

# WP5

## Pilot Sites: adaptation strategies and measures for increasing resilience to climate change

Deliverable 5.5.1

### BANCO DELLA MULA DI MUGGIA DECISION PROCESS FINAL REPORT

Summary of the outcomes of the participatory phase

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## 1 Foreword

This document has been produced in the framework of the INTERREG Italy – Croatia CHANGE WE CARE Project. CHANGE WE CARE fosters concerted and coordinated climate adaptation actions at transboundary level, tested in specific and representative pilot sites, exploring climate risks faced by coastal and transitional areas contributing to a better understanding of the impact of climate variability and change on water regimes, salt intrusion, tourism, biodiversity and agro-ecosystems affecting the cooperation area. The main goal of the Project is to deliver integrated, ecosystem-based and shared planning options for different problems related to climate change (CC), together with adaptation measures for vulnerable areas, to decision makers and coastal communities. Additional information and updates on the CHANGE WE CARE can be found at <https://www.italy-croatia.eu/web/changewecare>.

## 2 Aims and content of the document

This document is the guideline for Adaptation plan in the Banco Mula di Muggia pilot Area and corresponds to the Deliverable 5.5.2 indicated in the Application Form. It represents the synthesis of adaptation/management Plans for the Pilot Sites, where the shared knowledge base on the present and expected dynamics of coastal systems in the cooperation area and Pilot sites, built in WP3 and WP4, is conveyed. The definition of such Plans is foreseen to be pursued by means of participatory processes (cf. Deliverable 5.5.1) determined in order to get all information available, shared decision and consensus by the stakeholders to make the Plan effectively implementable in a collaborative way by all subjects and decision makers involved. The Adaptation Plans will be developed taking into account outcomes of WP3, WP4 and of the Participatory process itself, including shared vision, objectives, measures/ actions/ interventions.

### 3 Change we care project and the objectives of WP 5

CHANGE WE CARE fosters concerted and coordinated climate adaptation actions both at Pilot Sites and transboundary level. The project explores climate risks faced by coastal and transition areas contributing to a better understanding of the impact of climate variability and change on water regimes, salt intrusion, tourism, biodiversity and agro-ecosystems affecting the cooperation area.

WP5 main objective is the preparation of climate change Adaptation Plans in Pilot Site, containing the assessment of present state and of foreseen scenarios, the indication of measures and intervention priorities, monitoring strategies and jurisdictional references.

The Planning options presented are the result of participated processes involving local authorities and stakeholders. The Adaptation Plans include actions and interventions, where appropriate, indicating the timeline and the financial strategy for the implementation of the envisaged activities and Monitoring Plans (taking stock also of WP4 indications) for observing and ensuring the durability of the project outcomes and of the implementation of the Plan.

### 4 General site description

The study area, entirely included in the Municipality of Grado (Friuli Venezia Giulia Autonomous Region) is located between the Grado inlet and the mouth of the Isonzo River, in the Gulf of Trieste, northern Adriatic, Italy (Figure 3-24) ( $13^{\circ}24'36''$  -  $13^{\circ}28'15''$  East and  $45^{\circ}21'17''$  -  $45^{\circ}39'30''$  North). It represents the easternmost part of the system of barrier islands bordering the Grado Lagoon and is nearly entirely devoted to tourism and agriculture. Here, the coastal area has undergone significant changes in historical times due to natural processes but also to anthropic actions i.e. land reclamation and tourism development.

Grado is a tourist town with approximately 8,000 inhabitants, which more than triples during the summer season; the number of nights spent in tourist accommodation is ca. 1.4 million per year (2017). Grado Pineta is a touristic district of Grado having several hotels, restaurants, second houses, and a small marina (Punta Barbacale). Four big camping-resorts with fully equipped beaches are located in the eastern part, between Grado Pineta and the Primero inlet. Most of the beaches are equipped, with services for tourists.



*Figure 3-24 Overview of the study area.*

The area is well connected by land, air and sea. Two regional routes connect Grado to the highway A4 and Trieste is about 1 hour of trip by car. The Trieste airport is about 20 km and railway stations are at the same distance. A seasonal service connects by boat Grado to Trieste and an efficient cycling network connects the site to the mainland.

