



LIFE
VIMINE

VENICE
INTEGRATED MANAGEMENT
OF INTERTIDAL ENVIRONMENTS

THE MONOGRAPH OF THE VENETO REGION COUNCIL ON THE LIFE PROJECTS ACTING IN THE ADRIATIC COASTAL AREA



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I PROGETTI LIFE IN LAGUNA DI VENEZIA E NELL'ALTO ADRIATICO

Test di nuove politiche per il ripristino dell'ambiente litoraneo

The dissemination of the project results among institutions has a crucial role in LIFE VIMINE. Indeed public institutions are the most suitable actors which could regularly fund the integrated approach of LIFE VIMINE after the end of the project, should its efficacy be demonstrated, for example using ordinary management funds, and even promote its application to other geographical contexts. For this reason it is important to provide institutions with decision support tools to assess if it is appropriate to invest money in the LIFE VIMINE approach as a new way to manage the environment and the territory, based on the prevention of hydro-geological risk through regular monitoring and maintenance actions and on an integrated approach resulting in the safeguard of the environment and at the same time in sustainable local development.

To disseminate the project results among local institutions, the Monograph Veneto Tendenze 1/2015 "I progetti LIFE in laguna di Venezia e nell'alto Adriatico. Test di

nuove politiche per il ripristino dell'ambiente litoraneo" (The LIFE projects in the Venice Lagoon and Northern Adriatic Sea. Test of new policies for the restoration of the coastal environment) was published by the Veneto Region Council and distributed to the newly-elected Regional Councillors on December 2015. In this publication the projects LIFE VIMINE, SERESTO and GHOST are presented as examples of innovative good practices for the restoration and management of coastal habitats. The monograph, in Italian, is available in the section "Documents" of the web site of the LIFE VIMINE project www.lifevimine.eu or directly at this link: <http://www.lifevimine.eu/documenti/15.pdf>.

THE BENEFITS PROVIDED BY SALT MARSHES TO MAN: A KEY ELEMENT FOR DECISION MAKING REGARDING THE MANAGEMENT OF THE LAGOON

LIFE VIMINE aims to defend salt marshes not only because they are unique environments which support biodiversity and hence deserve protection (as indicated in the European Directives "Habitats" and "Birds"), but also because they offer multiple benefits to humans, known as "ecosystem services". For example, many fish species found on our tables breed, grow, feed or take shelter near salt marshes: without salt marshes, these species would decrease in abundance, damaging the artisanal and traditional fisheries of the lagoon. Salt marshes are a natural barrier against the energy of waves: without them, the foundations and the borders of the islands would deteriorate much faster. Salt marshes mitigate the global



climate change absorbing the carbon dioxide found in the atmosphere, and filter the water of the lagoon, naturally purifying it from pollutants. Finally, the landscape of the lagoon would not be the same without the beauty of salt marshes. These are only some examples of the many benefits that salt marshes offer to humans, contributing to the well-being of people who frequent the lagoon, to the good state of the local economy and to the regulation of global climate.

Some of these benefits are very tangible and concrete and their economic value can be quantified. For example: what is the value of the lagoon fishery which depends on fish and invertebrate species found in the lagoon because of the presence of salt marshes? What is the cost that should be borne to upgrade wastewater treatment plants in the mainland and clean the water that is discharged into the lagoon from excess nutrients such as nitrogen and phosphorus, in the absence of salt marshes which act as natural wastewater treatment plants at no cost? The staff of LIFE VIMINE is calculating the value of these and other benefits through questionnaires (using the scientific methodology known as Willingness to Pay), statistical data analysis and ecological modelling. At the end of the project, the calculated value will be made public to demonstrate that protecting salt marshes is cost-effective, especially if an integrated approach merging environmental safeguard objectives with sustainable local development is applied.

LIFE VIMINE MEETS SCHOOL



The educational activities of LIFE VIMINE partners in schools for the divulgation and dissemination of the project have proceeded during the school year 2015-2016. This task is extremely important because LIFE VIMINE aims to demonstrate in practice the efficacy of a novel way of managing the territory, whose foundations are the prevention of hydro-geological risk through ordinary monitoring and maintenance actions, the participation of stakeholders and an integrated approach combining lagoon protection with local sustainable development. New ideas often need time and divulgation efforts to become popular, and the novel approach to the management of the territory proposed by LIFE VIMINE makes no exception: divulgation is thus fundamental, especially

among the young people who will soon become the adults that will exert a key influence on the fate of our territory with their actions.

Educational kits concerning the protection of the Venice lagoon and its salt marshes were produced by the project and delivered to 900 classes of elementary and middle schools in the City of Venice and Quarto d'Altino. The educational kit includes: learning materials about the lagoon ecosystem, a summary of LIFE VIMINE activities for the sustainable conservation of salt marshes, some worksheets and practical activities for pupils. A map of the Venice Lagoon is attached to the kit.

For the presentation of this educational kit, the Observatory of the Lagoon of the City of Venice organized - with the support of some experts - two training sessions for teachers and workers of the sector, e.g. nature guides. The sessions, attended by many people, focused on issues related to the protection of the Venice lagoon, in particular on the problems of wave motion and salt marsh erosion, and the integrated approach proposed by LIFE VIMINE as a solution was presented. The worksheets and the laboratories and games proposed in the educational kit (aimed at increasing the awareness of the young students) were particularly appreciated by the teachers who considered them a very useful tool to introduce the local children and, indirectly, their families to the issues regarding the conservation of the lagoon.

Also, during the school year, about a hundred meetings were carried out in classrooms focusing on issues such as the lagoon protection and the solutions being demonstrated by LIFE VIMINE. The educational kit and the map of the lagoon can be freely downloaded in the "Documents" section of the LIFE VIMINE website www.lifevimine.eu or directly at the following links:

<http://www.lifevimine.eu/documenti/13.pdf>

<http://www.lifevimine.eu/documenti/23.pdf>

THE LANDSCAPE AND BIODIVERSITY LABORATORY

On summer 2015 the Landscape and Biodiversity Laboratory of LIFE VIMINE was officially launched through a first public workshop

held at the former school Galuppi, in Burano, on 16/07/2015. On that meeting, the LIFE VIMINE *CrowdmapDigital Platform* was presented to citizens and other stakeholders; it is a tool that allows anyone to submit reports, using a computer or a smartphone, about valuable, well-conserved, threatened or degraded biodiversity and landscape elements observed in the Northern Lagoon of Venice. This tool will thus become a “Virtual marketplace” where all the information obtained by the people frequenting the lagoon and regarding its nature and landscape can be stored.

During the following two workshops of the Laboratory, held in Burano on the 15th of October and on the 16th of December 2015, participants highlighted which places of the Northern Lagoon should be safeguarded and which ones are degraded (and hence need restoration). All the indications provided by the local community were stored in the *Crowdmap Platform*; results are publicly available on the related website <http://lifevimine.crowdmap.com>.

This *Crowdmap platform* is also being used in the framework of the participated project activity named *Condominio Laguna Nord*, for the management of the voluntary monitoring of salt marshes. Using this tool, anyone can report the presence of salt marsh boundaries needing protection from erosion, of abandoned wastes, etc. to the project staff, furthermore indicating the location of such problems on the map found in the *Crowdmap Platform* and attaching a small descriptive text and photos (if any). All reports are analysed by the staff of LIFE VIMINE and shared with competent institutions to decide whether actions should be taken and what is their priority compared to other scheduled works. The overall goal is thus to create a participated, diffuse landscape monitoring and maintenance system, allowing to act for salt marsh conservation through a prevention-based approach against erosion, which is one of the key concepts of LIFE VIMINE.



The fourth, last workshop of the Landscape and Biodiversity Laboratory is foreseen during autumn 2016; it will be organized in collaboration with Centro Studi Torcellani, a research institute working to disseminate knowledge regarding the Lagoon territory and culture. This last meeting will represent a chance to discuss about the past, present and future management of this area which is so precious and vulnerable. All the information collected in the framework of the Laboratory activities will be assembled into the Landscape and Biodiversity Atlas, a “participated map” that will be part of the wider Lagoon Atlas <http://www.atlantedellalaguna.it/>.

THE CHART OF THE SUSTAINABLE TOURISM IN THE NORTHERN LAGOON OF VENICE



In the Venice area, tourism is an important business that however yields large environmental and cultural impacts on the territory. For this reason, LIFE VIMINE aims to promote tourism activities which are respectful of the nature, local traditions and culture of the lagoon, to bring benefits both to the lagoon environment and, consequently, to the local economic businesses that benefit from the presence of a well-conserved lagoon. This choice thus aims to trigger positive feedbacks between nature conservation and local sustainable development, two activities that can benefit from each other.

One of the project tools to achieve this aim is the *Chart of the Sustainable*

Tourism in the Northern Lagoon of Venice. On the 12th of May 2016, the public participatory process to create the Chart was officially started; the Chart has the goal of promoting the development of sustainable tourism in the Northern Lagoon, by making those local businesses – which are concretely committed to the safeguard of the lagoon environment and the local cultural identity – more visible. The Chart aims to support and advertise those tourism-related local businesses already characterized by a good level of sustainability, and to motivate other businesses to develop good practices respectful of the environment and of the cultural identity of the lagoon communities. Another key goal is to create a network of all stakeholders that want to run their tourism-related businesses in a sustainable way, creating synergies and raising awareness of the importance of protecting the lagoon, e.g. by living and visiting it respectfully, also from the economic perspective of private businesses.

The participatory process comprises 5 public meetings (an initial forum, three technical workshops and a final forum) and the final output will be a “Chart of the Lagoon” consisting of two levels, each containing a different type of information:

1. The first level of the Chart will describe the current state of sustainable tourism in the Northern Lagoon: businesses already involved in sustainable tourism or in activities protecting the local cultural identity will be indicated on a map;
2. The second level of the Chart will contain the Action Plan for future actions: during the participatory process, stakeholders (e.g. people working in the tourism sector) wanting their business to become more respectful of the lagoon will propose a concrete action, whose future implementation they commit to, in order to develop a more sustainable tourism in the lagoon. The commitments will be listed on the back of the Chart and will represent a future direction for sustainable tourism in the Northern Lagoon of Venice.

This process will end in October 2016 with the public presentation and diffusion of the *Chart of the Sustainable Tourism in the Northern Lagoon of Venice* and the Action Plan.

SOIL-BIOENGINEERING WORKS TO PROTECT SALT MARSHES FROM EROSION

The soil-bioengineering works of LIFE VIMINE to protect the edges of the most interior, hard-to-access salt marshes in the northern lagoon of Venice from erosion are continuing. A key goal of LIFE VIMINE is to demonstrate the efficacy of a novel way to defend salt marshes, using protection works which can physically stop erosion but are also respectful of these delicate habitats.

But how is salt marsh protection achieved in LIFE VMINE? First of all, the project staff assembles manually small soil-bioengineering protection works, i.e. fascines made by tying wooden branches together with vegetable nets and cords. These fascines are then placed close to the salt marsh edges undergoing stronger erosion, to protect them from waves, and held in position tying them to wooden poles using vegetable cords. The placement of fascines in the lagoon started on July 2014 and is ongoing. So far, about 70% of the fascines planned in the project have been placed in the lagoon.

Why have we chosen to use the fascines to protect the most interior salt marshes of the lagoon, i.e. those salt marshes which are farthest from navigable channels characterized by strong currents and waves, but that are still undergoing erosion? For many reasons! An advantage is that fascines are made of natural and completely biodegradable material and so they exert a low impact on the environment and the landscape. Moreover, fascines are not waterproof barriers isolating salt marshes from the lagoon bordering them, rather they preserve the ecological connection between these two environments by allowing the passage of water, which vivifies the salt marshes during increasing tide, of organisms, and of sediments that are captured by the salt marshes through sedimentation and thus



make these habitats grow. The biodegradability of fascine is actually an advantage also from a “morphological” point of view: indeed salt marshes tend to change shape over time, as it can be guessed by watching their winding natural shapes from above (just think of the incredible meandering pattern of channels and creeks that cross salt marshes, visible for example on Google Maps at this link: <https://www.google.it/maps/@45.5127234,12.380381,1075m/data=!3m1!1e3>). Only biodegradable edge protections such as fascines can respect this natural tendency of salt marshes to evolve, while rigid protections, for example made with stones, would “freeze” the salt marsh in an unchangeable, hence not natural, form. Rigid protections thus represent an emergency solution to apply only in those lagoon areas where waves are very strong, for example along channels which are very busy with motorboats, and not in the most interior salt marshes. Another important point is that fascines are cheap, being made of branches resulting from the management of vegetation in the mainland and lagoon islands.



To achieve greater fascine durability and also continuity between a given salt marsh and the protection works placed on its edges, the small space between fascines and the edge of the salt marsh is manually filled with sediments collected from the neighbouring tidal flats. In this manner, the fascines are saturated with sediments and last longer, and furthermore small marsh surfaces are restored. In some other areas, instead, the sediments are pumped from the neighbouring tidal flat to reconstruct small areas of salt marsh previously irreparably-degraded by diffuse erosion affecting not only the edge but also the inside of the salt marsh: in this case, too, only small sediment volumes are relocated, to minimize the environmental impact of pumping and to put the greatest care in recreating the

height levels characterizing salt marshes. Indeed, only a careful restoration of the typical salt marsh levels can create the right condition allowing halophyte vegetation to colonize the newly-pumped sediments: such vegetation is typical of salt marshes and its roots consolidate the new soil, contrasting erosion.

In general, the minimization of the environmental impact of soil-bioengineering works is a keyword in LIFE VIMINE: all protection works are created mainly through manual labour, with small boats and, in the case of sediment pumping, with small pumps and lightweight mechanical means, paying attention not to damage during the construction phase those same, delicate environments that are being protected, that is the most interior salt marshes, where large boats and mechanical means cannot access, due to the very shallow bottoms, except with high costs or causing serious morphological alterations.

But this is not all: the project staff regularly carries out monitoring and careful maintenance of the soil-bioengineering protection works. These activities are one of the foundations of LIFE VIMINE because they ensure the long-term efficacy of the protection works and generate savings: ordinary maintenance is indeed a form of prevention, which is cost-effective. From 2014 to today, several maintenance works have been carried out, for example about 340 fascine and some poles were added or substituted, some cords were replaced, and some areas were refilled with sediments if needed, for example to compensate for the natural compaction of the recently-pumped sediments.



LIFE VIMINE: Un approccio integrato alla conservazione sostenibile delle barene della Laguna di Venezia.
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