

Preparing co-creation: stakeholder analysis

Deliverable D2.1

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Executive Summary

This deliverable presents the results of a stakeholder mapping process conducted among Demonstrators in the RECONNECT project. The mapping took place November 2018 and April 2019. Therefore, members of UFZ team travelled to the demonstrator sites 4 demonstrator A and 6 demonstrator B sites to gain an overview of the NBS measurements. Interviews, discussions and inquiries were conducted through conducting interviews with in addition to discussing how demonstrators to understand how they plan to and/or have involved stakeholders at different stages of the NBS process. This deliverable summarises the results of the stakeholder mapping exercise and provides feedback with suggestions for how to improve stakeholder involvement within demonstrator sites (i.e. demonstrator A) as well as reflections on theory and practice or lessons learnt from NBS that are already implemented (i.e. demonstrator B). The stakeholder mapping process results in

- insight in relevant stakeholder groups,
- a breakdown to stakeholder roles (stakeholders can have multiple roles),
- insight in at what project stage the stakeholders were involved,
- an overview on how mapped stakeholders are affected by the hazard (the hazard being the main reason for executing the demonstrator project) or NBS on the one hand and how they are able to influence the hazards and NBS on the other hand.

Stakeholder participation is considered as a central element to the successful implementation of NBS. Based on intensive stakeholder mapping processes, this document is preparing participation by identifying relevant stakeholder that should be (demonstrators A) or have been involved (Demonstrators B) during the realisation of NBS.

On the one hand, this report is directed to projects partners, particularly to Demonstrators, as it shall help them to get a systematic overview of the different stakeholders that should be involved during the implementation of NBS. On the other hand, the report is also of relevance for a wider set of stakeholders (e.g. other scientists, policy-makers, planners, etc.) interested in realising NBS. The report provides a practical and validated methodology of how a stakeholder mapping can be organised.

The mapping identified relevant stakeholders in all sites of demonstrators. Furthermore, our findings support that a transition from a top-down to a co-creation or even bottom-up governance model is taking place. The large proportion of representatives of the civil society, the private sector, but also of research and the media, which in sum outnumber representatives of governmental entities, underlines this shift. However, a closer look at the perceived ability of stakeholders to influence decision-making processes suggests caution: While a diverse and balanced set of stakeholders has been identified, their capacity to have an actual impact on decision-making processes seems to be unequally distributed, such is at least suggested by our mapping activity. The power to influence and take decisions, seems to rest among the representatives of governmental bodies and is less pronounced among other groups of stakeholders.

This deliverable presents the results of a stakeholder mapping exercise that was conducted between November 2018 and April 2019. Members of the UFZ team travelled to most of the RECONNECT demonstrator sites to gain an overview of the NBS measures in addition to discussing how demonstrators plan to and/or have involved stakeholders at different stages of the NBS process.

This document summarises the results of the stakeholder mapping exercise and provides feedback with suggestions for how to improve stakeholder involvement within demonstration sites where NBS are planned and will be or are being implemented (i.e. Demonstrator A) as well as reflections on theory and practice or lessons learnt from NBS that are already implemented (i.e. Demonstrator B). Parts of the mapping results as well as insights from other European NBS projects have been published.

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Abbreviations

AAKS	Aarhus Kommune
ACA	Agencia Catalana del Aigua
Anywhere	Horizon 2020-Project “EnhANCing emergencY management and response to extreme WeatHER and climate Events”
BOKU-MET	Universität für Bodenkultur Wien – Institut für Meteorologie
BUE	Behörde für Umwelt und Energie Hamburg
CCI	Chambre de Commerce et d’Industrie
CNR	Consiglio Nazionale delle Ricerche Italy
DRR	Disaster Risk Reduction
DN	Danish society for Nature Conservation
DOF	Danish Bird society
DRR	Desaster Risk Reduction
DTU	Technical University of Denmark
Eawag	Swiss Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz
EPA France	Les Établissements publics d’aménagement France
EPA Denmark	Danish Environmental Protection Agency
ETH	Eidgenössische Technische Hochschule Zürich
EU WFD	European Union Water Framework Directive
FAI	Fondo Ambiente Italiano
(EU) FD	(EU) Flood Directive
FHH	Freie Hansestadt Hamburg
FRMP	Flood Risk Management Plan
GISIG	Geographical Information System International Group
HWW	Hamburger Wasserwerke
HYDS	Hydrometeorological innovative solutions
KPI	Key Performance Indicators
LSBG	Landesbetrieb Straßen, Brücken und Gewässer Hamburg
Mst	Dansk abbre. for Environmental Protection Agency
NBS	Nature Based Solution
NGO	Non-governmental organisation
OIN	Operation d’interet national France
PAPI	Les programmes d’actions de prévention des inondations – France
PPRI	Plans de prévention des risques inondation – France
RECONNECT	Regenerating ECOSystems with Nature-based solutions for hydrometeorological risk rEduCTion
SBB	Dutch StaatsBosBeherr
SCHAE	schéma de cohérence hydraulique et d’aménagement d’ensemble France
SH	Stakeholder
Sylcaf	Syndicat du Littoral Yves- Châtelailon-Aix-Fouras
TU HH	Technische Universität Hamburg Harburg
UFZ	Helmholtz Zentrum für Umweltforschung Leipzig

UIBK	Universität Innsbruck
UNSA	Universität Nizza Sophia-Antipolis
WDOD	Waterschap Drents OverIJsselse Delta
WLF	Wildbach- und Lawinenverbauung Österreich

1 Introduction

Implementation of Nature-Based Solutions (NBS) for hydro-meteorological risk reduction offers the possibility to break away from traditional practices and enable to **reconnect** our land management practices and developments with nature in order to achieve multiple benefits to services and functions of ecosystems. According to Olsen and Bishop (2009) and van der Nat et al. (2016), such measures are potentially more cost-effective and adaptable than traditional hard engineering measures. However, cost-effective design and implementation of NBS is only part of the answer. Of equal importance is the ability to effectively place them in **diverse local and cultural contexts** and integrate them into broader land and risk management strategies. It is therefore of crucial importance **to understand the complexity of each case** and to design the NBS in such a way as to minimise social/economic losses and environmental impacts, increase resilience to hydro-meteorological events, while achieving multiple co-benefits, and ensure upscaling, business models and financial viability of interventions. Examples of large scale NBS for hydro-meteorological risk reduction which can provide proof-of-concept for their upscaling and replication is currently lacking and there is a clear need to enhance their evidence base through demonstration within the European reference framework.¹

Project RECONNECT H2020-C5-08-2017-GA-776866 is an interdisciplinary international project that aims to contribute to European reference framework on NBS by demonstrating, referencing and upscaling large scale NBS and by stimulating a new culture for 'land use planning' that links the reduction of risks with local and regional development objectives in a sustainable way.

In order to contribute effectively to the EU reference framework on NBS, to generate higher impacts across Europe, and enable learning and upscaling internationally, RECONNECT (Regenerating ECOSystems with Nature-based solutions for hydrometeorological risk rEduCTion) draws upon a number of Demonstrator and Collaborator cases (see Figure 1.1). These have been carefully selected to cover a range of local criteria including i) climatic and geographic conditions, ii) type of hydro-meteorological hazards (floods, storm surges, droughts, landslides), iii) vulnerability to these hazards, and iv) governance structures and social/cultural settings. Besides these criteria, the potential for collaboration and upscaling has also played a role in the selection process.

¹ Disasters are defined as "a serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope with using its own resources." (UNISDR 2017).

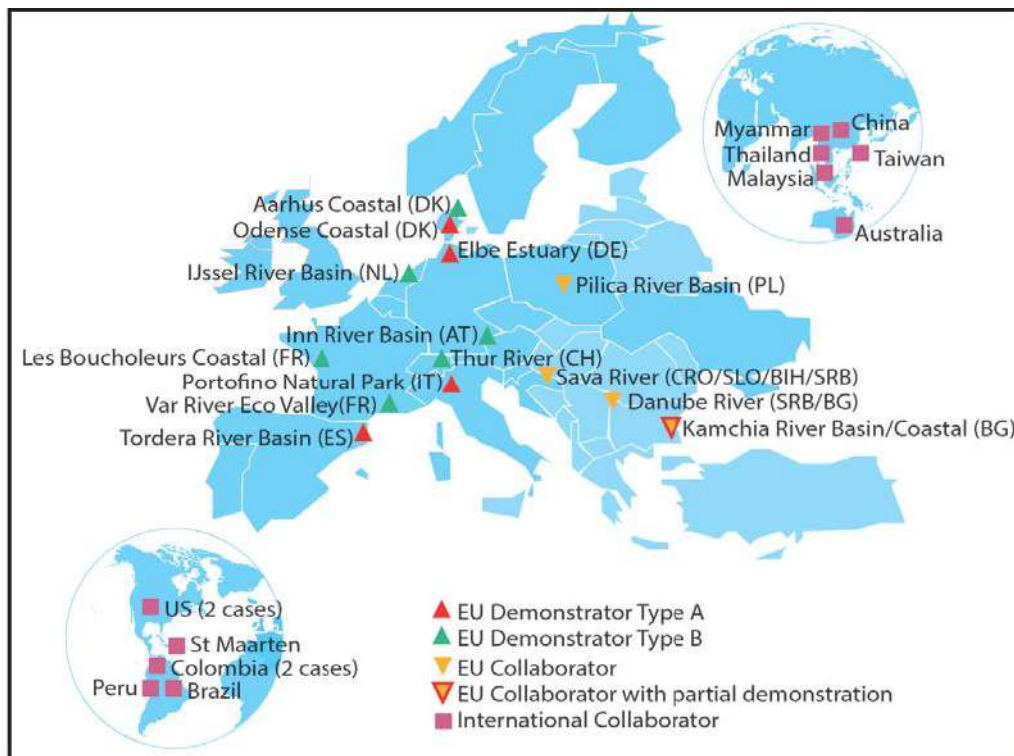


Figure 1.1 RECONNECT network of cases

Stakeholder involvement and engagement is a crosscutting issue that influences the success of each stage of the NBS decision-making process. The RECONNECT project has identified five phases where co-creation can take place: 1) co-assessment, 2) co-design, 3) co-implementation, 4) co-operation and co-maintenance as well as 5) co-evaluation and monitoring.

This deliverable focuses on reporting the results of a stakeholder mapping exercise carried out in the **demonstrator sites** (see Table 1.1). In RECONNECT, demonstrator activities are coordinated and executed in WP2 “Demonstration”. Deliverable 2.1 lays the groundwork for future interactions between stakeholders in the demonstrator sites as well as draws on the lessons learnt in sites where NBS have already been implemented. This document therefore provides a first initial overview; it is to be expected that further updates are required as RECONNECT and the social scientific work packages included are evolving.

In all demonstration sites, interviews will be conducted with mapped stakeholders. The outcomes of the interviews and the analysis will be included D3.7 - Final report describing validation work in Demonstrators.

Demonstrator A:	
Demonstrator Site	Project Partners
DA-1: Elbe Estuary/ The Federal State of Hamburg, Germany	FHH, TUHH
DA-2: Seden Strand, Odense, Denmark	Odense, Amphi, Ramboll
DA-3: Tordera River Basin, Spain	ACA, HYDS
DA-4: Portofino Park , Italy	Portofino, CNR, GISIG
Demonstrator B:	
DB-1: IJssel River Basin, The Netherlands	Tauw, WODD
DB-2: Inn River Basin, Austria	UIBK, BOKU-MET
DB-3: Greater Aarhus, Denmark	AAKS, Amphi, DTU
DB-4: Thur River Basin, Switzerland	Eawag
DB-5: Les Boucholeurs, France	UNSA
DB-6: Var River Basin, France	UNSA

Table 1.1 Demonstrators in RECONNECT

In the following sections each of the demonstrator sites will be introduced with a summary of the perceived hydro-meteorological risks/hazard as well the mapping of stakeholders who were or are planned to be involved in the NBS process (i.e. assessment, design, implementation, operations/maintenance and monitoring/evaluation). By following the methodology outlined in D1.2, this document maps stakeholders affected by and who can influence both the

management of hydro-meteorological risks/hazards as well as the NBS process. We also map the extent to which stakeholders are involved in each phase of the NBS process. Based on these results, a short feedback regarding potential improvements to planned stakeholder involvement activities in each of the demonstrator sites is provided. The aim of this feedback is to provide a first suggestion of the extent that stakeholders could be involved in the NBS process in order to avoid conflicts, delays and the strengthening of vulnerabilities. Moreover, by comparing theory and practice to demonstrator experiences where the NBS has already been implemented (i.e. demonstrator B), lessons in regards to whom demonstrators have involved as stakeholders in the past and how they dealt with issues/conflicts when they arose, are also presented. Further specifications and guidance, based on social science methodologies, will be provided later in the project.

In line with D1.2. and D4.1., stakeholders are broadly defined as persons, groups, or organizations who have a concern in a process or in a geographical area through residence, employment, or interest. In the context of RECONNECT, stakeholders are affected (positively or negatively) by a) the hydro-meteorological event(s) they are exposed to and/or b) the planned/implemented NBS in the case study area and beyond; or they affect c) either by increasing or decreasing the risk of turning the event into a disaster (e.g. in urban planning policies, and prioritisations of funding mechanisms for DRR), and/or d) the choice and implementation of the NBS. As such, relevant stakeholders involve a whole range of actors from legal agencies to individual citizens. Among the stakeholders that should be identified in relation to the NBS are those that are affected by the NBS’s area of influence, i.e., stakeholders that are indirectly affected by the flow of water coming from the NBS site. Figure 2.1 (a) shows a hypothetical example of a site with implemented large- and small-scale NBS. Figure 2.1 (b) depicts the same hypothetical case but simplified, including only one of the NBS. Stakeholders that are indirectly affected would include stakeholder B (e.g. the authority responsible for the small watercourse receiving inflow from the NBS site), stakeholder C (e.g. the authority responsible for the main river), and stakeholder D (e.g. the authority responsible for the final water body recipient).

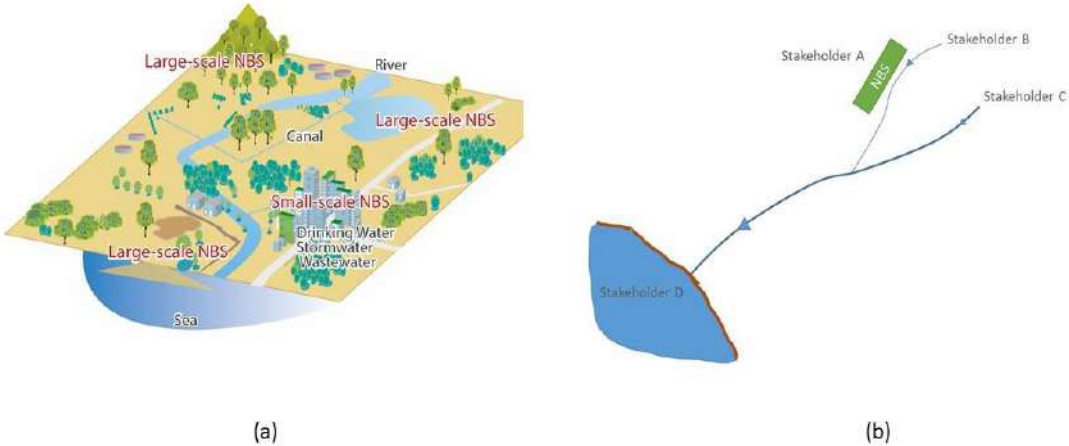


Figure 1.2 Stakeholders indirectly affected by the NBS

Stakeholders may be self-identified or selected by others. They may represent themselves

directly, be represented by a group or organisation, or represent their community or particular interest groups (Forrester et al., 2008). The stakeholder mapping focuses on the relevant hazard as well as NBS being considered, both of which vary from case to case. Hazards are defined here as a potentially damaging hydro-meteorological event that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

RECONNECT focuses on the physical, institutional, and social structures that affect or are affected by the hazard as well as by the solutions suggested or implemented to mitigate or adapt to the hazard. We therefore aim to understand which stakeholders do have an influence on the realisation of the NBS as well as on changing the extent of the hazard. We also, aim to identify stakeholders who are affected both the hazard as well as the realisation of NBS.

It cannot be assumed that NBS will only bring about positive change. Rather, it is important to investigate whether there are individuals, groups, or organisations who experience the NBS as disadvantageous and why, because these stakeholders are likely to voice strong opposition to the NBS and in some cases even block attempts of implementing a NBS. Acknowledging these stakeholders and inviting them to partake in co-creation could have a positive impact upon the dynamics of the decision-making process, highlight any potential physical, social or environmental risks associated to the NBS, and help address and mitigate potential negative impacts from the NBS upon the physical, institutional, and social structures of a place.

While stakeholder inclusion is a defining element in any co-creation approach, identifying who has something at stake is more challenging than it may first appear. In the absence of a robust methodology, stakeholder identification can easily turn into a subjective selection of easily accessible or well-known actors. In fact, across the sciences, the concept of stakeholders has attracted criticism for how “elastic” the term tends to be, and for participatory processes that at best “offer limited opportunity for meaningful stakeholder inclusion, and at worst may be a front for corporate self-regulation or government policy whitewashing” (Malcolm 2015:1).

If in the stakeholder map there are too many stakeholders providing expert knowledge and too few able to influence decisions or implement actions, the result might become a knowledge-rich workshop, but with very few possibilities to influence practice. If, on the contrary, there are too many stakeholders with decision making roles and too few stakeholders with expert knowledge (including knowledge of everyday experiences and local knowledge), the process could easily become top-down with potentially little anchorage in everyday practices.

So, how can we ensure that in the co-creation process of NBS all relevant stakeholders are considered and democratically involved, taking into account questions related to social cohesion and equity? How can we deal with conflicting goals and interests between stakeholders when creating and choosing options for NBS? How can we mitigate potential vulnerabilities (e.g., potential health impacts, compromised accessibility, increased real estate prices) arising from the creation of a NBS?

The following section documents the approach in RECONNECT to address these questions in the demonstrator sites.

1.1 Who is potentially affecting and affected by the hazard?

In participatory and co-creation processes it is important to find ways in which stakeholders representing different groups in society can participate effectively. One way of making sure all groups are represented in the stakeholder analysis for a given hazard is to follow the process through which a disaster and its solution play out.

Disasters are sometimes considered external shocks, but disaster risk results from the complex interaction between development processes that generate conditions of exposure, vulnerability and hazard. Disaster risk is therefore considered as the combination of the severity and frequency of a hazard, the number of people and assets exposed to the hazard, and their vulnerability to damage (UNISDR 2017). Exposure is defined as the people, property, or other elements subject to hazards. Vulnerability is seen as the lack of capacity to cope with, resist and recover from the impact of a hazard. Vulnerability can be determined by, amongst others, the characteristics of the physical assets, the social, environmental, and institutional setting, organizational infrastructure, and the strength of social networks (Schneiderbauer and Ehrlich 2004). Coping and adaptive capacities are determined by physical, social, cognitive, economic, and environmental factors or processes, which increase the risk of being affected by hazards (Pelling 2011).

A hazard poses no risk to infrastructure or populations if there is no exposure to that hazard. An expansion of infrastructure and urbanisation could, however, imply that a hazard that did not have an impact previously, could be disastrous tomorrow. At the same time, hazards that strike in areas with low vulnerability are not likely to turn into disasters (Quarantelli 1998). The same ('natural') hazard could lead to different social disasters and impacts depending on (the type and extent of) vulnerability. This applies to both infrastructure and to different social groups (e.g. elderly as opposed to young, women as opposed to men, farmers as opposed to industry). Vulnerability may differ due to, for example, income, livelihood, education, health, or area of residence, i.e. vulnerability is differentiated (Segnestam 2017). Differentiated vulnerability not only causes inequity, an important underlying driver of disaster risk (Pelling 2011), but similar to exposure it may change over time, adding further complexity to vulnerability measurement and disaster risk estimation (Birkmann and Wisner 2006). Together, increases in vulnerability and exposure dominate the overall increase in risk observed worldwide over the past several decades, and therefore require attention in the formulation of policies and actions to reduce disaster risk. Hence, an inclusive strategy for the involvement of stakeholders who can have an influence on the management of hazards as well as those who are potentially affected by the hazard in the co-creation process is vital.

1.2 Who is potentially affecting and affected by the NBS?

Often the success of NBS processes depends on those who can affect, as well as those who are affected by the NBS. While the implementation of structural (grey) measures such as dikes or levees are entrenched in institutional structures which do not always provide meaningful opportunities for stakeholder involvement, NBS often include private lands and use expertise of stakeholders outside of those who are usually responsible for management of hydro-meteorological hazards (Begg 2018). Therefore, in order to ensure the sustainability of the project as well as deal with potential conflicts, issues and constraints that may arise, identifying and addressing stakeholder values, interests and knowledge is a crucial step in the NBS process (Cohen-Shacham et al. 2016). In other words, "[c]ommunity members require a clear

understanding of the project, the implementation process, their rights and role in the project, and the benefits they may derive from participation in the project” (Cohen-Shacham et al. 2016, 25).

2 Methodology for mapping stakeholders

The methodology used in RECONNECT for stakeholder mapping and analysis is based on an iterative process, which will be revised on a yearly basis. The methodology, which was developed in D1.2, comprises four approaches:

1. The first methodology consists of mapping stakeholders according to their groups (Table 3.1) and roles in the process (Table 3.2). This methodology will help respond the question of who should be involved?
2. The second is a rainbow diagram and a matrix to analyse the extent to which stakeholders a) influence the hazard(s) and/or NBS (e.g. decisions, structures, dynamics), and b) are influenced by the hazard(s) and/or NBS (e.g. exposure and vulnerability). Results from this methodology will help assess whether the most influential or influenced stakeholders are being included in the stakeholder map. This methodology addresses the question: who has what at stake?
3. The third methodology will help to assess the level of involvement or participation required and desired by each stakeholder. This will address the question: how much should stakeholders be involved and when?
4. For the demonstrator A clusters (one of more institutions/organisations which are working on the same NBS), a network analysis was conducted in order to identify the strength of the relationships between different stakeholders in order to assist in decisions related to how to initiate contact with different stakeholders throughout the NBS process.

Based on the results of these exercises, demonstrators are provided with feedback which compares their approach to co-creation to recommendations from the literature on stakeholder involvement.

A more encompassing description of each of the steps for stakeholder mapping and analysis is described below.

2.1. Stakeholder mapping: Who should be involved?

2.1.1. Stakeholder groups

Stakeholder groups should represent the main sections of society: authorities from governmental agencies, political representatives, civil society, commercial sector, academia, media, and international and transnational organizations. Table 2.1 describes each of the groups in the context of RECONNECT.

It is important that all relevant stakeholder groups are present and that each stakeholder **only represent one group at a time** (i.e., a stakeholder cannot wear two hats in the same stakeholder group) in order to avoid a potential conflict of interest. The group should be formed by individuals as well as by group representatives who have the support and confidence of the people they are representing, who have the knowledge relevant to the issues to be discussed or willing to acquire the necessary information, and who can make the time commitment to actively participate during the whole process. Care should be taken not only to include those that commonly are consulted.

Stakeholder (SH) group	Description
SH1: Authorities	Local, national, or regional governmental organizations with key decision-making power, and/or assigned with overseeing, monitoring or evaluating management plans. In centralized governance systems, regional or national governments might be directly responsible for managing the area. In decentralized systems, the allocation of responsibilities may not be as distinct and have for instance, a local agency responsible for building permits and a regional agency responsible for disaster relief.
SH2: Political Representatives	Citizens elected to political office on behalf of their fellow citizens who do not hold political office. It is important to involve elected representatives as they are the ones who are most likely influenced by the decisions taken – or not – locally.
SH3: Civil Society	Individuals, civil society groups, or NGOs that have been involved in the area and issue in question and/or that may affect, gain, or be affected by the hydro-meteorological hazard(s) or the NBS.
SH4: Commercial Sector	Businesses, entrepreneurs, companies, and corporations that may affect, gain, or be affected by the hydro-meteorological hazard(s) or the NBS. These actors may be involved in the construction of the NBS or may be impacted by the hazard. These may include service-providers, local businesses, producers, tourist operators, or insurance companies, to name a few.
SH5: Academia	The scientific community with thematic expertise and experience in the area.
SH6: Media	Media (mass media, print media, digital media, social media) has unparalleled reach and power to change minds and behavioral patterns and can further accelerate mitigation and adaptation by bringing DRR stories to wide audiences. In order to fulfil this potential, media must be brought to the table as a partner rather than just a messenger.
SH7: International and transnational organizations	These could be intergovernmental organizations composed by states (e.g., the Council of Europe, the International Council for the Exploration of the Sea, the Black Sea Commission, the Helsinki Commission). They could also be non-governmental (e.g., the International Sava River Basin Commission, Baltic Sea Action Group, Marine Stewardship Council, etc).

Table 2.1 Stakeholder groups

2.1.2. Stakeholder roles

While stakeholders can only represent one group, it is possible for them to have several roles. The role of each stakeholder will vary across contexts. For instance, authorities will probably not have the same role or mandate across all cases, particularly when contrasting centralized and decentralized governance systems. Table 2.2 includes descriptions of different roles and examples of stakeholders that potentially fit the description. Ultimately, Collaborators will need to look at their own context and identify the role that each stakeholder has in their locality.

If in the stakeholder map there are too many stakeholders providing expert knowledge and too few able to influence decisions or implement actions, the result might become a knowledge-rich workshop, but with very few possibilities to influence practice. If, on the contrary, there are too many stakeholders with decision making roles and too few stakeholders with expert knowledge (including knowledge on everyday experiences like local knowledge), the process could easily become top-down with potentially little anchorage in everyday practices.

Stakeholder role	Description	Examples
Decision-makers	Stakeholders in a position to make and execute decisions concerning a society or community (not necessarily executing them – see the following category). They can be from different (local, national, regional) levels	Representatives of government ministries, state agencies, and departments, staff in national or local administrations, members of parliament, donors, and their governments
Implementers	Stakeholders responsible for the execution or implementation of plans and policies.	National authorities, NGOs, regional agencies, civil protection authorities
Coordinators	Stakeholders that coordinate a variety of actors for the implementation of plans and policies	Umbrella organizations (governmental or not)
Providers of expert knowledge	Stakeholders that provide expert knowledge and information such as research or site-specific data	Think tanks, consultants, universities, insurance companies, but also the tourist industry, energy (gas or oil) or electricity providers, extractive or food-producing companies, local informants from civil society.
Funders/sponsors	Stakeholders that finance activities in the site. These may refer to governmental agencies but also private and non-governmental financing for instance research or local engagement	Public agencies, ministries, banks, international organizations, private sector actors.
Lobbyists	Broad category that refers to individuals, associations and organized groups attempting to influence decision-making.	Individuals in the private sector, corporations, legislators, parliamentarians, government officials, advocacy groups (interest groups), financial agencies, multi-stakeholder partnerships between state and non-state actors.
Mediators	Widely recognized officially posted or unofficial stakeholders with a responsibility or mandate to mediate and facilitate communication between different sections of society.	Think tanks, local associations, private consultancies, journalists, influencers, knowledge-brokers, religious and other individual leaders from civil society.

Table 2.2 Stakeholder roles

2.2. Stakeholder analysis: Who has what at stake?

Once the identification of groups and roles is completed, the next step is to determine to what extent they affect and/or are affected by the hydro-meteorological hazard(s) and/or the NBS.

A stakeholder rainbow diagram (Burgers and Farida 2015) can help visualize the stakeholder selection carried out in the first step and flesh out potential imbalances in representation (see Figure 2.1). For example, it could be the case that after step 1, the group of stakeholders involves more actors in decision-making positions whilst actors potentially affected by the NBS are underrepresented. Alternatively, there may be equal representation in the number of stakeholders, but with very uneven stakes in the process which could lead to the failed problematization of the issue in question.

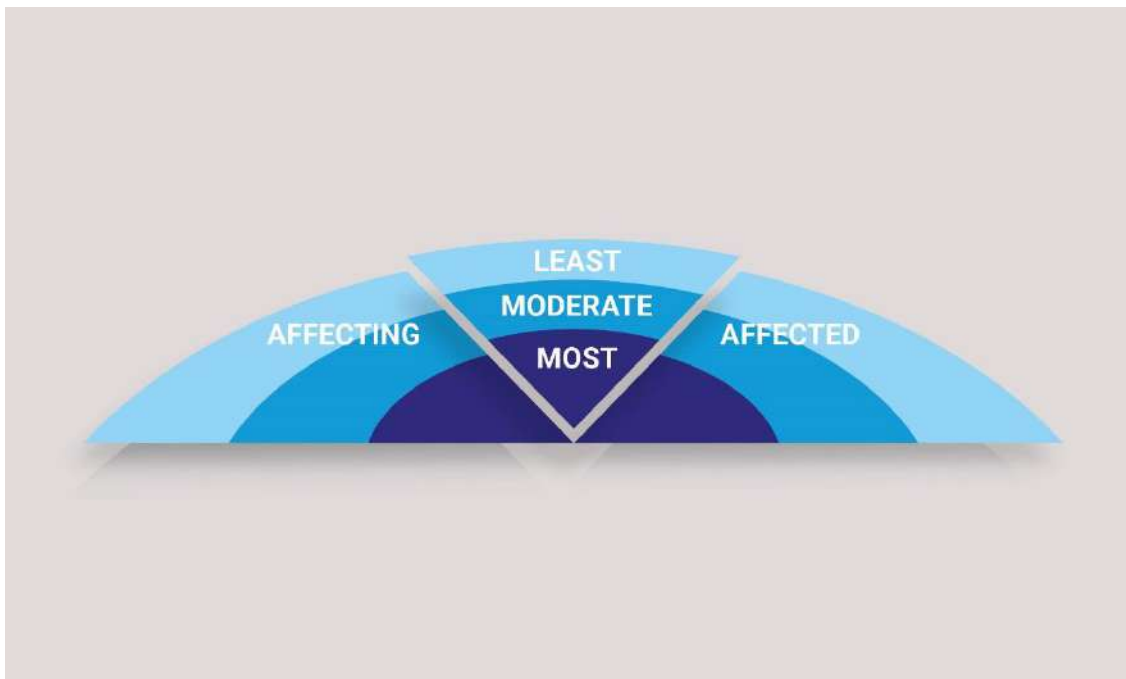


Figure 2.1 Example of Rainbow Diagram for the Hazard (adapted from Burgers and Farida 2015)

In RECONNECT, separate diagrams should be used for 1) stakeholders affecting or affected by the hazard, and 2) for stakeholders affecting or affected by the NBS (i.e. two rainbow diagrams per case)

In the first diagram (stakeholders impacting and impacted by the hazard), the category “Affecting”, stakeholders should include actors that to different extents may be causing the hazard to turn into a disaster. This could, for instance be connected to urban planning policies, lack of funding mechanisms for DRR, aging infrastructure, or refusal of land owners to collaborate in mitigation and adaptations actions. In the category “Affected”, stakeholders that are exposed to the hazard(s) should be included according to their vulnerability and the level they experience negative effects. Based on stakeholders’ groups and roles, the respective actors representing these issues should then be invited to participate.

The second rainbow diagram (impacting and impacted by the NBS) would include stakeholders that may be affecting (e.g. the decision, the production, or the location of) the NBS. Stakeholders being – negatively or positively – affected by the NBS should consider actors that may receive multiple benefits, alternatively negative impacts, from the implementation of

the NBS. The diagram would also include the stakeholders that are indirectly affected by the flow of water coming from the NBS site, e.g., authorities responsible of water bodies receiving the inflows from the NBS site.

It is likely that the stakeholder analysis process requires a series of iterations as the advancement of the co-creation process might put the relevance of the initial selection into question. For instance, the initial identification of stakeholder groups and their assessment of roles might be deemed irrelevant in the rainbow diagram because they might turn out to be less influential or less affected than initially thought. At the same time, if the identified groups (or individuals representing these groups) are not willing to participate in the process (or participate to the extent needed), it will be necessary to find alternative stakeholders.

Also, there may be stakeholders that are relevant in the context of the hydro-meteorological event(s) that are not relevant in the context of the NBS, and vice versa. It is also possible that some stakeholders will be both affected by and affecting; stakeholders could also be relevant for both the hazard and the NBS diagram.

Depending on the stage which the case is with regards to the identification of hazards and implementation of solutions, it might be difficult to fill out a complete diagram- already during the first iteration. For example, it may be clear which hazard will be in focus but not which NBS is feasible at this point. In such case, there are two options: one is to consult some of the stakeholders from the first rainbow diagram (focusing on the hazard), to assess whether there is an interest in a specific solution. Alternatively, based on the hazard and a literature review, an NBS can be suggested that might be suitable to address the hazard, and thereafter consult with some of the stakeholders from the first rainbow diagram, whether this would be a feasible option. Based on the identified NBS, the second rainbow diagram (on the NBS) can be filled out, even if the solution being assessed is only exploratory.

A participatory process of stakeholder analysis should seek to involve the stakeholders themselves in co-defining their own role in the process, since results from the first analysis iteration will merely highlight the researcher's own perceptions. Therefore, in a second stakeholder analysis iteration, demonstrators should invite stakeholders to co-define their own role in the issue (and the project). Practically, this could be done by allowing stakeholders to place themselves in the rainbow diagram. Comparisons between the assumptions made in the first iteration with the responses from stakeholder in the second iteration will feed into the stakeholder analysis.

In addition to the rainbow diagram, it is also possible to map stakeholders using the following matrix (see Figure 3.2). This matrix combines the information collected in the rainbow diagram and links it to the level of participation (i.e. high or low) that should be considered based on the level of affectedness (of the stakeholder in relation to either the hazard or the NBS depending on the context of the demonstrator site). Based on the literature on stakeholder involvement (see Begg et al. 2011), this matrix is able to provide demonstrators with feedback in regards to the level of engagement of stakeholders in order to avoid conflict, project delays and the creation or strengthening of vulnerabilities (see the results sections of each of the demonstrator sites in chapter 4).

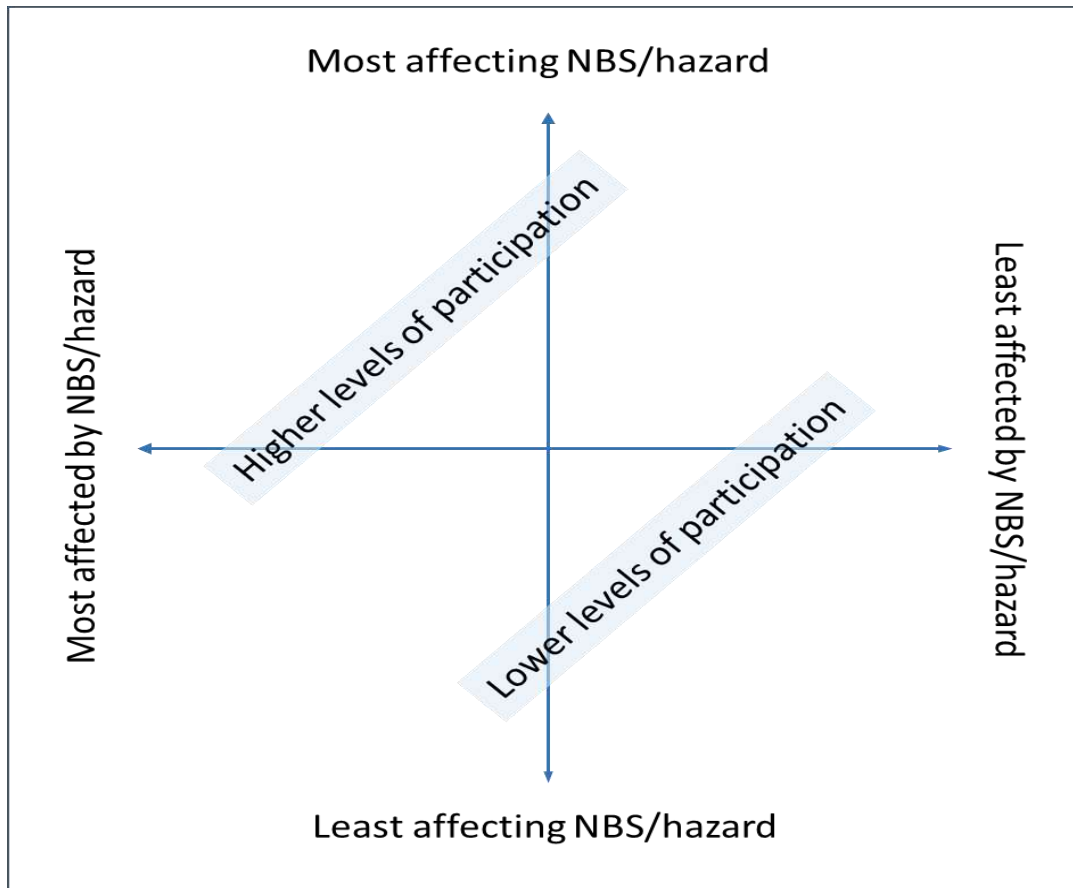


Figure 2.2 Stakeholder Matrix

2.3. How much should stakeholders be involved and when?

Once stakeholders, their roles, and the extent to which they either affect or are affected has been identified, it will be important to find ways in which each stakeholder can participate effectively. It is important to consider not only which stakeholders are needed at different stages to obtain the necessary inputs, but also the willingness of stakeholders to participate, and the interests they might have on the different stages of the process. Especially the latter needs to be determined in consultation with the stakeholders. Finally, it is necessary to be aware of powerful stakeholders that allow, facilitate and encourage the involvement of other stakeholders, or conversely prevent their participation, and ensure that all stakeholders feel free to make their voices heard.

For the mapping of stakeholders in the demonstration sites, two core levels of participation (i.e. high and low) were differentiated (see D1.2). For the purposes of the interviews with demonstrators, these levels of participation were further specified and used as the basis of discussions regarding how stakeholder have been involved in the part and how they are planned to be involved in the future (see Table 2.1). The lowest level of participation is the provision of information. The second level of participation is consultation and the highest level of participation is co-deciding.

- **Co-deciding** is the strongest level of involvement where all stakeholders hold power to influence the decision. Co-deciding aims at creating open and mutual exchange while allowing the identification of different or similar opinions, worldviews and values among and between different actors; on the other hand, it also aims at the participants to actively influence the final decision-making process. Examples are study-groups, round tables, citizen juries, mediation procedures etc. (Arbter et al., 2007; Kenyon et al., 2001).
- **Consultation** can take place either face-to-face or digitally/written communication. However, in contrast to co-deciding, power to take the final decision is in the hands of the body conducting the consultation. Consultation generally presents stakeholders with a number of options and asks them to choose/adapt one of those options to suit their interests. It aims to allow different actors to express their opinions and views on a planned project. Examples of this participant strategy are: public meetings with discussions, opinion surveys, citizen panels, or a request for comments (Arbter et al., 2007). However, decision-makers may or may not take the feedback of the interested parties into account.
- **Information provision** relies on indirect, one-way communication with (almost) no feedback mechanisms (e.g. notice-boards, mailing lists, public meetings to inform residents or other actors, making documents and plans publicly accessible). The purposes of such communication are: informing about projects, plans and policies, raising awareness, encouraging protective behaviour, or warning residents at risk (e.g. by means of flood risk maps) (Arbter et al., 2007).

In addition, the level of involvement of stakeholders should be identified in relation to the 5 stages for implementing a NBS through RECONNECT's co-creation approach: Co-assessment and planning; co-design; co-implementation, co-operation and maintenance; co-monitoring and evaluation (Figure 2.3).

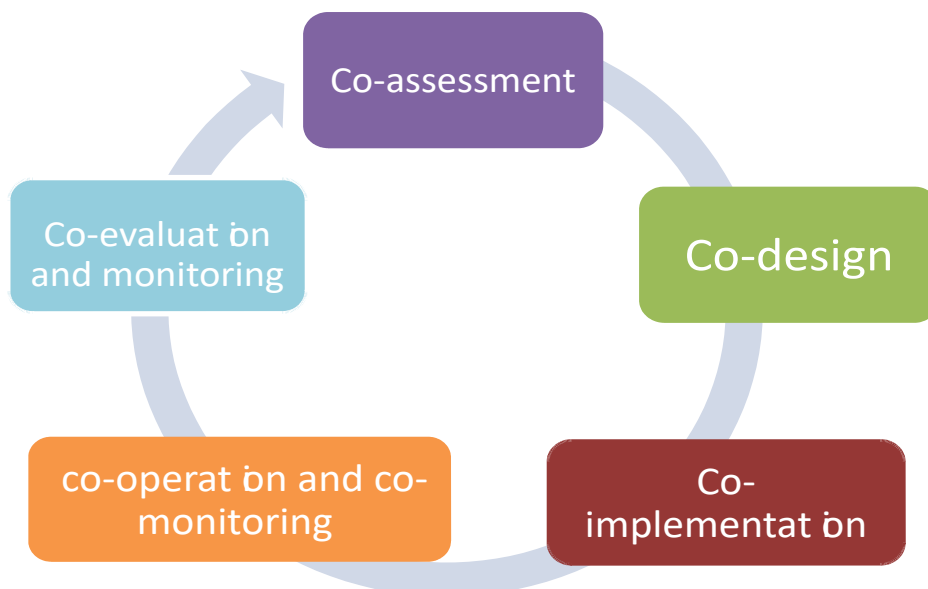


Figure 2.3 A co-creation approach for NBS Implementation

- **Co-assessment and planning (Who and what is at risk? What are suitable types of NBS?):** Assessment of hazards, vulnerabilities and risk of demonstrators and collaborators to hydro-meteorological events, their experiences, expectations, needs and capacities to implement NBS and other risk mitigation options, as well as decision making processes, practices and stakeholders. Based on these assessments, the applicable types of NBS will be determined. Appraisal of different types of NBS will be carried out in relation Key Performance Indicators (KPI). The development of indicators will address definition of expected benefits and co-benefits of NBS with each developer and collaborator. Where new indicators are developed, they will follow the SMART criteria list, which means that they will be Specific, Measurable, Achievable and Relevant and Time-bound.
- **Co-design (Which design configurations meet stakeholders' needs and use?):** This step involves analysis of different NBS design configurations and discussions with local stakeholders about their preferences and needs. For example, if a particular NBS aims to store and treat the water, the analysis of different design configurations (e.g., which parts of the land will need to be reshaped to allow for storage, where should inlet and outlet structures be located, etc.) will need to be carried out in a participatory approach.
- **Co-implementation (How do we do it?):** Development and implementation of selected and co-designed NBS in land use management. Co-implementation requires an in-depth understanding of regulatory process, public opinion, stakeholder involvement and construction practices
- **Co-operation and Maintenance:** refers to all of the activities needed to run a NBS, except for the construction of new measures. The overall aim of co-operation and maintenance is to ensure efficiency, effectiveness and sustainability of the NBS. Implementation of co-operation and maintenance activities is not just a technical issue, but includes social, financial, institutional, managerial and environmental aspects as well (Brikké 2000)
- **Co-evaluation and co-monitoring (How are co-implemented NBS effective in achieving desired benefits and co-benefits?):** Evaluation and monitoring of the performance of NBS is evaluated by using indicators developed during the co-design stage to measure progress on developers' expectations for benefits and co-benefits of NBS.

In order to gain an understanding of how different stakeholders were/are/will be involved in the different phases of the NBS process, we asked demonstrators to fill out the following table 2.3).

Decision influencing and co-deciding					
Consultation					
Information provision					
	Co-assessment and planning	Co-design	Co-Implementation	Co-operation and co-maintenance	Co-monitoring and co-evaluation

Table 2.3 The extent to which stakeholders were/are/will be involved in the different phases of the NBS

3 Summary of Results

In this section the aggregated results of stakeholder groups, stakeholder roles, and stakeholder groups and roles in relation to the two dimensions (1) affected by hazard/affecting hazard and (2) affected by NBS/affecting NBS will be summarized for all Demonstrators.

3.1 Stakeholder groups

In total 121 stakeholders were mapped by Demonstrators. As Figure 3.1 displays, by far the majority belongs to the stakeholder group “authority”, followed by members of the civil society, the private sectors, political representatives, academia/research, media and international or transnational organisations.

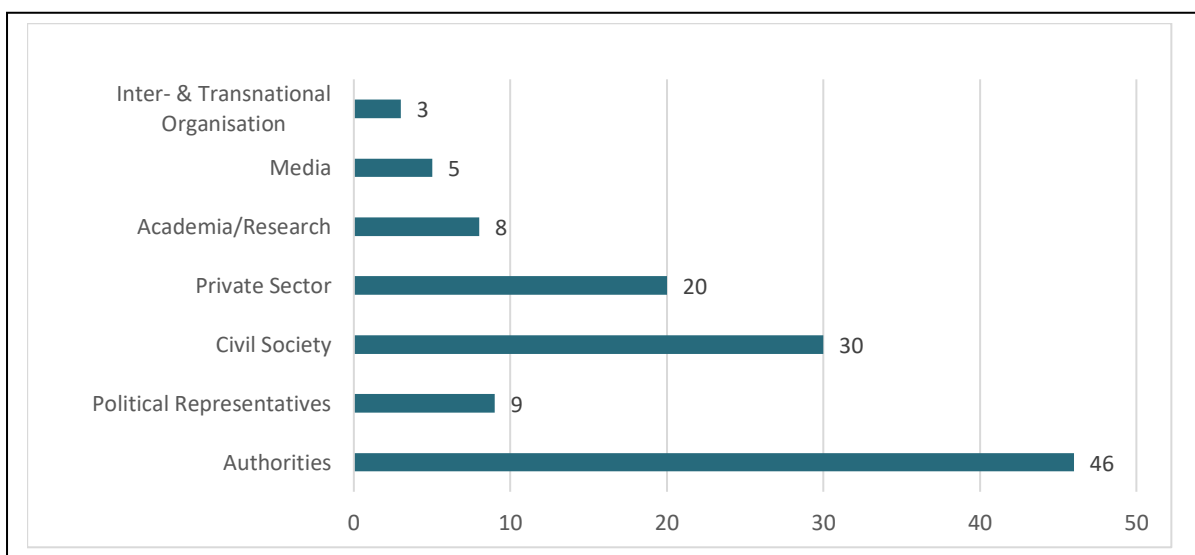


Figure 3.1 Overview on stakeholder groups mapped by Demonstrators (n=121)

Stakeholder mapping, thus shows a relative diverse spectrum of stakeholders with a dominance from actors from governmental bodies as well as members of the civil society. In this sense, the Demonstration cases seem to reflect a polycentric governance structure that includes a relative large number of and a diverse spectrum of stakeholders involved in the realization of NBS. In total non-governmental stakeholders (i.e. media, academia/research, private sector and civil society) are mapped more often than governmental stakeholders (i.e. political representatives, authorities).

A deeper look into the single Demonstrators reveals differences with respect to the groups of stakeholders mapped. Figure 3.2 indicates that in DA4 Portofino Park, BD1 IJssel River Basin and DB3 Greater Aarhus stakeholders from non-governmental actors (i.e. civil society and private sector) are more often mapped. In DA1 Elbe Estuary, DA3 Todera River Basins, DB2 Inn River Basin it is rather governmental stakeholders that are predominantly mapped (i.e. authorities and political representatives). The reasons for such differences need to be further explored during the next steps of the stakeholder interaction. They can be grounded, among others, in either the case itself (i.e. Portofino being a touristic area, more stakeholders from the

private sector are affected than in the Inn River Basin) or by the perspective of the Demonstrators and their knowledge about the wider stakeholder landscape².

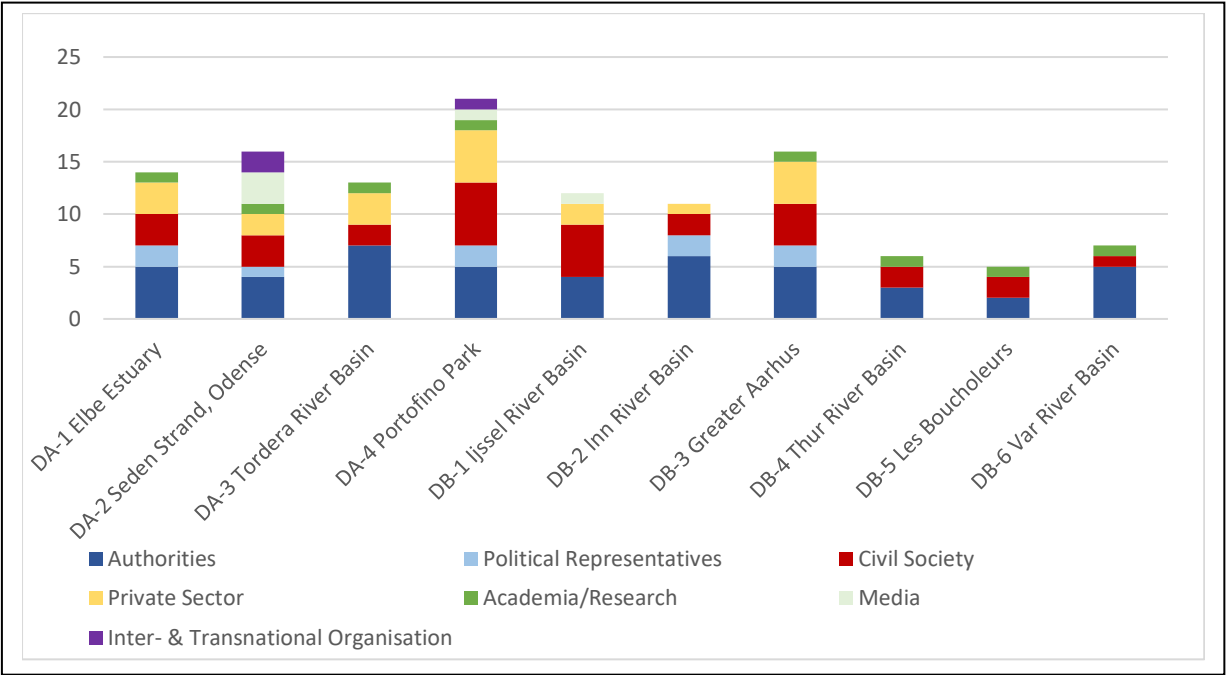


Figure 3.2 Mapped stakeholder groups in the Demonstration sites (n=121)

3.2 Stakeholder roles

While stakeholders can just belong to one group, they can have multiple roles. Although stakeholders representing governmental entities are a dominant group in all sites, they do not play the most important role as decision-makers, implementers or coordinators, as one might expect. The two most important roles that stakeholders play are being lobbyists or knowledge providers, followed by implementers, decision-makers and coordinators.

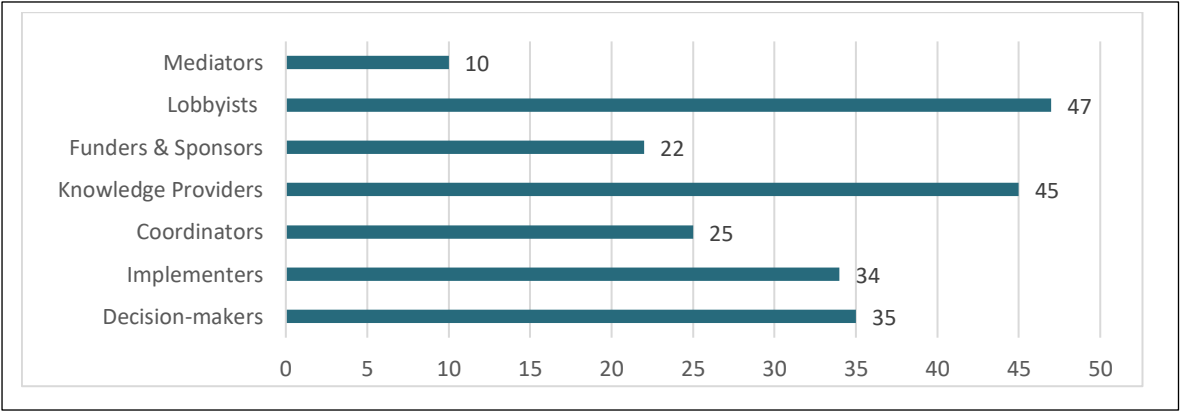


Figure 3.3 Overview on mapped stakeholders' roles (n=218)

² The relatively low number of stakeholders mapped in DB4, 5 and 6 will be enhanced as the project is progressing. We will apply a snow-ball sampling procedure and will identify additional stakeholders in these cases.

Again, there are distinct differences between the Demonstrators (see Figure 3.4). In DA4 Portofino Park not just a large proportion of non-governmental stakeholders was mapped, this site has also identified the highest share of “lobbyists”, followed by DB1 IJssel River Basin. In DB3 Greater Aarhus many stakeholders seem to play the role of “konweldge providers”. In DA3 Todera River Basin stakeholders serve as “decision-makers”, “implementers” and “coordinators”.

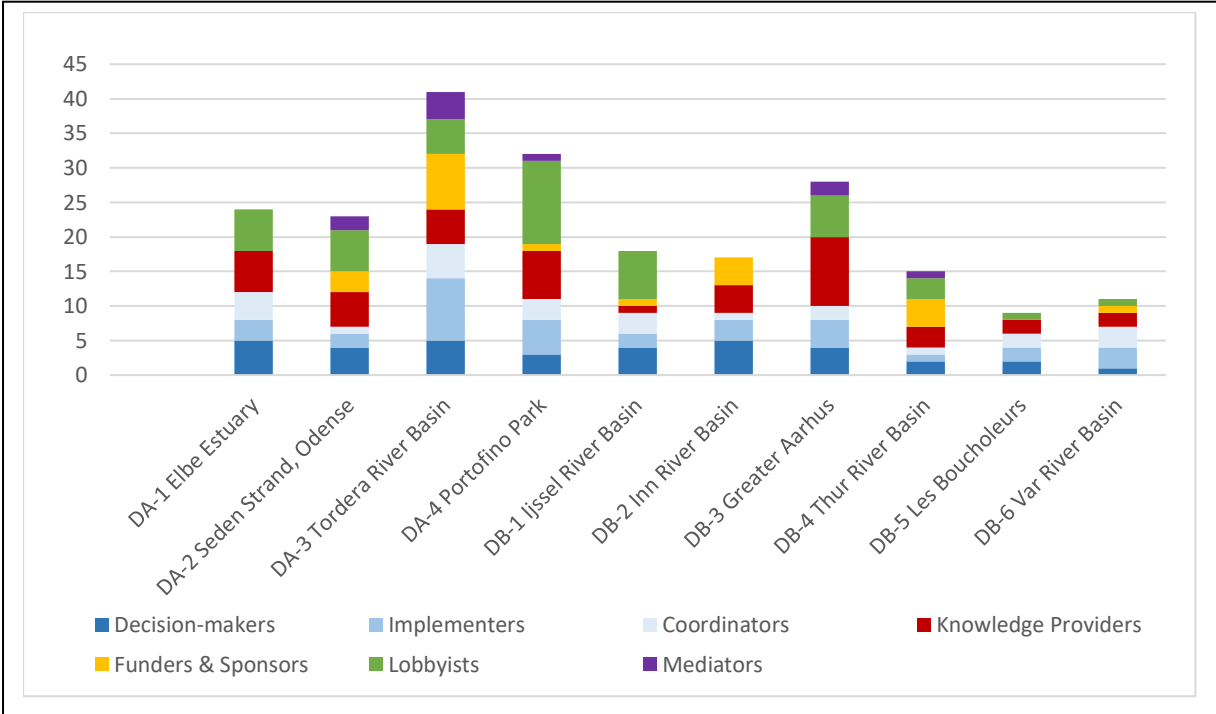
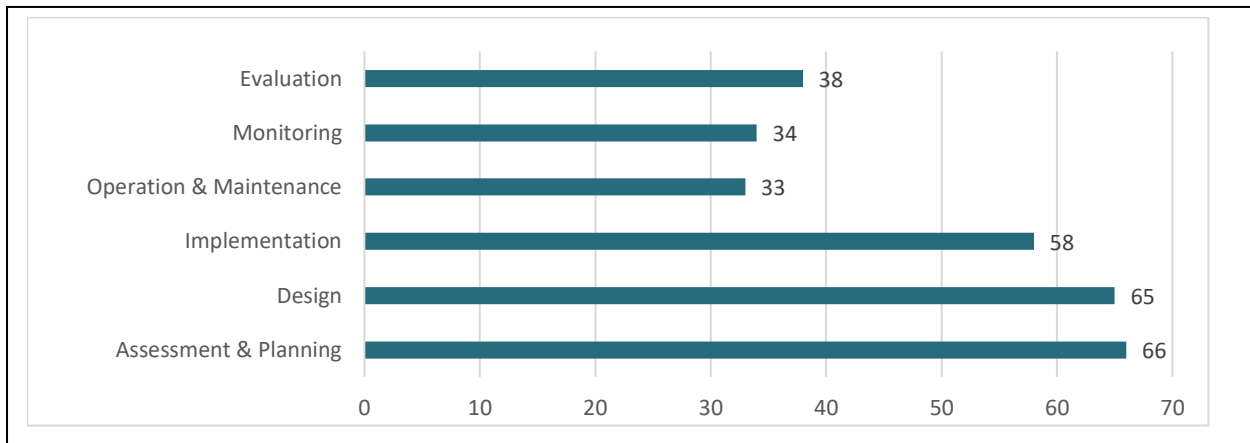


Figure 3.4 Mapped stakeholder’s roles in the Demonstration sites (n=218)

3.3 Stakeholder involvement during different stages of the NBS realisation

Most stakeholder should be and/or are involved during the initial stages of the realisation process (.e.g assessment/planning and design), followed by implementation. The phases of monitoring and evaluation as well as operation and maintenance were, at the time the stakeholder mapping was conducted, considered as being of lower relevance with respect to stakeholder engagement. However, it is expected that this preliminary assessment will change



as the project is progressing.

The difference between single Demonstrators are less pronounced than with respect to the previous categories (i.e. stakeholder groups/roles).

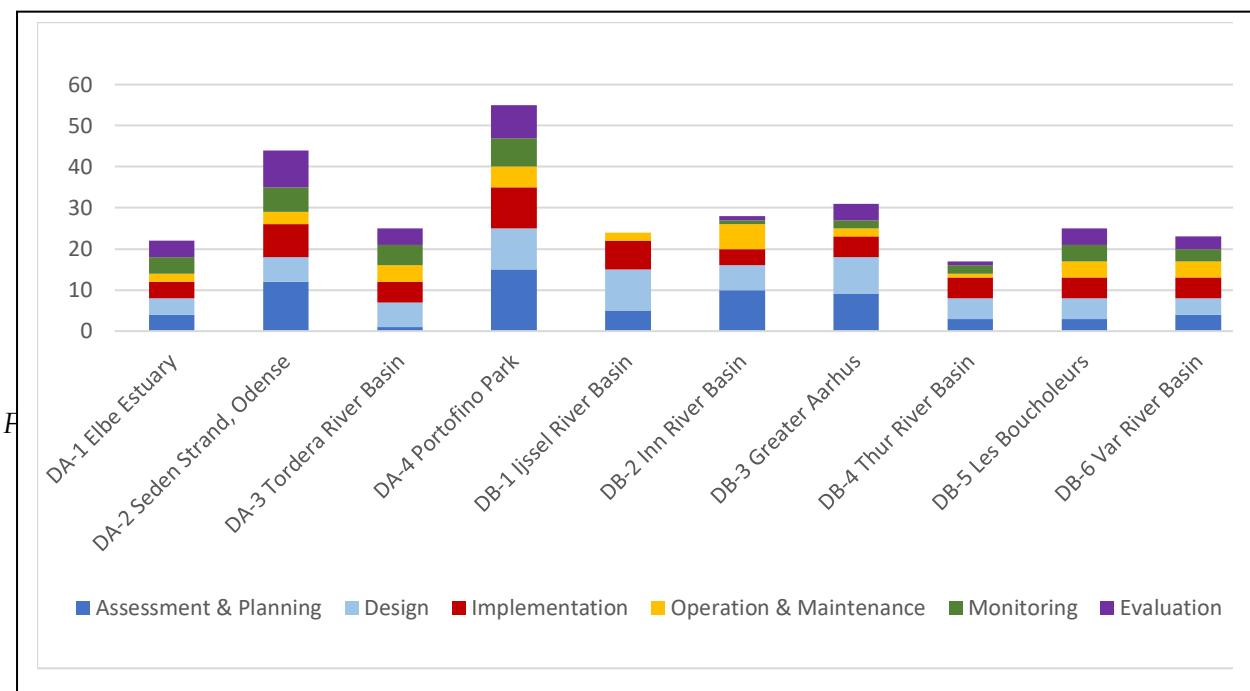


Figure 3.6 Overview on mapped stakeholder's involvement during different stages (n=121)

3.4 Stakeholders and relation to hazards/NBS

The overview on how mapped stakeholders are affected by the hazard or NBS and/or how they are able to influence the hazards and NBS (see Figure 3.7), reveals a remarkable difference. Figure 3.7 indicates that on average authorities, political representatives as well as academia/researchers are able to better influence decision-making processes than representatives of civil society and private sector. At the same time, the latter groups are more often exposed to hazards/NBS. This points towards an unbalanced relation with respect to exposure and ability to influence decisions. Particularly, members of the civil society seem to not be able to effectively affect the hazards. Stakeholders representing the private sector seem to be highly exposed to the hazards, but also hardly able to affect decisions regarding NBS and hazards. Again, the implication of this inequality and how stakeholders perceive it themselves, will be further explored during the next steps of the co-creation process. However, for each of the Demonstrators specific recommendations are provided on how to counteract such patterns of inequality.

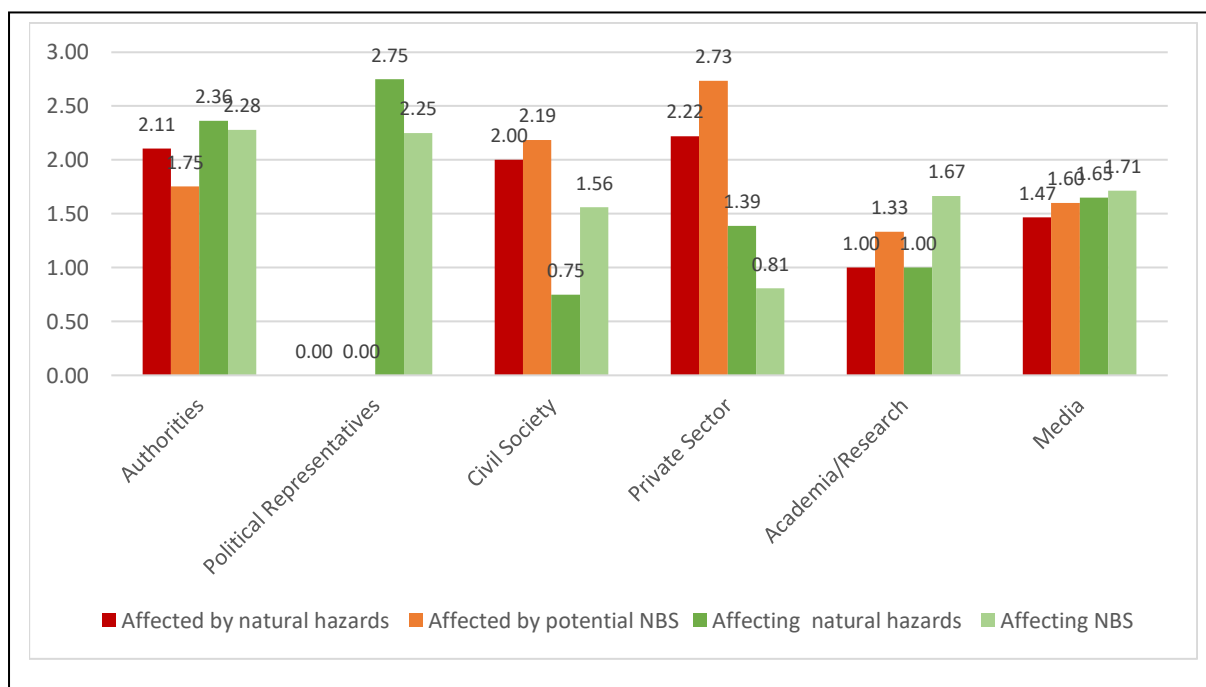


Figure 3.7 Overview on how stakeholders are affecting hazards/NBS and/or are being affected by hazards/NBS

3.5 Discussion and conclusion

Relating back to the purpose of the stakeholder mapping task conducted among Demonstrators, the summary findings indicate that all Demonstrators have effectively identified stakeholders that can contribute to a co-creation process.

Generally, Demonstrators have identified stakeholders representing different groups and playing different roles. While representatives from “authorities” and/or “political representatives” are the dominant group of stakeholders, the dominant role stakeholders are

attributed to are “lobbyists” and “knowledge providers”. This indicates that, in principle, at least the different groups and roles are represented in a balanced manner. However, such statements are still preliminary, and need to be further substantiated during the next steps of the co-creation process.

Furthermore, our findings support that a transition from a top-down to a co-creation or even bottom-up governance model is taking place. This shift is underlined by the large proportion of representatives of members of civil society, private sector, and also representatives of research and the media, which outnumber representatives of governmental entities.

However, a closer look at the ability of stakeholders to influence decision-making processes warrants a certain level of caution: Our mapping activity suggests that while a diverse and balanced set of stakeholders has been identified, the capacity they each have to actually impact on decision-making processes, seems to be unequally distributed. The power to influence and take decisions, seems to continue to rest with representatives of governmental bodies. We therefore, provide specific feedback for each Demonstrator how to ensure a balanced representation of stakeholders by pointing out stakeholders that are strongly affected, but with lower power to influence decisions. We suggest, that this stakeholder group should be strongly involved during the co-creation process.

Results from this initial mapping exercise are just the first step of the stakeholder interaction and thus form the basis of the co-creation processes. They do not yet provide a thorough analysis and they by no means provide information about stakeholders perspectives, interests, power, and capacities. These aspects will be explored in-depth in a next step, wherein each of the mapped stakeholders will be interviewed to understand its perspective on the project, on processes of co-creation, and on NBS in general. The outcomes of the interviews and the analysis will be included D3.7 - Final report describing validation work in Demonstrators.

4 Results for Each Demonstrators

Where possible, members of the UFZ team travelled to the demonstrator sites to conduct the mapping exercises in person. This provided the opportunity to get to know the demonstrator partners and their sites better. Our meetings were also based on discussion, explanation and assistance with filling out the different templates. This section presents the results of stakeholder mapping and analysis for each of the demonstrator sites. Note that stakeholders that are indirectly affected by the flow of water coming from the NBS site may not have been identified yet. In the revised version of the report those stakeholders will be included in the rainbow diagrams and a figure similar to 1b will be produced for each Demonstrator case.

4.1 DA-1: Elbe Estuary, The Federal State of Hamburg, Germany

The stakeholder mapping exercise was designed to get to know the demonstrator sites, support the development of the co-innovation framework in RECONNECT and provide demonstrators with a first feedback in regards to their existing/planned interaction with stakeholders at this stage of the project. In two rounds of discussion each member of the Hamburg cluster, the official partners of RECONNECT at the demonstrator site, present described the perceived hydro-meteorological risk and what is understood as a nature based solution (NBS). The participants were asked to write down each stakeholder that they thought of while discussing these topics.

This sub-section summarizes the first findings of the stakeholder mapping, which will be specified and could vary in the ongoing process of implementation.

The hydro- meteorological risks perceived by the members of the cluster are both the increasing number and strength of flood events, which might be caused by high water levels in the river Elbe and the North Sea. Decreasing rainfall can cause drought. Thereby, the surface and groundwater resources in the Eastern part of Hamburg can be reduced and the drinking water supply from these resources might be threatened.

The innovation by the demonstrator in Hamburg is, for the members of the cluster, to find a NBS (mainly enhanced water management), which addresses both the risk of flooding and drought by using the same measures; by offering innovative smart water management technologies to responsible state authorities (detailed information on demonstrator Hamburg in Del. 2.3 and 2.5) (see Figure 4.1).

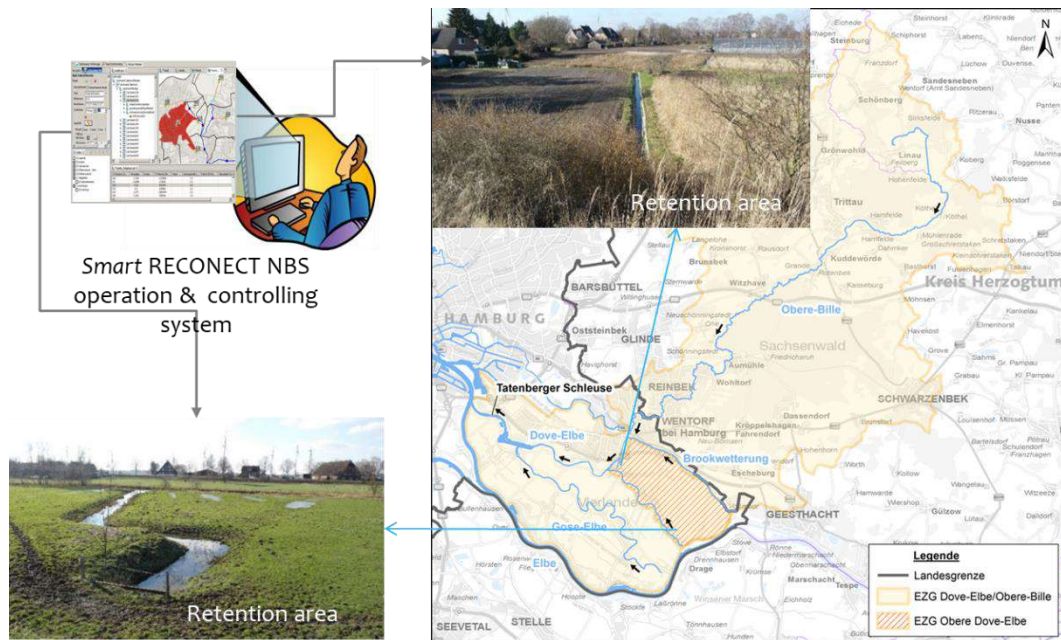


Figure 4.1 The demonstration area Dove/Gose Elbe (marked in yellow) and the typical retention areas

4.1.1 Hamburg's main interests in the RECONNECT project:

- For the Hamburg cluster it is important to know in which way the co-creation process in RECONNECT is supporting the implementation of the NBS at the demonstrator site in Hamburg. At which stage of the co-creation process do we need which kind of participatory processes without slowing down the process?
- Understanding the perspective of potential veto-players is as crucial as identifying influential supporters for NBS. It is of highest importance to convince sceptical, influential stakeholders with the help of fact-based knowledge: Why did we do it different in the past?
- What are the benefits of nature based solutions compared to traditional solutions? The demand for this kind of knowledge is also crucial to convince decision-makers in the long-run. Additionally, it would be important to know who is benefiting from specific types of NBS to identify potential supporters in the whole set of stakeholders.

4.1.2 The results of the stakeholder mapping exercises

The following stakeholders were identified in the Hamburg demonstrator site in regards to their roles in the management of the hazard(s) (see Table 4.1) as well as their role in the NBS (see Table 4.2).

Stakeholder Group	Name, Position and Organisation	Role						
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders / Sponsors	Lobbyists	Mediators
SH1: Authorities	State Administration for Environment and Energy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	LSBG: Flood authority	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	District of Bergedorf: general, cultural heritage, water management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City Planning	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Hamburg Wasser (drinking water, wastewater)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH2: Political Representatives	City of Hamburg: government (Senat)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	City of Hamburg: mayor's office (Senatskanzlei)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH3: Civil Society	Farmers/Gardening/Sport/Fishing Club	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Nature Conservation Association	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Citizens/residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH4: Private Sector	Shipping/tourism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Industry/ small business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Private property owners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	University/science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.1 Stakeholder groups and roles related to hazards, Hamburg

Stakeholder (SH) Group	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process					
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	State Administration for Environment and Energy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	LSBG: Flood authority	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	District of Bergedorf general, cultural heritage, water management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	City Planning	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Hamburg Wasser (drinking water AND wastewater)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH2: Political Representatives	City of Hamburg: government (Senat)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	City of Hamburg: mayor's office (Senatskanzlei)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SH3: Civil Society	Farmers/Gardening/Sport/Fishing Club	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Nature Conservation Association	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Citizens/residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						

	Shipping/tourism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Industry/ small business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Private property owners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
SH5: Academia / Research	University/science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.2 Mapping stakeholders related to NBS, Hamburg

In the two rounds of discussion, on the one hand we identified which stakeholders at the Hamburg Demonstrator site might be affected by the hydro-meteorological risks. On the other hand, we identified the stakeholders, which might be influencing the risks, and who has the power to influence the implementation of NBS and who might be affected by the NBS. It was a relatively open and lively discussion.

The city of Hamburg, its infrastructures and inhabitants as a whole have been affected by hydro-meteorological risks already for centuries. Therefore, the standards for flood protection and water management are extremely high and measurements perceived as very successful. But droughts and floods still can affect, for example, water quality, the utilities responsible for water supply and all inhabitants connected to this water supply infrastructure. The public company charged with the responsibility of running this infrastructure is Hamburg Wasser, which is perceived as a very influential stakeholder as affected by the risk, and influential on the NBS as well. This large municipal company operates largely independent and follows diverging interests, e.g. different for the drinking water and the wastewater sections. Hamburg Wasser will be integrated in future meetings of the demonstrator team if thematically suitable.

One stakeholder who has a strong influence on the implementation of NBS is the district administration (Bezirksamt) of Bergedorf and different units of it. It was explained that one important department within the Bezirksamt could be the one responsible for cultural heritage, as the old 'Serrahn' weir might be affected by changing ground water levels. Additional stakeholders who might influence the implementation of the NBS is the Wasser- und Bodenverbände (water and soil boards), the residents (especially at the tributary Bille), and stakeholders responsible for recreational activities, such as the local fishing association or nature conservation groups on the local and city level (all these Stakeholder might also be affected by the NBS).

Stakeholders who represent economic interests in the area and who might be affected (positively and negatively) by the NBS could be shipping, tourism (e.g. restaurants), farming, real estate agencies (value of properties). The risks and the NBS also affect important infrastructures like roads leading to hospitals or the airport.

Influential stakeholders with the capacity to influence the NBS, and in a sense the risk as well, are policy makers of the federal state of Hamburg in general, deciding on city planning, road construction (B5), and (changing) overall social issues like housing and mobility. For water management, long-term solutions are essential to reduce risks. The Hamburg cluster has already integrated very influential stakeholders: e.g. Senatskanzlei, BUE and LSBG. Stakeholders that influence the risks at stake are also authorities in the surrounding German states of Niedersachsen and Schleswig-Holstein, but these are not in the scope of the RECONNECT project.

As a result of this discussion Hamburg agreed on the two rainbow diagrams and the following stakeholder matrixes in order to answer the questions: *who is affected by and can affect hydro-meteorological hazards* (see Figure 4.2.) and *who is affected by and can affect the NBS?* (see Figure 4.3)³.

³ In Hamburg three working groups conducted the stakeholder mapping exercise in parallel. So the terms used to describe stakeholders in the matrixes (Figures 3.4-3.6) and the stakeholder involvement tables (Table 3.3-3.5) differ. In the rainbow diagrams we have tried to standardise the names of



Figure 4.2 Stakeholders affecting and affected by the hazard, Hamburg

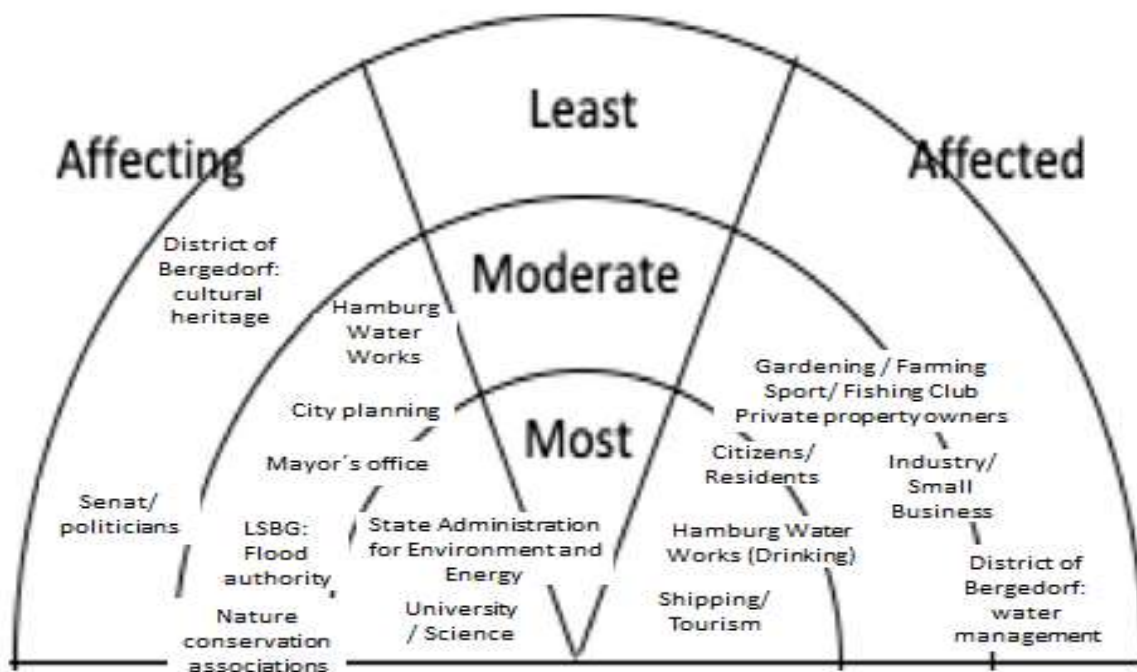


Figure 4.3 Stakeholders affecting and affected by the NBS, Hamburg

stakeholders together with the Hamburg demonstrator cluster. Therefore, the rainbows contain a summary of the matrixes. We think it is important for our methodology to keep the wording of the matrixes and tables filled in by the demonstrators as far as possible.

After these discussions the participants were asked to fill the most important stakeholders in the following graph in three groups of two people (see Figures 4.4. 4.5 and 4.6). Afterwards each team explained the results to the group. The names of the group members are anonymous for the purposes of this report.

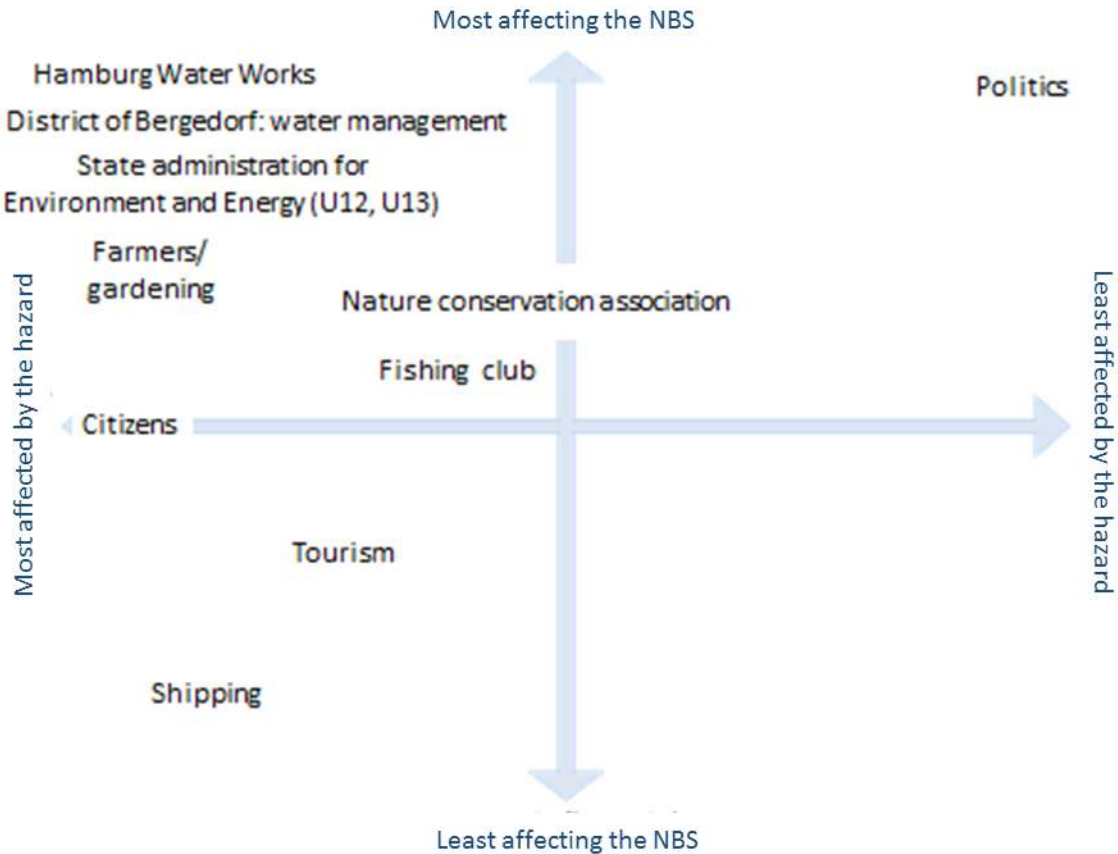


Figure 4.4 Stakeholder matrix – Group 1, Hamburg

For these members of Hamburg demonstrator site there are three stakeholders who are most influential and most affected at the same time: The public but independent company Hamburg Wasser; the responsible units for water management in the district administration and the municipal/state administration. When discussing the findings of the member of the demonstrator site (every team presented its results to each other), an important question was, in which sense is a stakeholder like a responsible administration affected by a hydro-meteorological risk? After a major flood or drought specific units for water management might become more influential, receiving more resources or competences. Politics or the political agenda is clearly influenced by hydro-meteorological events, but not necessarily by constantly growing risks. Therefore, this team thought, regarding the implementation at the demonstrator site, administration is highly effected and politics not. Additionally we see that more or less influential stakeholders come from farming, gardening, fishing, nature conservation, tourism and shipping, and they are perceived as quite affected.

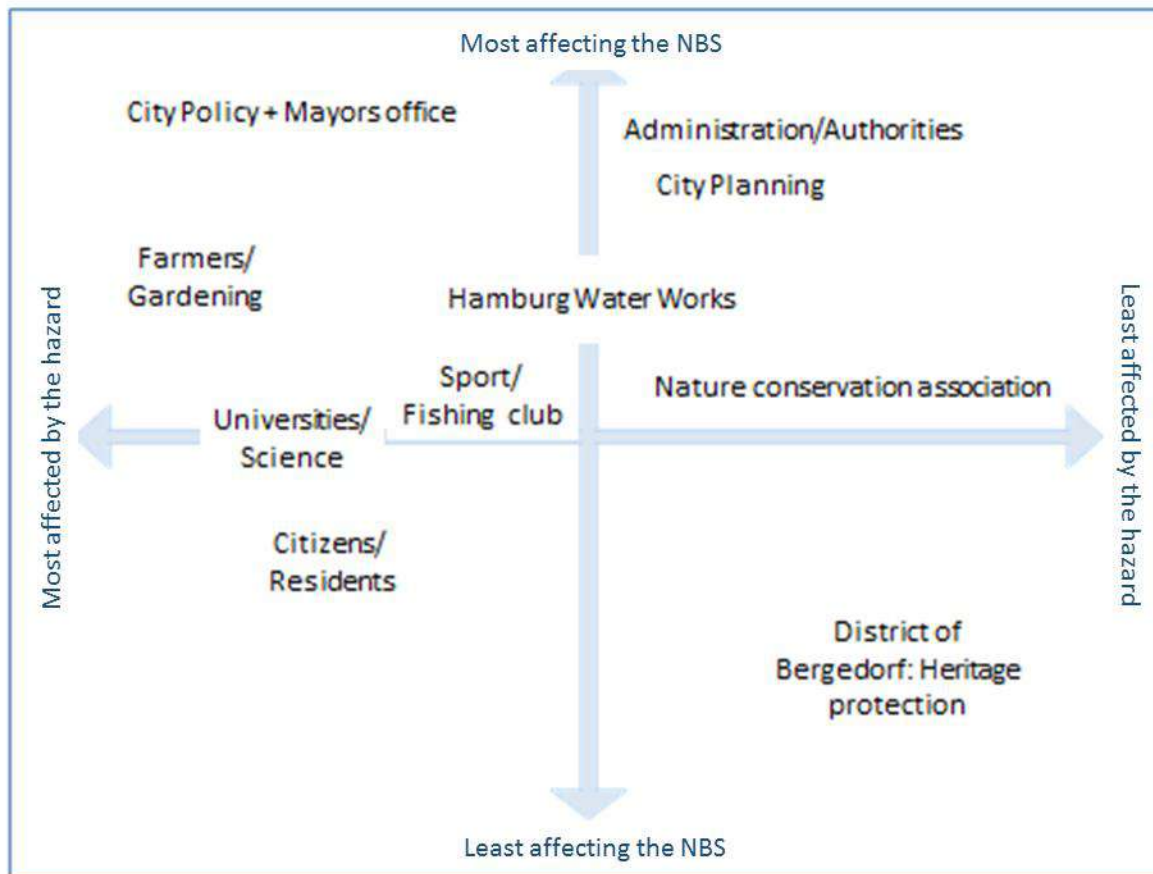


Figure 4.5 Stakeholder matrix – Group 2, Hamburg

Similar to group 1, group 2 sees the Senatskanzlei as well as farmers and gardeners as being both influential in the decision-making process surrounding NBS and affected by flood/drought risk. Group 2 also placed sports/fishing in a similar place as group 1 (moderately affected by flooding/droughts and moderately influential). Group 2 sees citizens and the water works as slightly less influential as group 1 and the nature conservation association as being less affected by the risks. Additional stakeholders include universities, city planning/public offices/authorities.



Figure 4.6 Stakeholder matrix – Group 3, Hamburg

Similar to group 1 and group 2, group 3 sees the Senatskanzlei and citizens as being influential in the NBS decision-making process and affected by the risks. An additional stakeholder who is perceived as being both influential and affected is industry and small businesses. Like group 1, group 3 included shipping as being affected but not influential. Unlike group 1 and group 2, group 3 perceives the nature and conservation association as being neither affected nor influential.

All of the three figures show clearly, that Hamburg Wasser is one the most influential stakeholders at the demonstration site, influencing the risk and the success of the NBS. During the stakeholder mapping exercise an intense and detailed discussion emerged, which focused on the way that public authorities and Hamburg Wasser could and should cooperate. To successfully cooperate with Hamburg Wasser, a coherent strategy of Hamburg's administration is seen as crucial.

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Hamburg intend to involve which stakeholders at which stage of the decision-making process in a table (see Tables 3.3, 3.4 and 3.5).

Decision influencing and co-deciding	<ul style="list-style-type: none"> - Hamburg Water Works - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority 	<ul style="list-style-type: none"> - Hamburg Water Works - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority 	<ul style="list-style-type: none"> - Hamburg Water Works - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority 	<ul style="list-style-type: none"> - Hamburg Water Works - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority 	<ul style="list-style-type: none"> - City of Hamburg - State Administration for Environment and Energy
Consultation	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University - Farmers/Gardening/Fishing/ - Nature Conservation Associations 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University - Farmers/Gardening/Fishing - Nature Conservation Associations 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University - Farmers/Gardening/Fishing/ - Nature Conservation Associations 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University - Farmers/Gardening/Fishing/ - Nature Conservation Associations 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University - Farmers/Gardening/Fishing - Nature Conservation Associations
Information provision	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - Environmental administration - LSBG: Flood Authority - University/science 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - Environmental administration - LSBG: Flood Authority - University 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University/science 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration

	- Farmers/Gardening/Fishing/ Nature Conservation Associations	- Farmers/Gardening/ Fishing - Nature Conservation Associations	- Farmers/Gardening/Fishing/ Nature Conservation Associations	- LSBG: Flood Authority University - Farmers/Gardening/ Fishing/ Nature Conservation Associations	for Environment and Energy - LSBG: Flood Authority University - Farmers/Gardening/ Fishing/ Nature Conservation Associations
	Co-deciding	Co-design	Co-implementation	Co-operation and maintenance	Co-evaluation and co-monitoring

Table 4.3 Involvement of stakeholders at different stages of the decision-making process – Group 1, Hamburg

Decision influencing and co-deciding	- City of Hamburg Administration - Industry/ small business - Nature Conservation Association		- City of Hamburg - Hamburg Water Works	- City of Hamburg - Hamburg Water Works	- City of Hamburg - State Administration for Environment and Energy
Consultation		- Nature Conservation Association			- City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University/science

					- Farmers/Gardening/Fishing/ Nature Conservation Association
Information provision	- Economy - Nature Conservation Association Citizens	- Economy - Nature Conservation Association - Citizens - University/science	- City of Hamburg - University/science	- University/science - Nature Conservation Association	- City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority University/science - Farmers/Gardening/Fishing/ Nature Conservation Association
	Co-deciding	Co-design	Co-implementation	Co-operation and maintenance	Co-evaluation and co-monitoring

Table 4.4 Involvement of stakeholders at different stages of the decision-making process – Group 2, Hamburg

Decision influencing and co-deciding	- State Administration for Environment and Energy	- Hamburg Water Works - LSBG: Flood Authority - State Administration for Environment and Energy	- Hamburg Water Works - LSBG: Flood Authority	- Hamburg Water Works - LSBG: Flood Authority - State Administration for Environment and Energy	- City of Hamburg - State Administration for Environment and Energy
Consultation	- Hamburg Water Works	- Hamburg Water Works	- Hamburg Water Works	- Hamburg Water Works - LSBG: Flood Authority	- City of Hamburg - District of Bergedorf

	<ul style="list-style-type: none"> - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - LSBG: Flood Authority - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - LSBG: Flood Authority - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - State Administration for Environment and Energy - LSBG: Flood Authority - University/science - Farmers/Gardening/Fishing/Nature Conservation Association
Information provision	<ul style="list-style-type: none"> - Hamburg Water Works - LSBG: Flood Authority - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - Hamburg Water Works - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - Hamburg Water Works - LSBG: Flood Authority 	<ul style="list-style-type: none"> - Hamburg Water Works - LSBG: Flood Authority - State Administration for Environment and Energy 	<ul style="list-style-type: none"> - City of Hamburg - District of Bergedorf - State Administration for Environment and Energy - LSBG: Flood Authority - University/science - Farmers/Gardening/Fishing/Nature conservation Association
	Co-deciding	Co-design	Co-implementation	Co-operation and maintenance	Co-evaluation and co-monitoring

Table 4.5 Involvement of stakeholders at different stages of the decision-making process – Group 3, Hamburg

4.1.3 Feedback

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to be involved in the decision-making process.

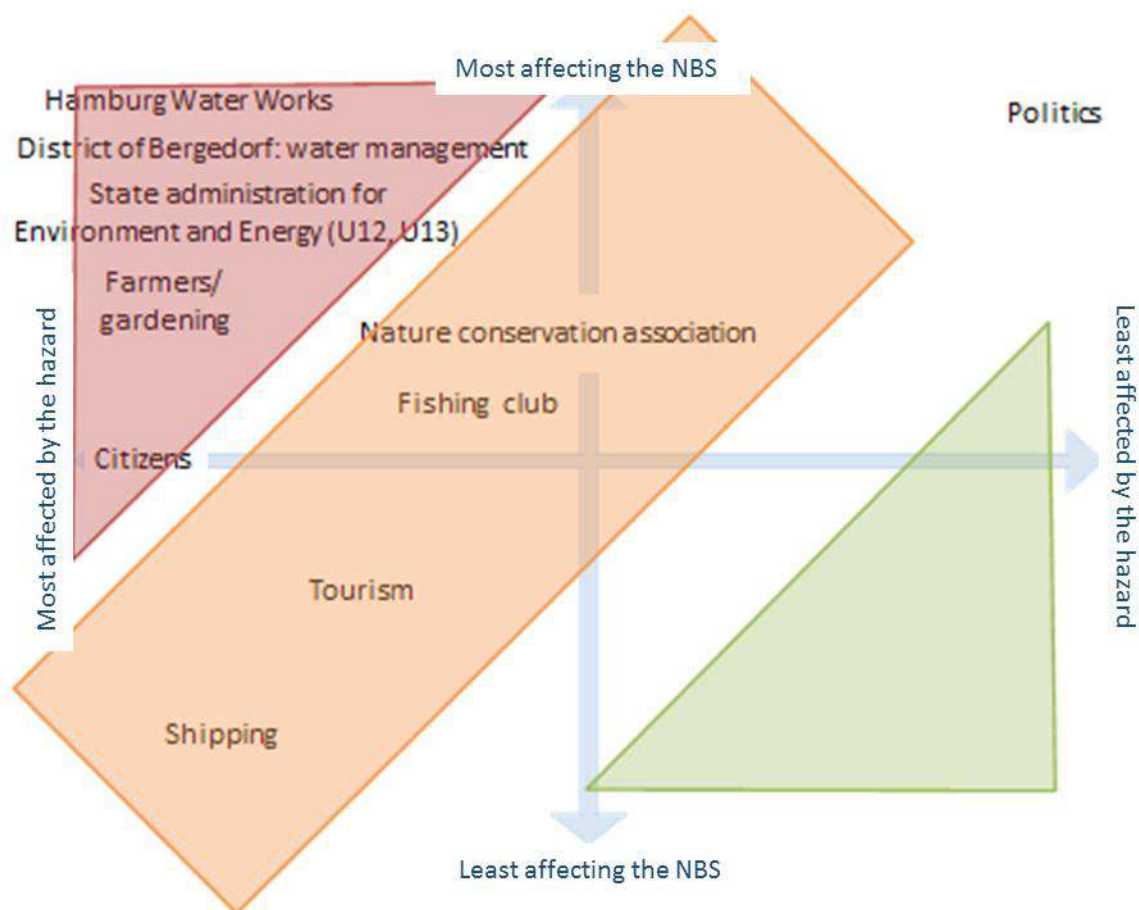


Figure 4.7 Stakeholder matrix with recommendations for level of engagement - Group 1, Hamburg

Red: co-deciding

Orange: consultation

Green: information provision

Based on a comparison of Figure 4.4, Table 4.3 and the recommendations of the level of stakeholder engagement in the literature (Fig. 4.7), we can see that although citizens were identified by Group 1 as being both affected and influential (see Fig. 4.4), they are not foreseen to be involved in co-deciding activities at any stage of the decision-making process (see Table 4.3). Based on the results, it is recommended to consider a more intense involvement of citizens in order to avoid conflict and delays as well as to ensure that citizens are not made more vulnerable as a result of the decision-making process. Also farmers and gardens are also seen to be affected by the risks and influential in the decision-making process, therefore, it may be worth considering if consultation is the most appropriate level of engagement for these

stakeholders. Based on the results of Figure 3.6, it is recommended that the nature conservation NGO and the fishing club be consulted throughout the decision-making process; this is already foreseen by Group 1. However, it is also recommended that stakeholders who represent shipping and tourism are consulted throughout the decision-making process, however, they are not included in Table 4.3.

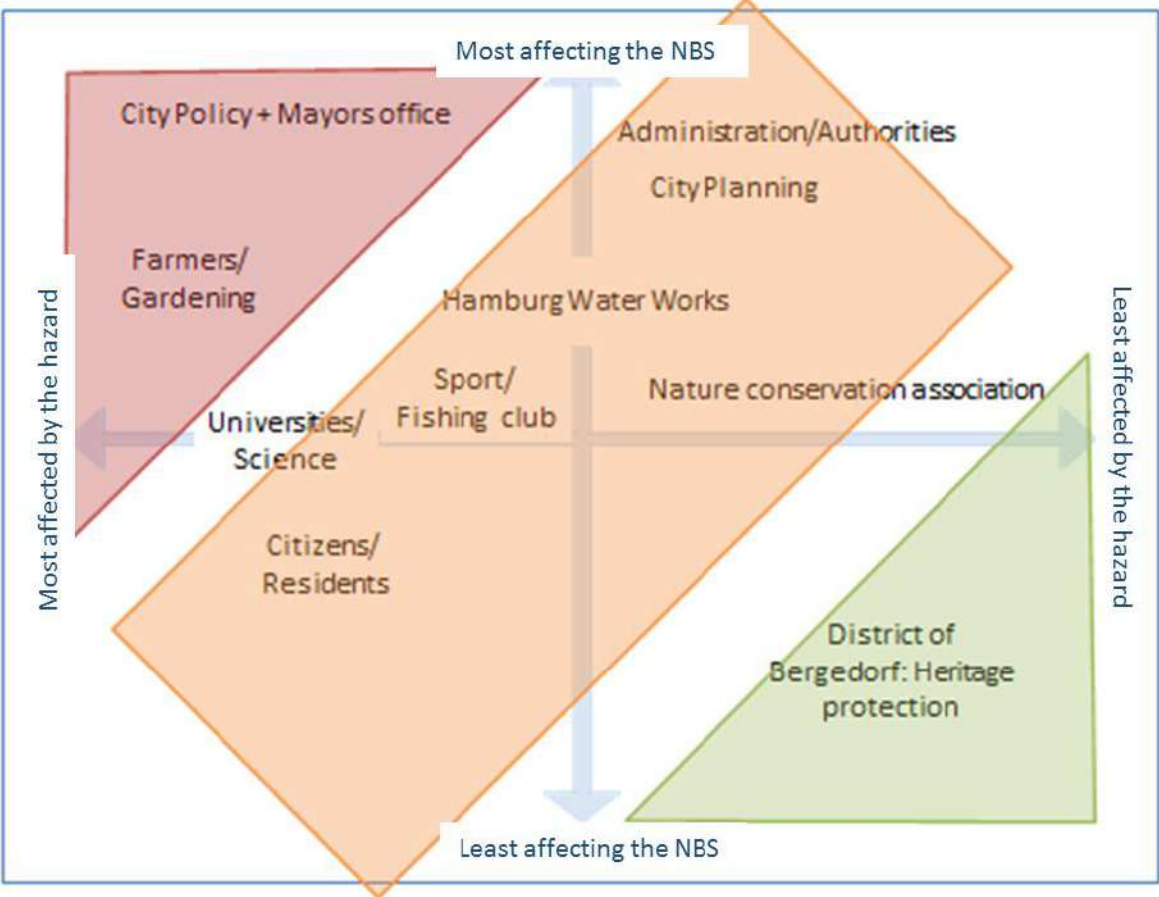


Figure 4.8 Stakeholder matrix with recommendations for level of engagement - Group 2, Hamburg

The results of the stakeholder mapping exercise (i.e. by comparing Table 4.4 and Figure 4.5), Figure 4.9 highlights the potential to consider additional stakeholders in the decision-making process who are currently not foreseen as playing a strong role on the decision-making process (see Table 4.4). For example, farmers and gardeners are seen to be both influential and affected by the risks and therefore, it is suggested that they be involved in co-deciding throughout the decision-making process in order to avoid conflicts and delays. However, they are not yet included in Table 4.4 and therefore, they have not yet been considered in the decision-making process. Moreover, information provision is foreseen for citizens, however, these stakeholders are perceived as affected and moderately influential. Therefore, perhaps a higher level of engagement could be considered in order to avoid conflict and delays. In addition, universities are located in the orange area of Figure 4.8 and therefore it is recommended that they be consulted throughout the decision-making process. However, it is only foreseen that these stakeholders be providers or provided with information. Other stakeholders who should be considered for consultation are nature conservation stakeholders,

sport and fishing clubs, Hamburg Wasser and the city planning and offices/authorities. Finally, it is recommended that the heritage protection stakeholders are provided with information throughout the decision-making process.

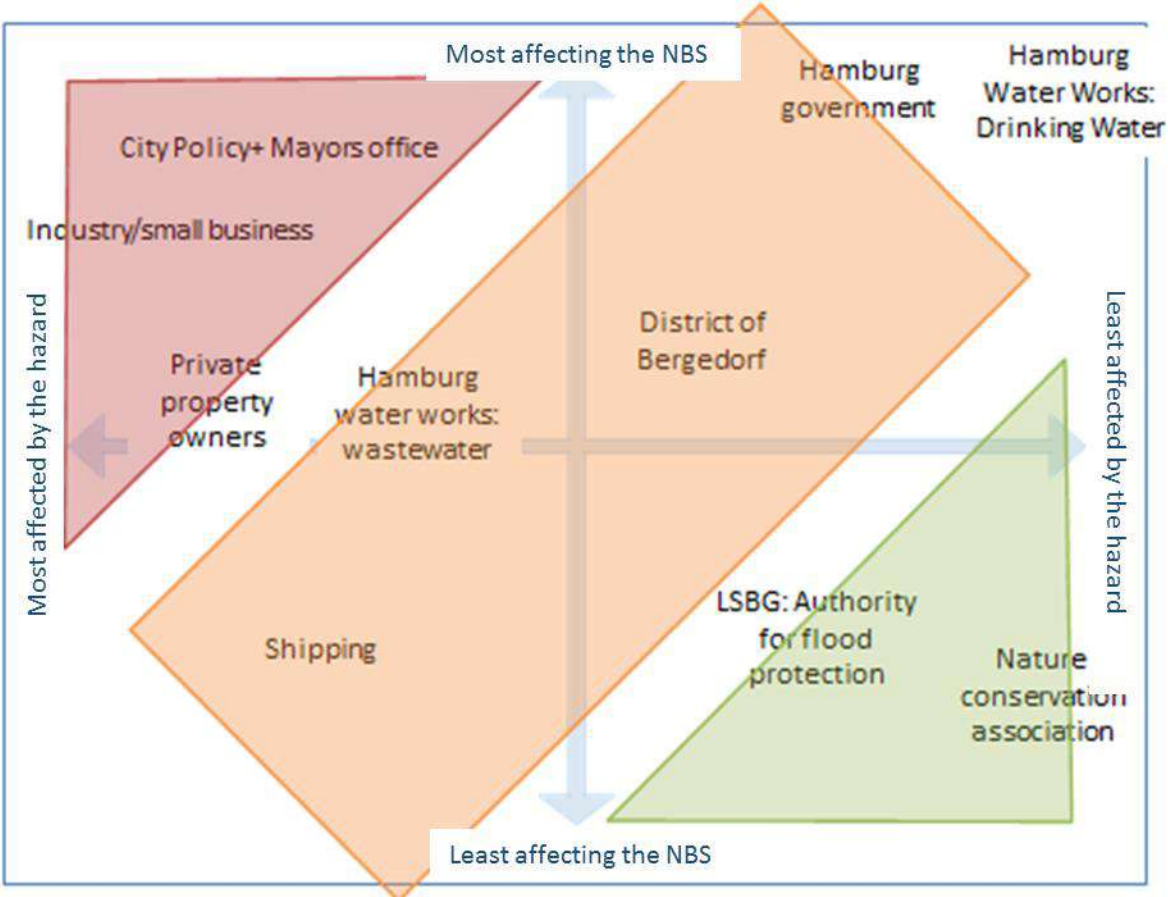


Figure 4.9 Stakeholder matrix with recommendations for level of engagement - Group 3, Hamburg

Based on the results of the stakeholder mapping exercise, by comparing Fig. 4.6, Table 4.5 and the recommendations from the literature (Fig. 4.10), we see that although industry/small business and private property owners are perceived to be both affected by the risks as well as influential in the decision-making processes related to NBS, they are not yet foreseen as active participants in the decision-making process. It is recommended that these stakeholders be considered for involvement in activities related to co-deciding in order to avoid conflict and potential delays.

It is recommended that stakeholders representing shipping are consulted throughout the decision-making process. They are not yet foreseen as stakeholders involved at any stage of the decision-making process. It should be considered that the District of Bergedorf and the LSBG should be provided more influence as indicated in the cross-graph at the moment.

If stakeholders in the most affected and most influential group are unlikely to reject the NBS, then consultation is likely to be an effective mode of involvement. However, it is important to consider issues, such as conflict, lack of acceptance and whether or not stakeholders should

be involved in the maintenance of the NBS after it has been implemented. If any of these points are relevant, it is recommended to consider a more intense involvement of these stakeholders from the beginning of the NBS be that in the definition of the problem and solution or the design/planning stage (Pahl-Wostl *et al.* 2013).

4.1.4 The strength of current relationships between Hamburg and other stakeholders.

The following exercise aims to gain an overview of the relationships between stakeholders. It is a useful exercise for considering how the Demonstration Site might be able to get in contact with stakeholder who they, personally, do not have a strong relationship with.

Mapping the strengths of the existing relationships between Hamburg cluster and the different stakeholders provided to be a helpful exercise because it allowed for an understanding of who Hamburg already has a relationship with and not (see Fig. 4.9). It also provides information about which other stakeholders might have a strong relationship that the City of Hamburg can use in order to develop contact with stakeholders which they may not have previously been in close contact with. Figure 4.9 also provides information about whether the stakeholder is active at the local (L.), regional (R.) and national (N.) level.

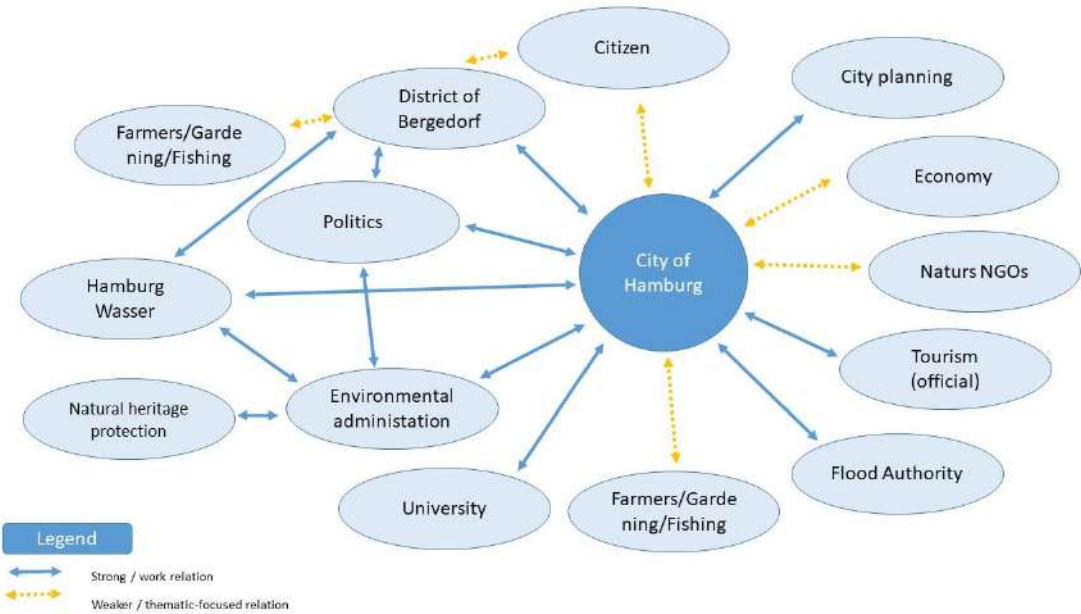


Figure 4.10 Hamburg stakeholder network mapping

4.2 DA-2: Seden Strand, Odense, Denmark

There are 142 houses in Seden Strandby, which is part of the municipality of Odense. Around 300 people reside in the west of Seden. Three farmers live and operate in the east. With the exception farming (and horses), there are no other commercial or industrial activities around. Public utilities for electricity and waste water operate in the area. The Demonstrator site for the Reconnect project is located in the east of Seden Strandby (see Figure 4.10). Odense Municipality wishes also to use the Reconnect-project to examine whether a similar nature based approach can be used on a larger area.

Seden Strandby is a settlement located 8 kilometres north east of Odense located directly at Odense Fjord which runs out in the Baltic Sea on the island of Fynen (1).

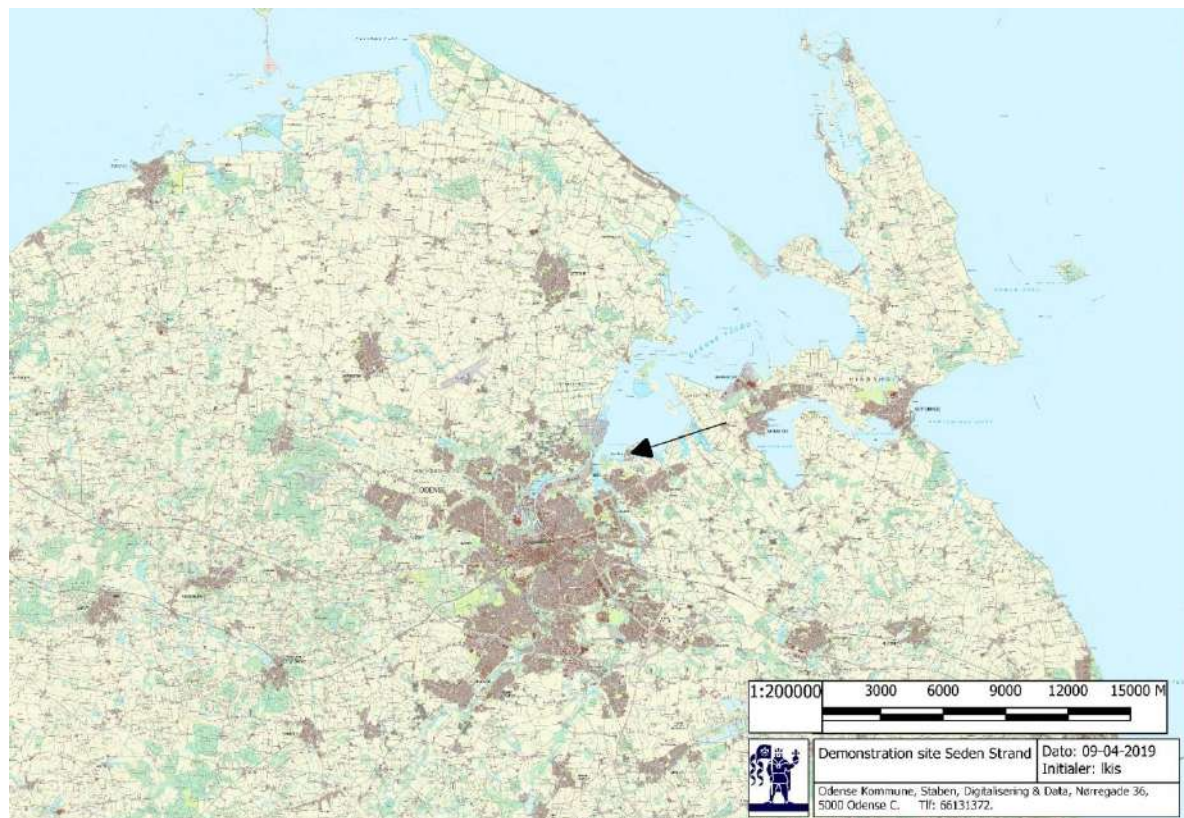


Figure 4.11 The demonstration site at Odense Fjord

The major **hydro-meteorological risk** perceived is sea flooding; which is likely, due to climate change, to occur more often and result in more severe damage. High tide combined with strong wind from the north can result in flooding in the community and the surrounding farm land.

For the members of the Odense cluster (the RECONNECT partners at the demonstration site as defined in the Reconnect proposal) **nature based solutions (NBS)** are strongly related to measures which aim to combine the interest in the area which both protect the settlement of Seden Strandby from flooding, increase biodiversity, improves the recreational opportunities in the area and to secure the the open coastal landscape without technical installations in form of large coastal dikes. The City of Odense is seen to be in need for areas for recreation. And the number of birds in the area dropped dramatically in the past 25 years. The bird protection society in Denmark is perceived as a powerful stakeholder by the participants of the mapping

exercise. NBS are understood as solutions which can serve different interests and therefore, achieve different benefits at the same time.

The Odense cluster is intended to design the NBS during the first 6 months of 2019 and hopes to implement it late summer 2019. Basically, the plan is to deconstruct the old summer dike close to the shore which has been built to improve the farming possibilities. Instead of building the existing dikes up to a height up 2,4 meters the project wants to move the dikes 300-500 meter further inland and preserve the dikes as low dikes not visible from a large distance. The new flood plain is believed to be large enough to protect the houses in Seden. However, the farmers around have to forego intensive farming and switch to less extensive businesses like cows and horses.

The city of Odense was able to find an agreement with two of the three farmers to change their farming practices. This agreement was formalised through legally binding and unlimited contracts. The contracts state, that on the one hand the farmer receives free flood protection for his property and compensation for the agricultural activities which are no longer possible. In return, the farmers have promised to use their land only for specific purposes as defined by the city and to allow water to enter his property, in the case of a flood.

The third farmer in Seden Strandby stepped out of the planning process. In the perspective of the members of the cluster there are no fundamental, rather irrational reasons for this. The farmer refused to negotiate any longer. Therefore, the implementation of the NBS has been redesigned in detail as a result of that. In Denmark private property owners are required to finance coastal protection (e.g. construction of dikes) and cover the costs of flood damage themselves. Therefore, in the perspective of the members of the Odense cluster, NBS might be easier to implement and much better accepted, if they prove to be cheaper and/or equally effective as conventional measures and the added value they will give for the society in terms of benefits for water, nature and people. The value of the property is reflected in the level of coastal protection. In other words, the higher the level of flood protection, the higher the value of the property. Local institutions such as the compulsory dike boards are well established in Denmark, it is broadly accepted everyone living at the coast has to be member and to participate somehow.

Importantly, in 2007 the planning system was reformed and the county level was removed. Resources and competences were redistributed to the national and the local level. This has had a lot of implications for water policies. For example, it was heavily debated during the interview as to whether the nature protection administration, now at the local level, has still enough resources and skilled employees to deliver its targets.

4.2.1 Odense's main interests in the RECONNECT project:

Odense would like to establish a financed pilot project in the East of Seden using financial resources from Natura 2000 and Reconnect and show how to combine interests and use solutions which will give added value for water, nature and people. In addition to that also to show whether there is an upscaling potential.

4.2.2 The results of the stakeholder mapping exercises

The following stakeholders were identified in the Odense demonstrator site in regards to their roles in the management of the hazard(s) (**Error! Reference source not found.**) as well as their role in the NBS (**Error! Reference source not found.**).

Stakeholder Group	Name, Position and Organisation	Role						
		Decision-maker	Implementer	Coordinators	Expert Knowledge	Funders / Sponsors	Lobbyists	Mediators
SH1: Authorities	Municipality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Environmental Protection Agency (EPA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Supply companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Emergency service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH2: Political Representatives	City politicians	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH3: Civil Society	Citizens of Seden Strandby	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	NGOs (nature)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Citizen of Bullerup and Agedrup	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH4: Private Sector	Farmers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Consultants – Reconnect (Rambøll and Amphi)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	Research institutes (DTU)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media	Fyens Stiftstidende (www.fyens.dk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	www.tv2fyn.dk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	www.dr.dk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations	EU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.6 Stakeholder groups and roles in regards to the hazard, Odense

Stakeholder (SH) Group	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process					
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	Municipality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	X	x	x	(x)	x	x
	Environmental Protection Agency (EPA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X		x		x	x
	Emergency Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Supply Companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH2: Political Representatives	City politicians	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X		x			
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH3: Civil Society	Citizens of Seden Strandby	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	X	x		x		
	NGOs (nature)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	X	x	x		x	x
	Citizens of Agedrup and Bullerup	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	X		x			

SH4: Commercial Sector	Consultants – Reconnect (Rambøll and Amphi)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	x	x	x	x	x	x
SH5: Academia / Research	Research Institutes (DTU)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	x	x		x	X
SH6: Media	Fyens Stiftstidende (www.fyens.dk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	x					X
	www.tv2fyn.dk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	x					X
	www.dr.dk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	x					X
SH7: International and transnational organizations	EU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	x	x		x	x
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.7 Overview of stakeholder groups and roles in regards to the NBS, Odense

The following rainbow diagrams are an alternative representation of the information the members of the Odense cluster gave us in when we met in December for the stakeholder mapping exercise. The Odense cluster agreed on the following two rainbow diagrams, answering the questions *who is affected by and can affect hydro-meteorological hazards* (see Fig. 4.12.) and *who is affected by and can affect the NBS* (see Fig. 4.13)⁴?

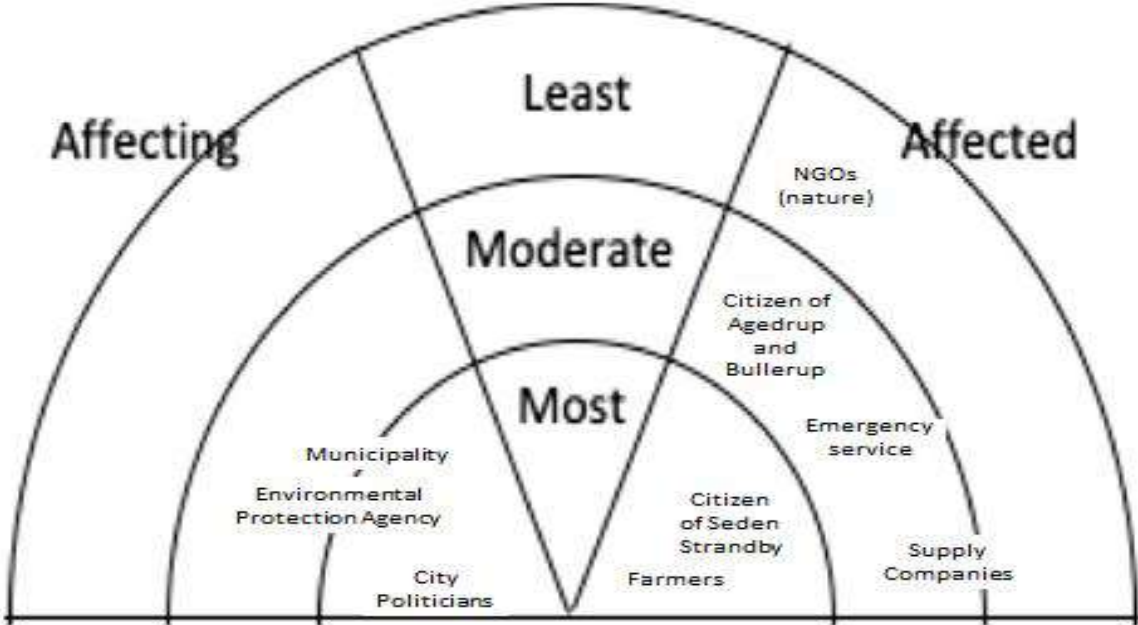


Figure 4.12 Stakeholders affecting and affected by the hazard, Odense

⁴ Please consider while reading: The rainbow diagrams (Figures 3.12 and 3.13) represent the stakeholders mentioned by the interviewees during the mapping exercise (see figure summary of stakeholder matrix, Figure 3.17). These stakeholders including additional stakeholders were added later on by the demonstrator cluster into the Tables 3.6 and 3.7 during a follow-up process. For this reason, there are differences between the stakeholders presented in the Table 3.6 and 3.7 and Figures 3.12-3.17. We consider the stakeholder mapping exercise an iterative process that will change and develop throughout the different phases of the project. The methods presented here help demonstrators to consider how should be involved and how at different stages of the NBS process. These stakeholders are likely to change during the NBS process. It is important that demonstrators reflect on their stakeholder involvement at every phase of the project.

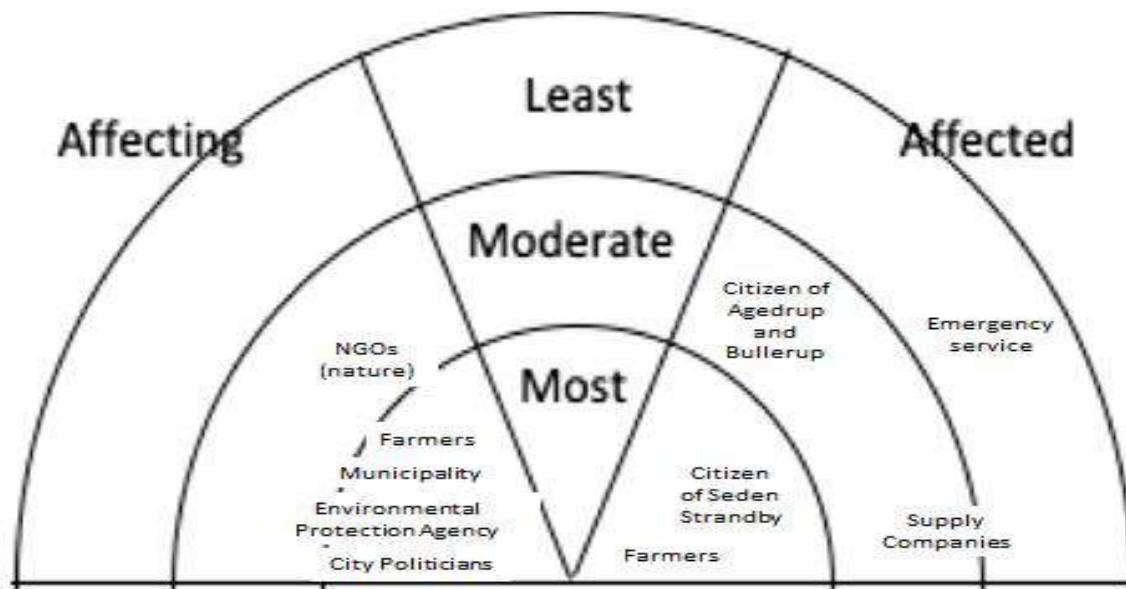


Figure 4.13 Stakeholders affecting and affected by the NBS, Odense

In the stakeholder mapping exercise, we discussed who the main stakeholders of the Odense Demonstrator site might be and who is affected by flooding and who has the power to influence decisions related to NBS. The participants prepared graphs and visualised their perception of stakeholders individually (see **Error! Reference source not found.** to **Error! Reference source not found.**). Afterwards, they discussed a fourth graph and discussed the positioning of each stakeholder until they found consensus (**Error! Reference source not found.**).

In Odense, stakeholders are affected by the risk of flooding and by the NBS itself (i.e. deconstructing the old dike, reconstruct a low dike on higher ground and allow flooding of farm land).

There was no discussion about stakeholders affecting the hydro-meteorological risk (sea level rise).

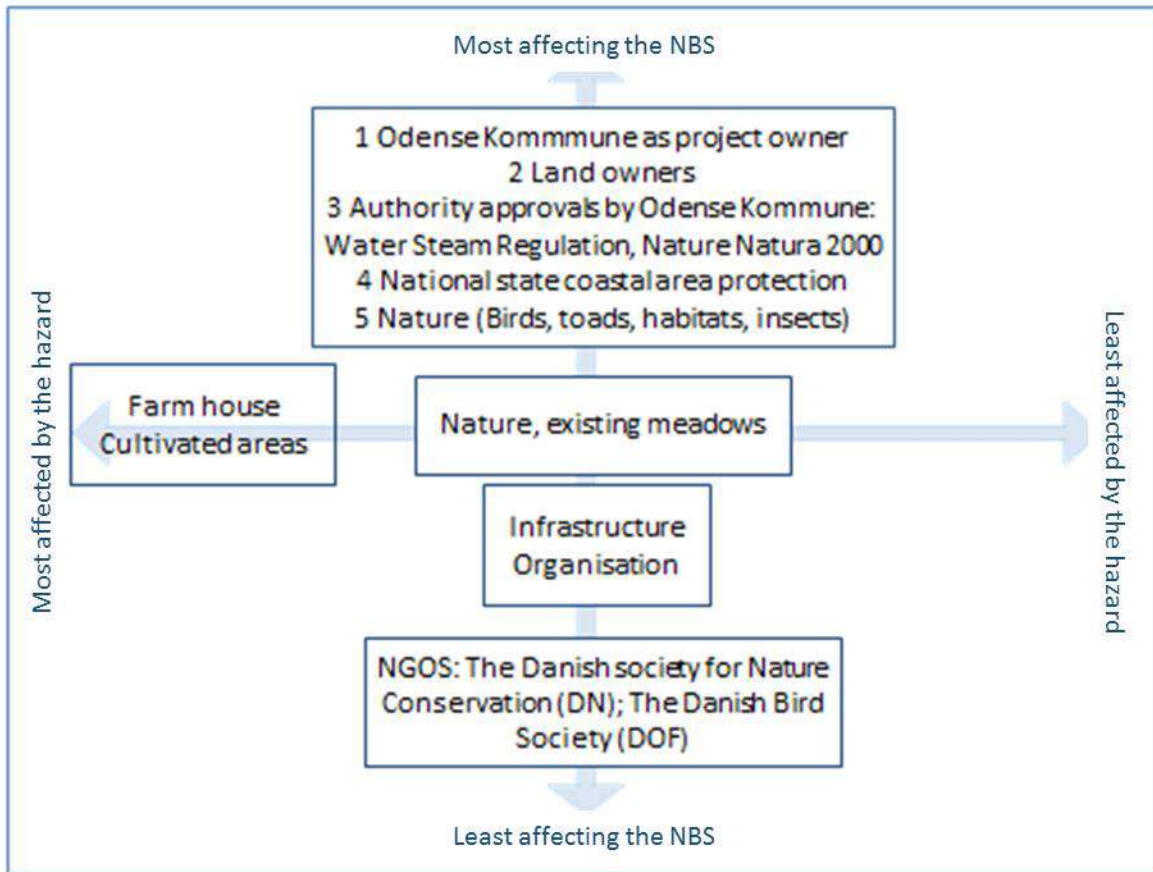


Figure 4.14 Stakeholder matrix (individual member of the cluster), Odense

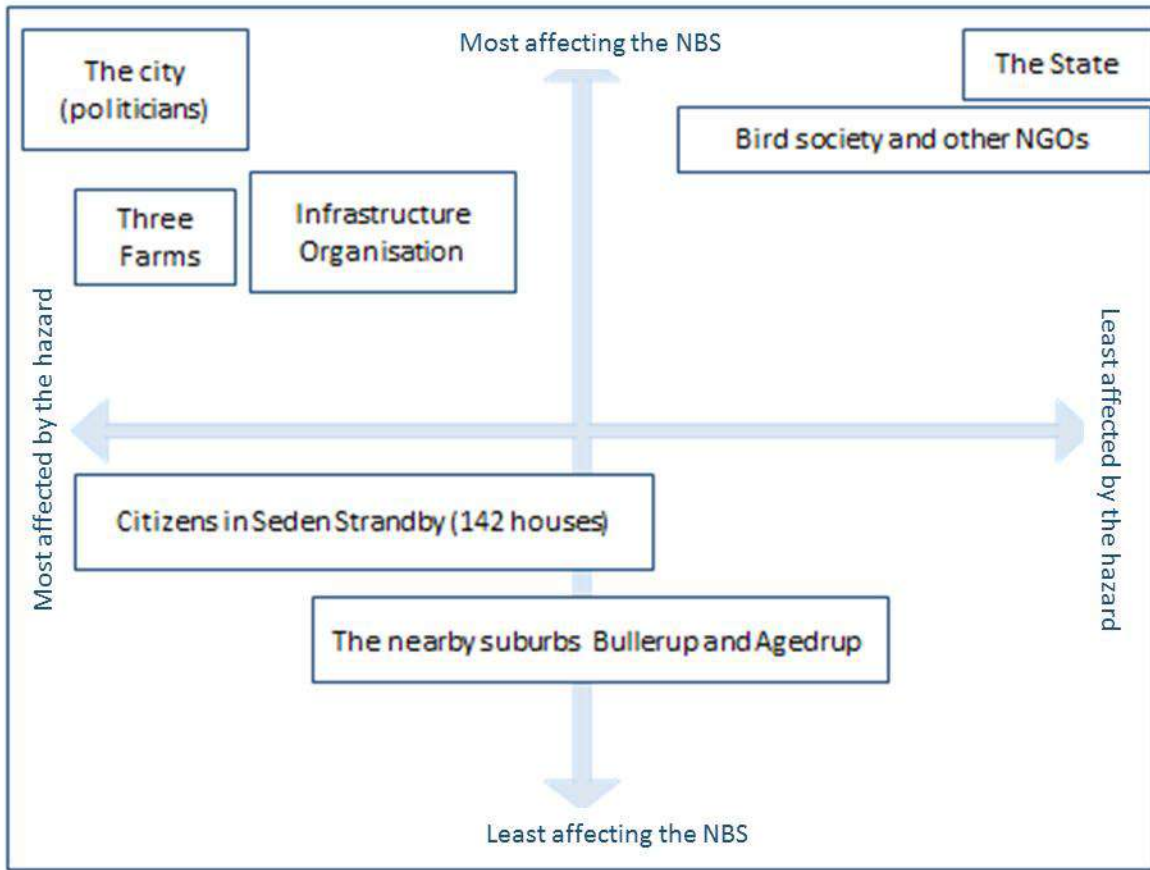


Figure 4.15 Stakeholder matrix (individual member of the cluster), Odense

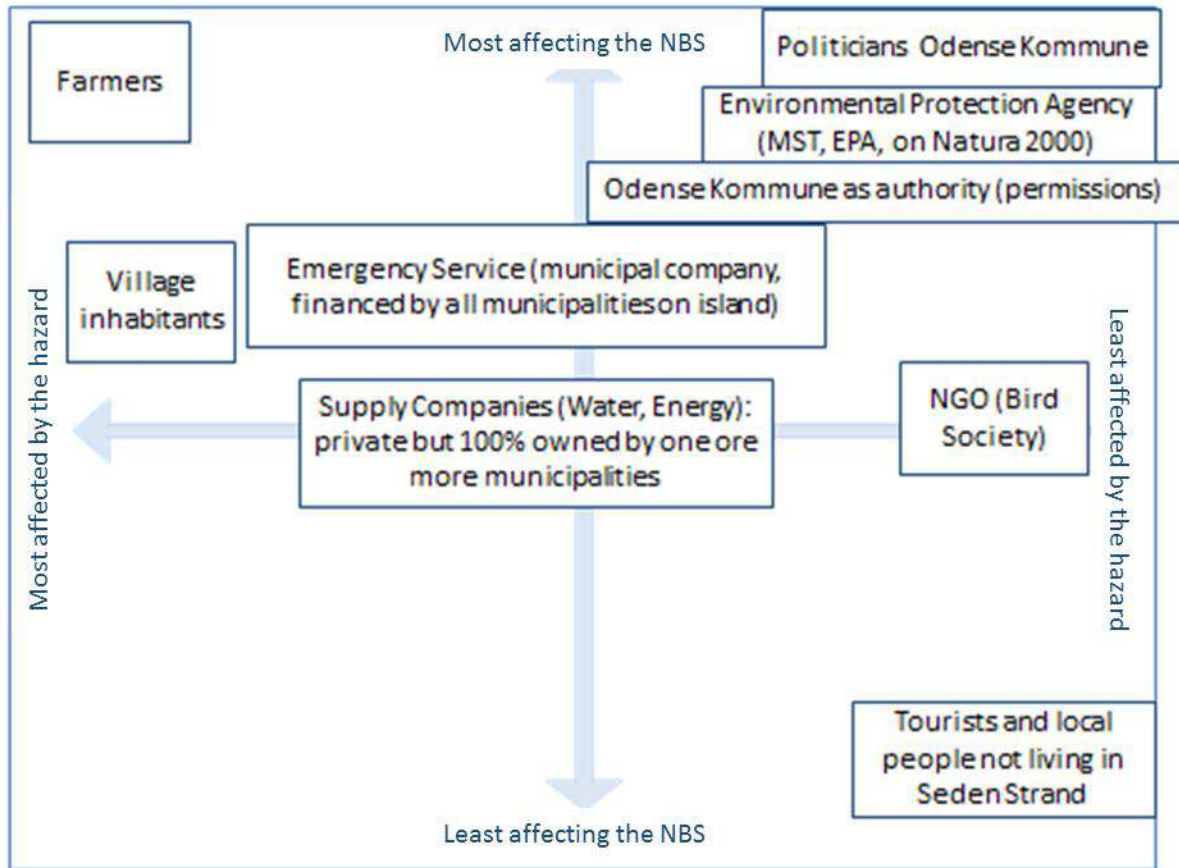


Figure 4.16 Stakeholder matrix (individual member of the cluster), Odense

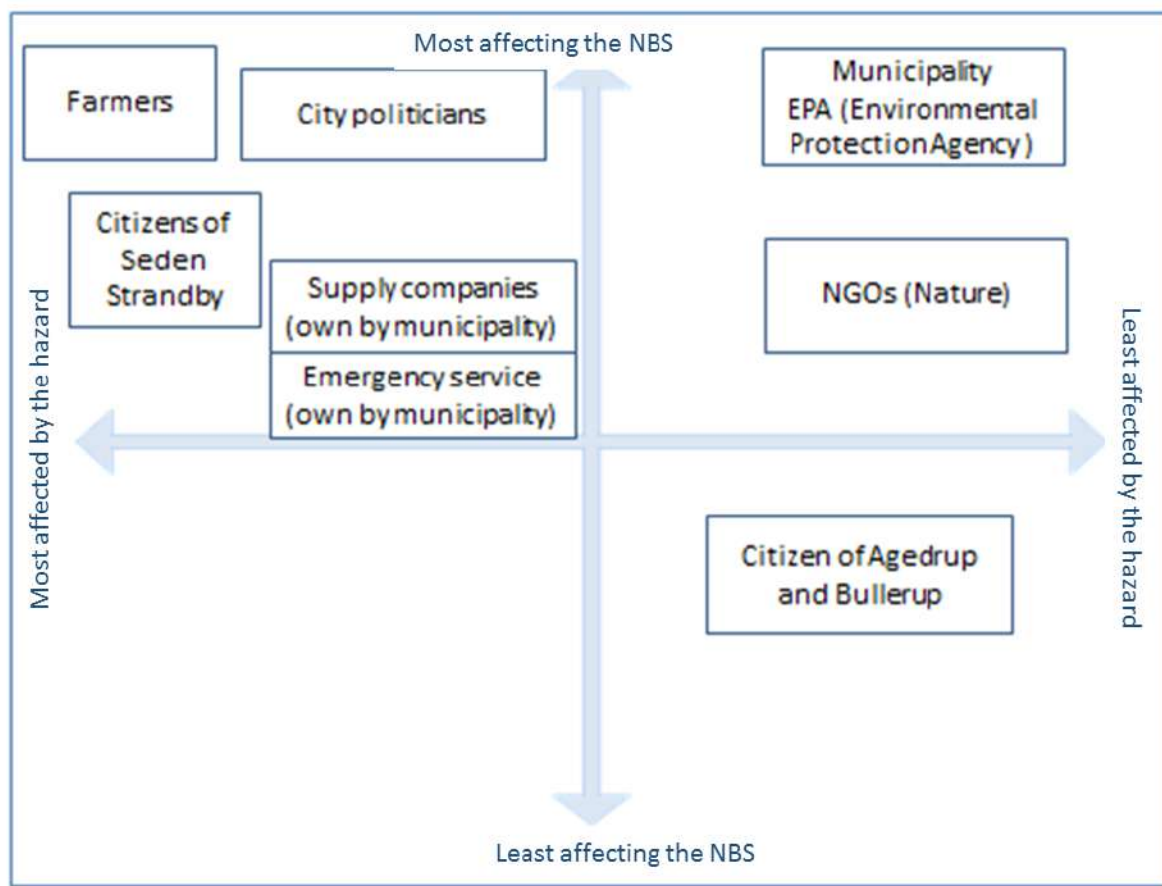


Figure 4.17 Summary of stakeholder matrix (in consensus), Odense

We can see in all the matrixes there, that farmers are seen as very influential at the Odense demonstrator site and that the farms/farmers are the most affected by the risk in the case of sea flooding events.

The city politicians are perceived as most influential by all members of the cluster as well, but the affectedness by the risk can be understood differently: the person of the politician is probably not at risk, unless she/he lives there. But the political agenda of the city can be affected by risks for sure.

The permitting authorities of Odense and Denmark are perceived as very influential but as not affected by all of the cluster members.

Citizens have to be analysed differently regarding the degree of being influential and affected: residents directly at the Baltic Sea (Seden) or nearby (Agedrup and Bullerup).

For this Demonstrator we can state an important role of the infrastructure utilities and emergency services, both run by municipal companies, which need to have the right to use properties for grids or roads in areas now needed for flooding as well.

Interestingly is the perception to see nature as a stakeholder itself in Odense, e.g. represented by the administration for nature conservation.

Obviously the nature NGOs, especially for bird protection, seem to be seen as powerful actors.

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Odense intends to involve which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

Decision influencing and co-deciding	<ul style="list-style-type: none"> • Farmers • Municipality • NGOs (nature) • City politicians 	<ul style="list-style-type: none"> • Farmers • Municipality • EPA • Consultants RECONNECT 	<ul style="list-style-type: none"> • Farmers • Municipality • Consultants RECONNECT 	<ul style="list-style-type: none"> • Farmers 	<ul style="list-style-type: none"> • Municipality • Consultants RECONNECT
Consultation	<ul style="list-style-type: none"> • Consultants RECONNECT 	<ul style="list-style-type: none"> • NGOs (nature) 		<ul style="list-style-type: none"> • Consultants RECONNECT 	<ul style="list-style-type: none"> • Farmers
Information provision	<ul style="list-style-type: none"> • Citizens Seden Strandby • Supply companies 	<ul style="list-style-type: none"> • Citizens Seden Strandby • EPA • City politicians • Supply companies 	<ul style="list-style-type: none"> • Citizens Seden Strandby • EPA • NGOs (nature) • City politicians • Supply companies 	<ul style="list-style-type: none"> • Citizens Seden Strandby • EPA • NGOs (nature) • City politicians 	<ul style="list-style-type: none"> • Citizens Seden Strandby • EPA • NGOs (nature) • City politicians • Supply companies
	Co-assessment	Co-design	Co-implementation	Co-maintenance	Co-evaluation and co-monitoring

Table 4.8 Involvement of stakeholders at different stages of the decision-making process, Odense

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

4.2.3 Feedback

Error! Reference source not found. links the results of the matrix and table to the theory outlined above by providing suggestions for which stakeholders should be involved in co-deciding, consultation and information provision.

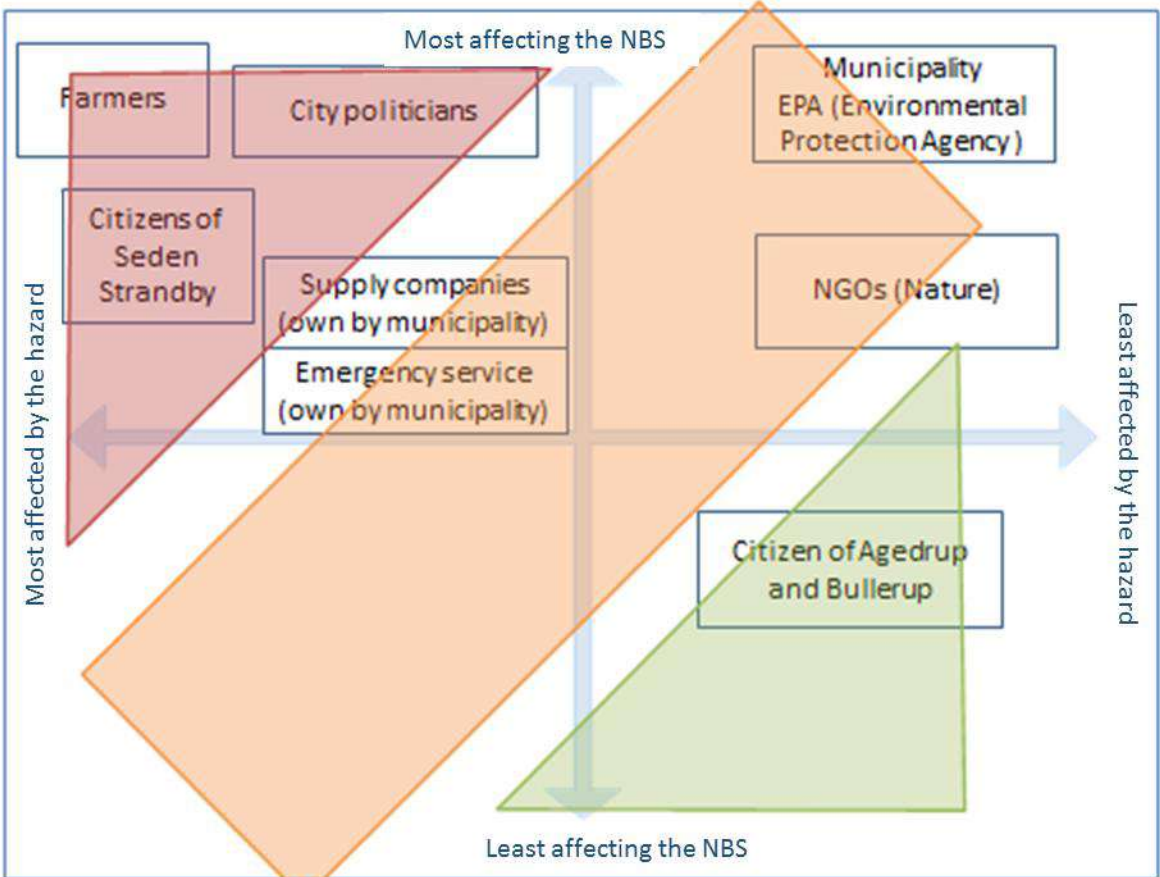


Figure 4.18 Stakeholder matrix with recommendations for level of engagement (summary), Odense

- Red: co-deciding**
- Orange: consultation**
- Green: information provision**

If stakeholders in the most affected and most influential group are unlikely to reject the NBS, then consultation is likely to be an effective mode of involvement. However, it is important to consider issues, such as conflict, lack of acceptance and whether or not stakeholders should be involved in the maintenance of the NBS after it has been implemented. If any of these points are relevant, it is recommended to consider a more intense involvement of these stakeholders

from the beginning of the NBS be that in the definition of the problem and solution or the design/planning stage (Pahl-Wostl *et al.* 2013).

Based on the results of the stakeholder mapping exercise, we can see that there are differences between theory (**Error! Reference source not found.**) and practice (Table 4.8) in regards to who Odense should involve when. Obviously the citizens of Seden, the farmers and the City politician (stakeholders covered red) should have a co-deciding role from the assessment to the monitoring, what is not indicated in the table regarding citizens and politicians, yet. Similarly, permitting authorities, nature NGOs, emergency services and supply companies (stakeholders covered orange) should be at least consulted in a bilateral manner. Information should be provided at all stages of the process to the citizens of Bullerup and Agedrup. While included in the table (Table 4.8), private consultancies have been forgotten to be included in the matrix, but two private consultancies are already member of the Odense demonstrator cluster.