The tidal magnitude is unusual for the Mediterranean Sea, with semidiurnal mean and spring tidal ranges of 65 and 105 cm respectively. The passage of atmospheric low pressure systems is able to amplify tidal water levels up to 160 cm: the so called “acqua alta”. Climate is temperate, influenced by ENE (Bora) and SE (Scirocco) winds.

The banco della Mula di Muggia is a system of active and relict sand banks, which extends up to 2 km seawards. It can be divided in two parts with arcuate triangular shape divided by the tidal inlet of Primero: the Banco della Mula di Muggia s.s. and the delta complex of the Isonzo River. The Banco Mula di Muggia can be considered as a barrier-island system i.e. an elongate accumulations of unconsolidated sediment that separate the open sea from a landward restricted basin (Figure 3-25). The main sediment source is the Isonzo River, which represent the eastern limit of the study area.

The succession of sandy bars (between -2 m and -5 m) if the Mula di Muggia is arranged in the form of an arc and represents the outer limit of a wide muddy intertidal area partially covered by seagrass (Figure 3-26). Historical data document the presence of the bank morphologies since 1822, long time before the urban development of the area. The present Isonzo delta consists of a delta structure stretched out along the mouth of Sdobba, which became the only distributary channel after the occlusion of the Quarantia branch in 1937. It has a typical river-dominated form, with a single elongate distributary, about 1300 m wide at the base, and 700 m wide at the mouth, extending ca. 1 km in NNW-SSE direction. A series of sandy bars characterize the delta front.



*Figure 3-25 Aerial view of the Banco Mula di Muggia.*



*Figure 3-26 The western part of the Banco Mula di Muggia: the sandy bars and the muddy intertidal zone.*

In the pilot site two areas are designated in the Natura 2000 network (Figure 3-27): SPA Valle Cavanata e banco della Mula di Muggia IT3330006 and SPA Foce dell'Isonzo - Isola della Cona IT3330005, both designated also as SAC.

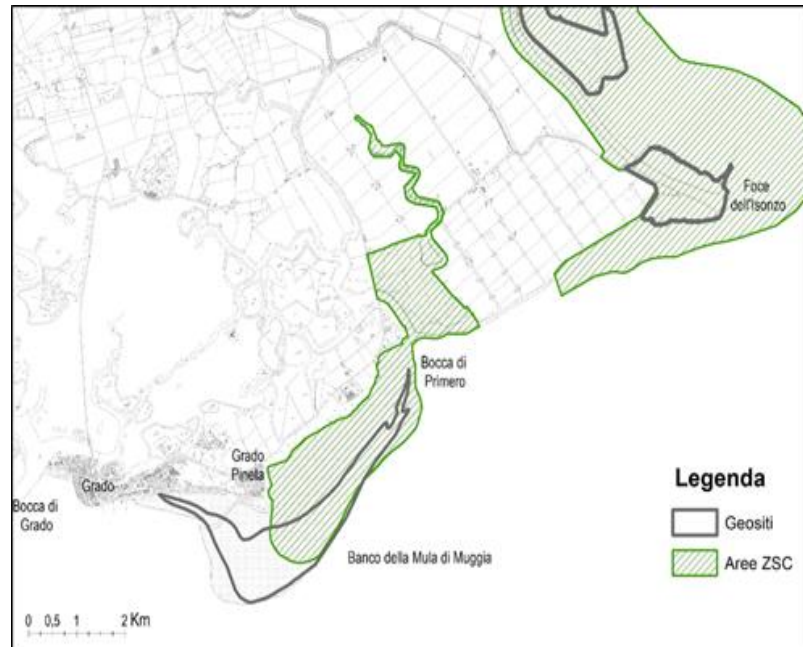


Figure 3-27 Natura 2000 and geosite perimeter.

site

## 5 Description of the participatory process designed for the Mula di Muggia Pilot area

Mula di Muggia, Adaptive management plan for a geomorphological conservation/restoration of the sand bank and its back barrier area

### 5.1 Area, themes, sectors of intervention

The Adaptation/management Plan for the Banco di Mula di Muggia Pilot Site (RAFVG) aims at the harmonization of tourism development and the protection of coastal geomorphological features and Special areas of Conservation. The rapid dynamics of the sand banks and the erosional/depositional pattern characterized based on WPs 3 and 4 results, as well as the vulnerability zoning are the key driver for defining the correct way to use a “living with nature” approach.

The designation of ‘Banco della Mula di Muggia’ as one of the pilot site test for the project represents a great opportunity to capitalize from the results of recently concluded studies, update knowledge and implement an adaptive strategy towards climate change

### 5.2 General aim of the operation

The operation has two targets:



- enhance/maintain the productive conditions of the tourism sector;
- reach/maintain the good environmental status/conditions of the area.

### 5.3 Synthesis of the participatory process

Respect to the “CWC\_template\_Project work\_participatoryProcess.” something is changed.

The participatory process was planned as a restricted process, organized in three meetings, having few selected participants.

In order to gather useful information for the project Change We Care, an online survey has been created before the organization of the first meeting. The answers are extremely important for the purposes of the project and the results were discussed with the stakeholders.

A non-technical report is planned for each meeting. Each report is focused on the topics of the meeting. The first report analyzes the geomorphological and ecological situation of the pilot site test and their evolution; finally reports the results of the online survey.

The second report focuses on the results of the project activities and presents the adaptation plan. The actions proposed are described.

### 5.4 Context of the participatory process

A possible Adaptation Plan must be driven by natural trends, as a fundamental guideline for a correct human use, thus forcing us to a responsible and sustainable development. The approach will be based on the evaluation of the natural dynamics in order to act mimicking or simulating natural phenomena. This permits to limit possible impacts of definitive choices, as those following hard engineering philosophy. Configuration regimes aimed at nourishment or morphological reshaping could be possible options

### 5.5 Objectives of the participatory process

Objectives of the participatory process are to stimulate the elaboration of contribution/ideas/innovation by the stakeholders in the relevant themes and issues of the area, solutions or mitigation of particular situations, analyzing and overcoming of conflicts.

### 5.6 Expected results of the participatory process

Expected results of the participatory process are to get contributes /ideas/etc. relevant for the adaptation plan, for interventions, for the solution of an issue or for the mitigation of a particular situation, by almost the main stakeholders relevant for the specific pilot area.

The dialogue with the stakeholders will bring out the criticalities of application of the proposed measures.

## 5.7 Timing foreseen for the participatory process

The duration of the process is about 16 months.

## 5.8 Phases of the process

Stakeholder mapping already done

Designing phase few people, restricted participation process.

Online survey created before the organization of the first meeting.

Non technical reports for stakeholder (Italian version)

Implementation phase with few people, it is a restricted participation process; the results will be presented in the final participatory workshop.

Finalization phase selected stakeholders will be involved in the finalization, for including the findings / contributions coming from the process into the Adaptation plan.

## 5.9 Description of the phases (and timing)

Stakeholder mapping June-July 2019

Designing phase October 2020-Januar 2021

Implementation phase January- March 2021

Finalization phase March-November 2021

## 5.10 Stakeholders involved

A restricted number of stakeholders are directly involved in the participatory process. By the way, 375 people answered to the online survey. This contribution is important to understand what people know and perceive about climate change.

The restricted stakeholders are technicians of Municipality of Grado (GO) as regards policy maker, two tourist operator having an economic relevance on the pilot site test, a researcher of University of Trieste as regard the environmental aspects and a technician from Autonomous Region of Friuli Venezia Giulia as regards fishing.

The on-line survey is in three languages: Italian, English and German.

Actually 171 Italian speaking answered to the survey: 47% are tourist, 16.7% live in Grado, 10.7% work in Grado, 6,5% have a second house in Grado, the remaining 19.1 % provided various answers.

The English survey has 38 answers. 94.7% are tourists, 5.3% work in Grado.

The German survey has 166 answers. 98.2% are tourist.

Most of the people working in Grado answered that work in tourism, 4 people work in environment, 2 in fishing, 1 in public transports and 1 in building.

## 5.11 Participatory techniques and tools

The participatory method, initially designed as a restricted process with selected stakeholders, is divided in two sections:

The extended consultation, set to an online survey translated into three languages.

The restricted participatory process, set on two different webinars.

Three sections characterize the online survey: the first is about the type of respondent, the second is focused on the Mula di Muggia Pilot area, the third on climate changes and their effects.

The online survey uses the Google-Module free tool.

A non-technical report, prepared for the first webinar with the stakeholders, analyze the answers of the online survey. The contents of the document are also a remittance, an analysis of the situation, a description of the protected areas and a description of the evolution over time of the environments.

PP4 made a power point presentation to introduce the first webinar.

Several partners of the project, involved in the study of the pilot site, participated in the first webinar.

The second webinar was organized when the analysis of the scientific data collected and the proposal for the adaptation plan was concluded.

## 5.12 Accessibility to the documentation

PP4 created a mailing list for the restricted participatory process. All documents created for the first webinar were sent using this channel.

One stakeholder, involved in the participatory process, contributed to the dissemination of the online survey using the mailing list of its tourist facility. About 13,000 people were contacted in this way.

The facebook page of the project: <https://www.facebook.com/changewecare/> contains news about the participatory process of PP4 and a link to the Italian version of the online survey.

The web page of the PP4, <https://www.regione.fvg.it/rafvfg/cms/RAFVG/ambiente-territorio/geologia/FOGLIA26/> contains also a link to the Italian version of the online survey.

[https://docs.google.com/forms/d/1\\_fp1BPGmeJIAGD2IswkFLWLA0JuePxD4Hir8YRtp3U/edit?usp=sharing](https://docs.google.com/forms/d/1_fp1BPGmeJIAGD2IswkFLWLA0JuePxD4Hir8YRtp3U/edit?usp=sharing) is the link to the English version of the online survey.

<https://docs.google.com/forms/d/1FodzHGkQEPFQpEXvCEgN1LdMa315TIMiZH-rzE1Us/edit?usp=sharing> is the link to the Italian version of the online survey.

<https://docs.google.com/forms/d/1Wum-7IGNfxB8cmxdufTwRKAhQqvKUnmkeU8YGvobE5g/edit?usp=sharing> is the link to the German version of the online survey.

You can access the non-technical report from this link (only the Italian version is available):

[http://www.regione.fvg.it/rafvfg/export/sites/default/RAFVG/ambiente-territorio/geologia/FOGLIA26/allegati/Sintesi\\_non\\_tecnica\\_primo\\_incontro.pdf](http://www.regione.fvg.it/rafvfg/export/sites/default/RAFVG/ambiente-territorio/geologia/FOGLIA26/allegati/Sintesi_non_tecnica_primo_incontro.pdf)

[https://www.regione.fvg.it/rafvfg/export/sites/default/RAFVG/ambiente-territorio/geologia/FOGLIA26/allegati/sintesi\\_non\\_tecnica\\_secondo\\_processo\\_partecipativo.pdf](https://www.regione.fvg.it/rafvfg/export/sites/default/RAFVG/ambiente-territorio/geologia/FOGLIA26/allegati/sintesi_non_tecnica_secondo_processo_partecipativo.pdf)

### 5.13 What are the conditions now?

The main problem is the conflict between the tourism development and nature protection. Two contrasting elements, such as an area for marine tourism development and a Natura 2000 site, coexist in the same area. Although the Banco Mula di Muggia is a wilderness area for its geomorphological peculiarities, the onshore area is densely populated, especially in summer.

The management of the camping and touristic villages ask for sandy beaches for their guests, but actually, their businesses look onto the wide muddy intertidal zone partially covered by seagrass protected by the succession of sandy bars. This is the result of a wrong land planning of the sixties of the last century, when seaside tourist activities were setup in a paleo lagoon area.

The other problem is the external sandy bars that tend to migrate toward south-west causing the loss of quality of the main touristic beach of Grado, the seabed becomes lower and the muddy component prevails.

These are great problems because the economy of the Municipality of Grado is based on seaside tourism. During the eighties of the last century administrator looked for a solution: a canal was dug in the area of Grado Pineta and the coastline was modified too, but it wasn't a successful operation.

On the other side, the system of banco Mula di Muggia is very sensitive to sea-level rise and storm patterns, as well as the entire urbanized part of the city of Grado.

The management objective for the Banco Mula di Muggia aims at the harmonization of tourism development and the protection of coastal geomorphological features according to the rules of the Special Area of Conservation IT 3330006. The rapid dynamics of the sand banks and the erosional/depositional pattern characterized based on WPs 3 and 4 results, as well as the vulnerability zoning are the key driver for defining the correct way to use a "living with nature" approach.

### 5.14 Which future we see for this area?

The "living with nature" is a solution driven by natural trends, as a fundamental guideline for a correct human use, thus forcing us to a responsible and sustainable development. This permits to limit possible impacts of definitive choices, as those following hard engineering philosophy. Configuration regimes aimed at beach nourishment or morphological reshaping could be possible options

### 5.15 Which objectives and strategies?

The first webinar highlights the awareness of all stakeholders that the effects of climate change in the Mula di Muggia Pilot area are a current problem. Those who responded to the questionnaire perceive the presence of extreme weather events and changes in the shape of the beach as the most evident effects of this process.

The second webinar presented the proposals for an adaptation plan to the stakeholders. The debate highlighted the critical issues of application but also the appreciation by the stakeholders of the proposed measures

### **5.16 What we suggest doing in this frame?**

The indications from the first participatory meeting are that the strategies for the future of the Grado area should focus on the monitoring and evolution of the beach area, on the adaptation of the infrastructures and use to the natural evolution and eventual implementation of light interventions that adapt to natural evolution. The indications that emerged from the second meeting are that certain measures are currently difficult to apply for bureaucratic reasons.

However, it is very important to know which direction to take to tackle climate change.

The participatory process is concluded. The first webinar was held the 26<sup>th</sup> February 2021. 10 people attended, 3 were stakeholders: one from Municipality of Grado, one tourist operator and one for the naturalistic aspects.

Another stakeholder, a tourist operator, contacted PP4 after the webinar for details about the participatory process.

The second webinar was held the 4<sup>th</sup> November 2021. 15 people attended, 8 of them were stakeholders: two from Municipality of Grado, two tourist operators, one for the fishery, three for naturalistic aspects.

375 people answered the online survey. The outcomes of the survey indicate that for most of the people involved:

The Banco della Mula di Muggia is an opportunity.

The fact that it is a natural environment, which is unique and preserved is an opportunity.

The fact that there are low sea beds is an opportunity.

The muddy seabed is not a great problem, mainly for strangers.

It is essential that the beach and the sea are clean.

Know about climate change and its consequences.

Climate change has currently effects in the Mula di Muggia Pilot area.

Perceived the effects of climate change in the area of the Mula di Muggia Pilot area.

The effect of climate change on natural places of the Mula di Muggia Pilot area is very important.

The effect of climate change on economic activity in the Mula di Muggia Pilot area, for example tourism, fishing, shopping, is very important.

The effect of climate change on the safety of things and people in Mula di Muggia Pilot area is very important.

The effect of climate change on the risk of flooding in Mula di Muggia Pilot area is very important.

The effect of climate change on the use of beaches in Mula di Muggia Pilot area is very important.

As regard the strategies for the future of pilot site test of Mula di Muggia, the survey indicated that most of the people think that the best solution is to apply soft changes that will adapt to the natural evolution of the area. Secondary is to adapt infrastructures and use to the natural evolution of the area and monitoring the sea banks and their evolution. Just few people answered that carry out heavy interventions that contrast the natural evolution or doing nothing should be a solution.

The participatory process is concluded and some outcomes from the participatory process have been considered and included in the Adaptation Plan for the Mula di Muggia Pilot area.

After the webinars and the online survey it is possible to point out that the strategies for the future of the Mula di Muggia Pilot area will have to focus on:

- the monitoring and evolution of the bench area;
- the adaptation of the infrastructures and use to the natural evolution;
- eventual implementation of light interventions that adapt to natural evolution.

The combination between a restricted process and an online survey, open to all, has given excellent results, so much so as to suggest exporting this kind of approach for future processes. The responses to the survey highlighted aspects that were not known at the start of the project. Carrying out an online survey made it possible to collect a high number of responses that guided subsequent choices.

Project activities filled many gaps in the knowledge of the Banco Mula di Muggia. This is the first pillar for the integrated management of coastal areas.

The direct relationship with stakeholders demonstrated that the proposed solutions represent an important step forward in the fight against climate change, but, at the same time, has shown how certain measures could be difficult to apply. In particular, the difficulties related to the presence of mercury (Hg) in the sediments of the Grado area emerged.

With this approach, it was possible to obtain excellent results with a decidedly limited expense. The realization of the non-technical reports for the participants in the meetings made the discussion much more fluid and constructive.