law of the first restriction measure for that specific area
- Date of the issue of the first restriction measure: date on the first restriction measure issued
- Reference Regulations of the latest restriction measure issued: law of the latest restriction measure for that specific area
- Date of the issue of the latest restriction measure: date on the latest restriction measure issued
- Note: particularity that might originate from the whole of the restriction measures

4.3 Cartography

In order to represent the real areas subject to the restricted measures, a polygonal cartography for the Cultural Heritage was created (Monti et al., 2004).
The geographic area boundaries maintained in the Cultural Heritage Geographical Database respect the limits of the entities that they represent (e.g., buildings, historical gardens, churches) or on which they are based (e.g., cadastral parcel of land). Since the input data used to create the Geographical Database was obtained from several sources having a diverse range of scales (Cadastral Map - 1:4,000; CTR – 1:2,000, 1:10,000, IGM – 1:25,000), the accuracy of the polygons boundary is based on the accuracy of the source material used in its production. In detail:

— The areas subject to *archaeological constraint* have been delineated on the base of the cadastral map since the perimeter often does not have a corresponding topographic element on the Regional Technical Map: in extra urban areas without constructions, the cadastral parcels boundary lines were taken as reference.

— The areas subject to *architectonic constraint* have been delineated on the base of the Regional Technical Map (in urban areas with 1:2,000 scale, in extra urban areas with 1:10,000 scale), through an interpretation/conversion work of the boundary elements; thereby the resulting cartography is a technical map directly usable for municipality and urban planning.

— Finally, the areas subject to *landscape constraint*, although they are originally delimitated with elements of the cartography with a scale 1:25,000, have been delineated on the base of the Regional Technical Map with 1:10,000 scale (Angeli et alii, 2010), through a careful interpretation/conversion work of the boundary elements, that allowed an up-scaling operation.

The resulting cartography is a technical map that is transmitted to the municipalities of the Regione Toscana. They can directly use it in their Geographical Information Systems for landscape planning and environmental management, overlapping the implemented thematic map with other geographical layers concerning environmental risks like landslides, flood areas, etc. (Angeli et alii, 2007).

4.4 Digital Catalogue of Restricted Measures

The Digital Catalogue of restricted measures includes the whole constraint documentation for each Cultural Heritage (decrees, plans, historical and artistic reports, etc.). Each paper document, obtained through photocopying the original stored by the Soprintendenze, was indexed with an unambiguous numeric code and scanned.

5. RESULTS

All the ten provinces of Tuscany and their municipalities, utilize the products implemented with the GIS for Cultural Heritage and Protected Landscape of Regione Toscana for the execution of their landscape planning activities. This implies a common interest in maintaining the system running and always updated, with the notification of possible inexactness.

6. CONCLUDING REMARKS

The GIS for Cultural Heritage and Protected Landscape of Regione Toscana is constantly utilized by several local governments in charge for land planning (MiBAC, Regione Toscana, municipalities). Additionally also professional categories like architects, engineers and building surveyors, use the realized system to facilitate the information gathering for their planning activities. During 2012 the web accesses to the system reached and surpassed the quote of 20,000.

6.1 Future Improvements

In consequence of the aroused interest in the system, a WMS (Web Map Service) is under implementation. Moreover, in order to provide facilitate access to the GIS for Cultural Heritage and Protected Landscape of Regione Toscana and to share knowledge, would be very stimulating to be part of a cross-domain portal like Europeana. By the end of 2012, after receiving the MiBAC certification, a partnership between the Cultural Heritage Department of Regione Toscana and Europeana is expected.

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* Accuracy: how closely the data represent the real world
References from Other Literature:
