Atlas and Informative System of the Lagoon of Venice: updated tools for a higher management efficiency in Natura 2000 sites

Gustavo De Filippo, Marco Favaro, Patrizia Melis, Stefano Guerzoni

Osservatorio Naturalistico della Laguna (lagoon naturalistic observatory)

Venice Municipality, together with Province, Region and other institutions for the safeguard of Venice lagoon, have defined the Special Project "Osservatorio Naturalistico della Laguna" (Atto Giunta Comunale 25.01.2002 N°7). The project is a response to the requirements related to the safeguard of the lagoonal environment, the preservation of its ecological and physical unit, the need of a morphological restoration of the lagoon (Leggi Speciali per Venezia L171/73, L798/84 e L139/92 e dal PALAV, Piano d'Area della Laguna Veneziana).

The functions of the ONL are:

• to gather and organize data and researches on the lagoon, creating tools that can be easily used by administration, public and scientific community (Altas of the Lagoon and Lagoon Informative System - SIL);

• to carry out the assessment of environmental impact (VIncA) and to ensure the implementation of EU directives "Habitats" and "Birds" in the Venice lagoon territory;

• to draw the environmental plans for the lagoon and surrounding coastal areas;

• to provide technical advice to the Municipality for plans and projects for the safeguard of the lagoon;

• to ensure the accessibility of environmental data and the diffusion of knowledge among local communities, and to enhance public participation to planning and management activities of the lagoon territory, through the Informative Centre.

The project follows an innovative approach, putting together administrative and scientific competencies (university of Venice and other research institutes). This is done in order to associate the different realities that work on environmental topics, and to create a good relationship between science and administration, that should cooperate in a continuous way. Other positive aspects of this approach are:

• the possibility to sum up all the knowledge on the lagoon of Venice, putting together information from different research bodies;

• the development of competencies on environmental topics inside the municipality context;

• the creation of a network between all young people employed in the different offices and institutes, in order to create a generation of experts that are able to tackle environmental problems from different perspectives, using a multidisciplinary approach.

The Atlas

The main product of the ONL has been the "Atlas of the Lagoon. Venice between land and sea", a visual and user-friendly tool to understand the lagoon, that can be used by scientists, administration and general public. The Atlas has been produced by the joint work of many different realities (CNR-Istituto di Scienze Marine, Università IUAV, Università Ca' Foscari, Istituto Veneto di Scienze Lettere e Arti, Berlin Technische Universität; Boston Worchester Polytechnic Institute, Magistrato alle Acque di Venezia, Provincia di Venezia, ARPAV, Museo di Storia Naturale di Venezia and many others).

The Atlas is composed by a series of maps. Every map has an explanatory text with graphs, photos and other information. There are three main types of maps:

• descriptive maps: most maps give basic information, and has been created in order to provide an exhaustive description of the lagoonal environment (morphology, maps of animal and plant species, etc);

• planning and assessment maps: they give an analysis of restrictions on territorial uses, the current plans, the tools of environmental safeguard that are present in the lagoon (SAC, SPA, etc);

• integrated analysis maps: they give a few examples on how the information provided by the other types of maps can allow to carry out novel elaborations.

The maps are subdivided into the 5 tematic areas of the Atlas: Geosphere, 34 maps on climate, geology and hydrology; Biosphere, 35 maps on flora and fauna; Anthroposphere, 12 maps on pollution and territorial transformation; Safeguard Areas, 7 maps on social dynamics and administrative restrictions; Integrated Analysis, 15 maps that interconnect in different ways some of the maps included in the other areas. The Atlas will be periodically updated and integrated.

In order to make it more accessible, the Atlas will be translated into a web-gis that will allow to realize overlapping and comparisons between the different maps.

The SIL

At present we are planning to create an Informative System of the Lagoon (SIL) in order to give visibility to all information gathered and elaborations carried out by ONL and by other research institutes. The SIL can be considered as a further development of the Atlas. The digital format will make data easier to be updated and elaborated according to the needs.

The SIL has a multidisciplinary approach and associates the environmental sectors, the territorial informative systems and urban planning. First of all, the actors to be involved have been defined, together with the requirements that could make it a useful preliminary tool to plan all the activities related to safeguard and management of the territory. The available data have then been organized, and the technical and organizative needs have been fulfilled in order to start creating the SIL.

The SIL will be managed by ONL and will be used to carry out all ONL functions. Even if not all data will be necessary gathered in the SIL, this will be a sort of reference point to address people to other databases.

The SIL should sustain the following activities:

• environmental monitoring and modelling, also aimed at assessing the pressures deriving from human activities;

• in itinere assessment, a process carried out throughout the interventions. Studies and analyses should be carried out to compare the expected results of planned interventions and the actual results;

• Strategic Environmental Assessment as described by EU;

• VIncA assessments;

• follow the process of information and gathering of observations done by the public on Plans and Programs in the lagoon.

As data are complex, we are creating a predefined set of metadata that will be then updated. The standard adopted by Veneto Region is CEN/TC 285, whereas the most commonly adopted at the international level is ISO 19115. The system will be able to find information both from metadata and through a geographic research, using spatial coordinates or keywords in specific fields (name of data, year, description, etc).
The system will visualize the metadata or the corresponding maps. It will be possible to overlap maps in order to obtain integrated information, also for a better understanding of the complexity of the lagoonal system.

Atlas and SIL for habitat and species of community interest management

Studies and researches translated into paper and digital maps by the Atlas and SIL can give a good range of information on habitats and species of community interest. Pressures on habitats and impacts of new interventions can be highlighted, so that management and safeguard are facilitated. The SIL in particular is continuously updated, and it could gather also information from assessment studies, allowing to carry out a better planning of interventions. Hereby a case study of an assessment of impact carried out by ONL is described.

The VIncA of "Ex tiro al piattello" area in Campalto

One of the objectives of ONL is to assess the impact of plans and projects on habitat and species of community interest. The Atlas is a good reference tool, as it provides a good overview of the state of the lagoon, including maps indicating the priority habitats and the naturalistic values of the different areas.
A complex project that has been assessed by ONL is related to the restoration of an area previously used for shooting. Such an area is in a saltmarsh zone close to Campalto and it is included in the SAC of the upper lagoon (IT3250031). The concentration of toxic compounds, and especially of Pb (over 300 g per kg on soil analysed), is very high. The area had already been embanked, but now the barriers are not effective anymore. The project's proposal is to remove the first 30 cm of saltmarsh, and in the two most polluted sites to remove a deeper layer of sediment. Such proposal was assessed by our working group and discussed with the other involved bodies, in order to minimize the impact of the interventions on habitats and species. Alternative solutions were discussed, a map of vegetation and habitats and other information of the utmost importance were obtained from the Atlas, and mitigation and compensation measures were planned.