4.2.4 The strength of current relationships between Odense and other stakeholders.

The following exercise aims to gain an overview of the relationships between stakeholders. It is a useful exercise for considering how the Demonstration Site might be able to get in contact with stakeholder who they, personally, do not have a strong relationship with. As we can see from the results presented in Fig. 4.19, Odense has strong relations to the most influential and/or most affected stakeholders; and the most influential stakeholders are perceived to have strong relations (i.e. citizens of Seden, city politicians, farmers). The municipality, in the orange field according to our mapping exercise above (see Fig. 4.18), has a strong relationship with nearly all the other major stakeholders. The team at the Odense demonstrator site should consider how the weak relations (represented by the yellow arrows in Figure 4.18, below) (i.e. EPA, Nature NGOs, Citizens of Agedrup and Bullerup, Supply Companies), can be improved.

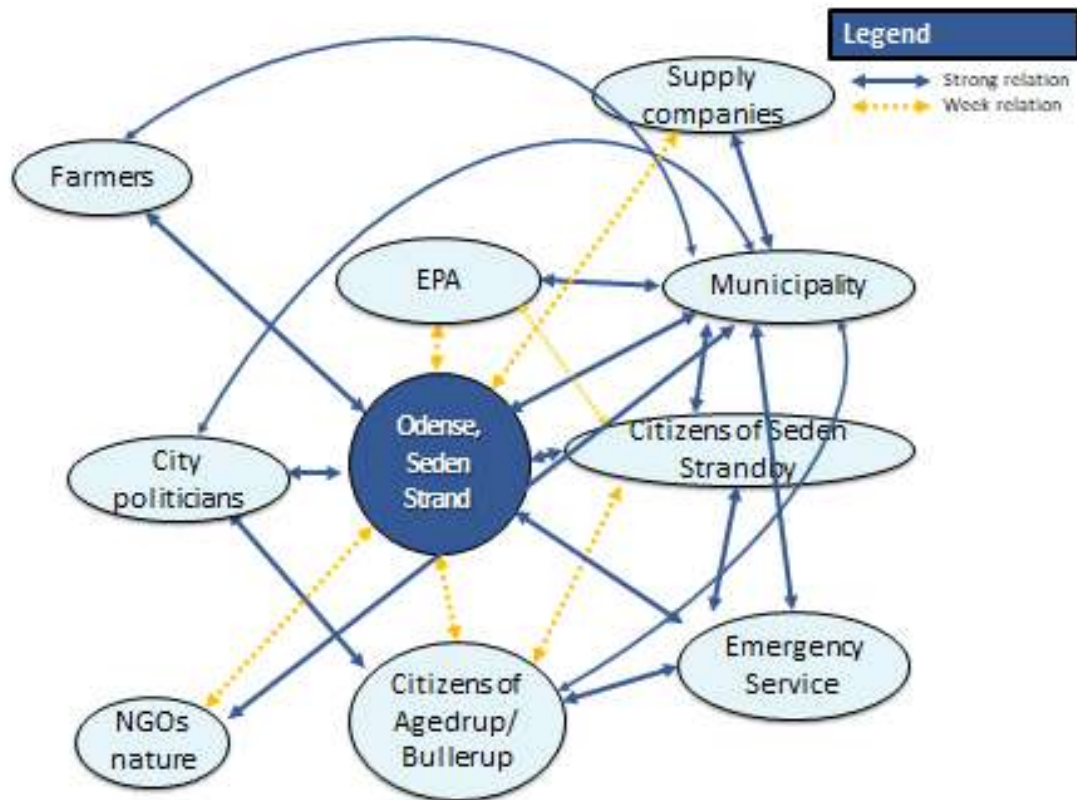


Figure 4.19 Stakeholder network mapping, Odense

4.3 DA-3: Tordera River Basin, Spain

“The type of NBS we plan to study and implement in the context of the “Tordera Levee Management Plan” are: mainly water storage areas and the setback of levees for reconnecting rivers and floodplains” (response to the demo survey). The Tordera River Basin demonstrator sites are also considering the viability of the restoration of a secondary tributary of the Tordera River (located in the municipality of Tordera) as a way of diverting water from settlements in the case of a flood.

The demonstration sites are located in the Tordera river basin and affect the cities of Tordera, Malgrat de Mar, Blanes and possibility Sant Celoni. Blanes and Malgrat de Mar are located on opposite side of the Tordera River mouth and are both at risk of storm surges and river flooding (see **Error! Reference source not found.**20). Camping sites are located on both sides of the river and are at extremely high risk to the point that they are no longer allowed to be there. They are not allowed to be located in the area of preferential discharge for the 100 years return period flood. Outside this area, they need to implement protection measures to protect themselves for the 500 years return period flood. As of 2016 no more development is allowed in flood risk areas if they don't have a self-protection plan approved.

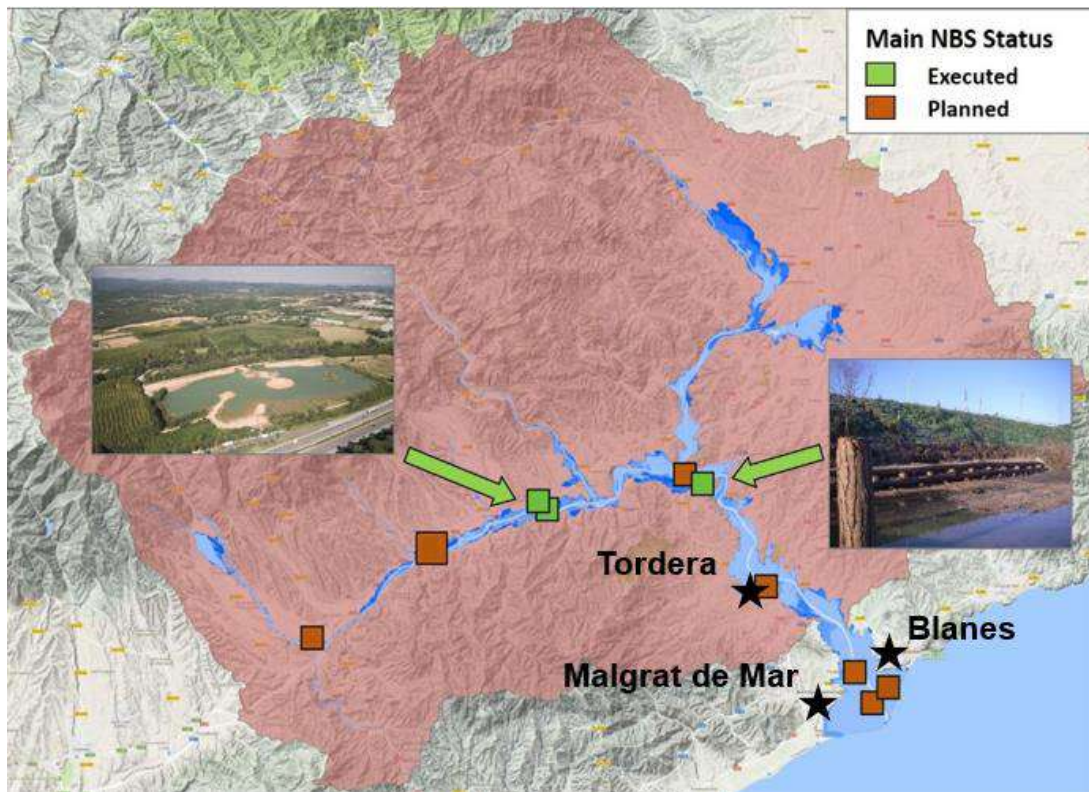


Figure 4.20 Map of the demonstration site, Tordera River Basin

Source: http://sig.gencat.cat/visors/VISOR_ACA.html)

However, little has been done, other than refusals for further development, to remove the camping sites from the area. The department of the Agència Catalana de l'Aigua (ACA) involved in the RECONNECT project is responsible for the implementation of the EU Floods Directive 2007/60/CE (FD). Therefore, they are interested in employing NBS along the Tordera River to its mouth and the main tributaries in order to reduce risk for camping sites, urban areas and critical infrastructure such as a desalination plant with better protection from floods; particularly as climate change becomes more of an issue in the future. They would like to set the dikes back in order to give the river more space. For this to happen, ACA needs to work together with the municipalities and the owners of the campsites. It was mentioned that the readiness of the campsites and municipalities to become involved is different in each of the cities (municipalities are yet to be contacted because the location of the NBS is still to be confirmed).

The other sites are along the Tordera River and are retention ponds/lakes that aim to reduce the velocity of the flood waters as it makes its way down the Tordera River to its mouth. The hope is that, as a result, the campsites will have more time to receive a warning and evacuate. During a field trip the interviewer (UFZ) was shown two ponds/lakes. One is located near an industrial area and the highway and is yet to be built. The idea is to use already existing gravel mining pits that have not been restored yet. In the Tordera river basin there is a lack of sediment so gravel mining is not recommended. In the case that a pit/retention pond needs to be excavated, the sediment would be put back in the river. They would like to work closely with the company to construct a wetland/retention pond/lake. However, there are issues related to how to go about this because ACA is not allowed to mine for profit and it may be difficult to get the company on board. Another issue could be the perception of the factory owners' to the measure because the retention pond/lake will only be used in extreme flood circumstances

(the entrance of the water will be controlled through weirs); they are likely to see the river level as being higher during times of regular flooding. Therefore, communication with factory owners will be needed in order to gain their acceptance of the measures.

The second site (Les Llobateres) is located next to a highway. It was a gravel pit mine that was regenerated in the early 2000s. The area is now a protected wetland but the opportunity to use it as a flood retention area has been lost because it is already full. Moreover, the entrance to the water retention area is not well designed, so in case of flooding water will not come in into the pond.

ACA would like to use the RECONNECT project to identify ways of improving this site. This is seen to be a miscommunication between ACA and the mining company and an example of conflicting interests when it comes to regenerating decommissioned mining areas.

4.3.1 Tordera's main interests in the RECONNECT project:

The Tordera River Basin demonstrator site is "interested in exchanging knowledge with those demonstrators that have already implemented similar NBS in their pilot sites to learn from them. In this sense, we are very interested in learning more about the technical solutions proposed and/or implemented in Hamburg, the IJssel River basin, the Var River basin and the Thur River basin" (answer to the Online Demonstrator Survey).

ACA would like to employ NBS as part of their requirements for implementing the WFD and FD (i.e. "to plan and implement flood protection measures that enhance or at least do not deteriorate the ecological status of the water bodies" – response from the Demonstrator Survey).

Creating a business case and monitoring/evaluating NBS is of particular interest of ACA. In order to take better NBS-related decisions in the future, it is important to know what other sites have done and what their experiences were. This information includes the cost and effectiveness of different NBS. Catalonia has a budget for green infrastructure and if ACA could make a business case for the use of NBS, they might be able to get funding to implement such measures in the future. This information could also be forwarded to the Central Government because experience shows that once an idea has credibility it can be taken on by the central government in a positive way. For example, in 2021 there is a new cycle of flood risk management plans (FRMPs) and NBS could be included in these if there is a good business case for them (NBS have been already included in the FRMP of the 1st planning cycle, but not executed yet). FRMPs are approved by the central government.

ACA is also very interested in having access to methodologies and reports of how other projects have organised their stakeholder engagement processes. This is because ACA are at early stages of the project and do not have extensive experience in working with stakeholders. As a result, the information included in the following sub-chapters is based on ACA's assumptions and hopes for the project.

4.3.2 The results of the stakeholder mapping exercises

The main stakeholders identified in the Tordera demonstrator site are:

- ACA
- Tourism: Camping sites in Blanes and Malgrat de Mar
- Municipalities of Sant Celoni, Blanes, Malgrat de Mar and Tordera
- Citizens of Sant Celoni, Blanes, Malgrat de Mer and Tordera
- NGOs
- Land Use Planning Department

- Environmental Department
- Coastal Management Authority
- Civil protection
- Research
- Critical infrastructure:
 - o Highways
 - o Trains (public service)
 - o Desalination plant (managed by ACA)
 - o Water treatment plant (managed by Consell Comarcal del Maresme)
 - o Industry (chemical)

These stakeholders have been mapped in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (**Error! Reference source not found.**)

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders / Sponsors	Lobbyists	Mediators	
SH1: Authorities	ACA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Civil protection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Municipalities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Coastal Management Authority	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Land use planning and environmental department	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	The climate change office of Catalonia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Trains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH4: Private Sector	Highways	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Chemical industry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

	Camp sites	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	Research platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.9 Stakeholder groups and roles in regards to the hazard, Tordera River Basin

Stakeholder (SH) Group	Name, Position (if relevant) and Organization (if relevant)	Role						Stage of the NBS process						
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	ACA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Civil protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Municipalities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Coastal Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Land use planning and environmental department	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The climate change office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Trains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SH4: Commercial Sector	Chemical industry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Highway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			✓		✓	
	Camp sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			✓	✓	✓	
SH5: Academia / Research	Research platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		✓			✓	✓
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.10 Overview of stakeholder groups and roles in regards to the NBS, Tordera River Basin

ACA also filled out the stakeholder mapping diagrams and matrix. This discussion took some time as ACA are only at the very beginning of project and have never carried out such an exercise before. They generally tend to develop a project plan and then go to the municipalities for consultation and to ask for assistance for implementation/sell the project to the municipalities so that they take responsibility for the implementation and management (local projects are the responsibility of municipalities and they have their targets to meet, ACA can provide their expertise by providing project suggestions. ACA is responsible for the management of regional water-related projects). ACA pays 80% of the cost of the measure and municipalities 20% when the protection measure only benefits one single municipality. When the measure benefits more than one municipality, then ACA pays for the 100% cost of the measure. What it is not clear in some cases is who should assume the maintenance cost of that measure. ACA and the municipalities should get to an agreement to define that. It was slightly difficult to draw the boundaries around who to included in the mapping exercises because the project is in the assessment phase and ACA acknowledge that there is a difference between an ideal situation in regards to stakeholder influence and the reality of getting a project off the ground and finding someone to maintain it. We decided to treat the exercise as an ideal situation.

ACA filled out the two rainbow diagrams and a stakeholder matrix in order to answer the questions: *who is affected by and can affect hydro-meteorological hazards* (see Fig. 4.21) and *who is affected by and can affect the NBS?* (see Fig. 4.22).

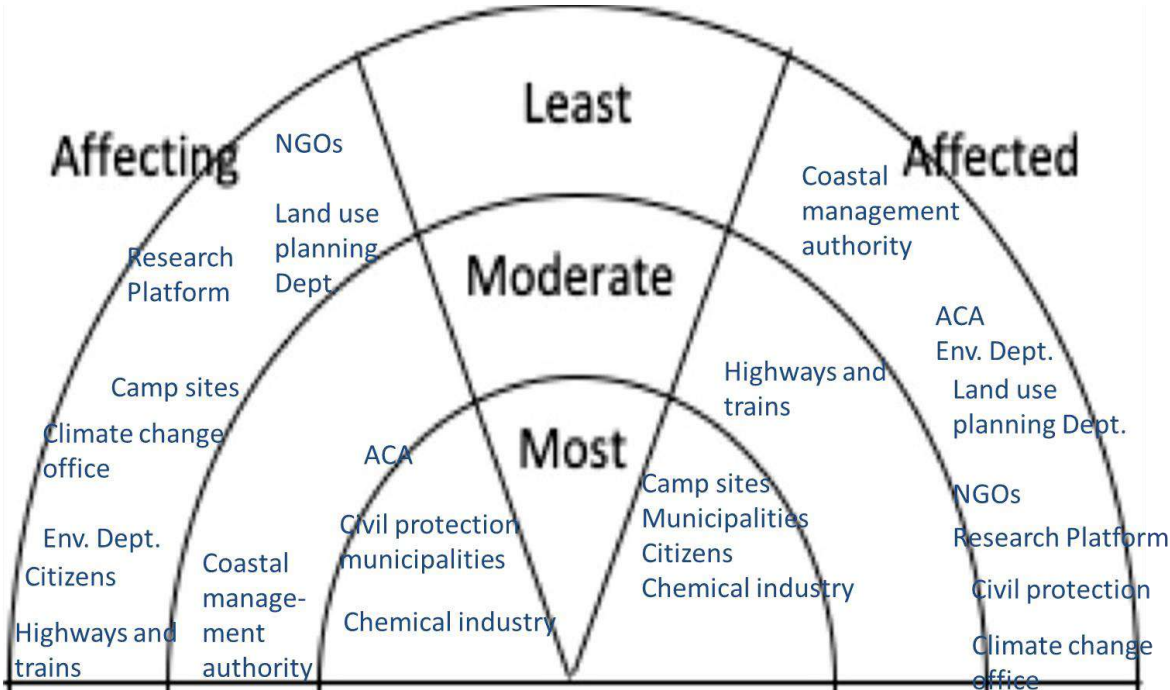


Figure 4.21 Stakeholders affecting and affected by the risk, Tordera River Basin

Municipalities and civil protection play an important role in the management of floods. The chemical industry is also required to take private preparedness and protection measures due to the potentially dangerous and environmentally damaging products that could be released into the environment in the event of a flood. The camp sites and citizens are seen as being affected by the flood risk but having little influence over the management of the risk. The

coastal management authority is responsible for the management of coastal flooding but this is not the risk that the Tordera River Basin is focusing on in their NBS sites.

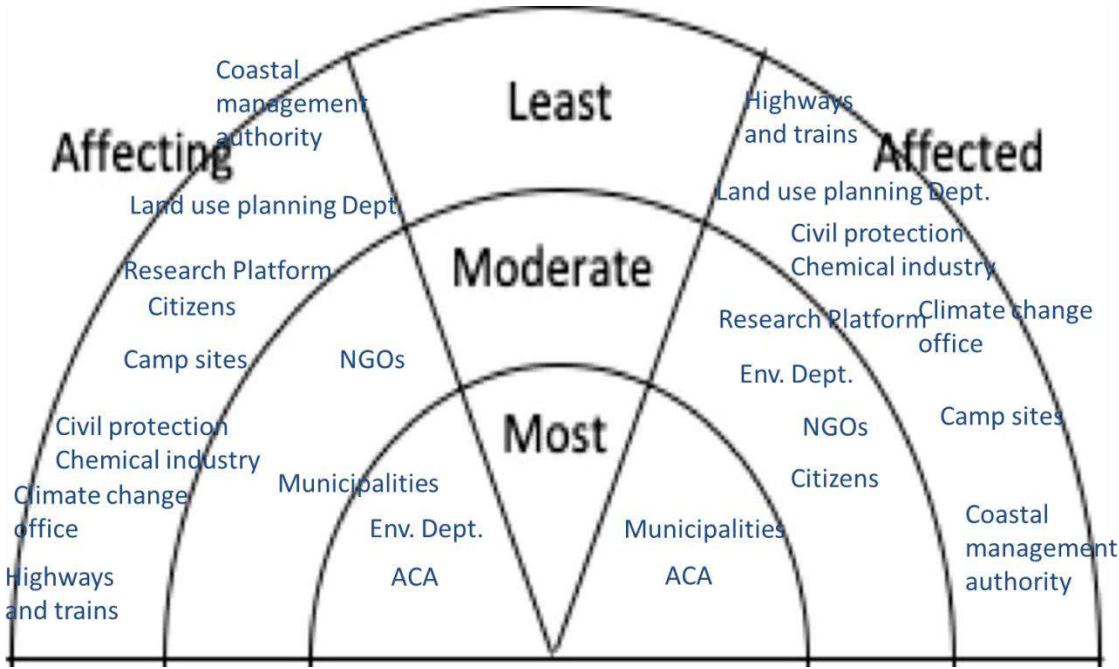


Figure 4.22 Stakeholders affecting and affected by the NBS, Tordera River Basin

It is hoped that because camp sites and chemical industry are likely to benefit from the NBS (and lobby ACA for flood risk protection), they could also play a role in funding the solutions. The research platform is likely to be interested in studying the sites and is therefore, likely to benefit from the knowledge generated at the sites rather than playing an active role in influencing the decision-making process. Although citizens are considered as being most affected by the risk of flooding as well as moderately affected by the NBS, it is not clear how citizens will be involved and who we be responsible for their involvement. ACA assumes that citizen involvement will be carried out by the municipalities as they have more experience and better conections to citizens than ACA.

The following matrix focuses on the stakeholders affected by flooding rather than those affected by the NBS (see Figure 4.23). In this demonstrator site, the two are intertwined. For example, the NBS aims to create co-benefits by providing flood protection to the chemical industry, for example, as well as increasing biodiversity. The stakeholders who are affected by flood are also affected by the effectiveness of the NBS.

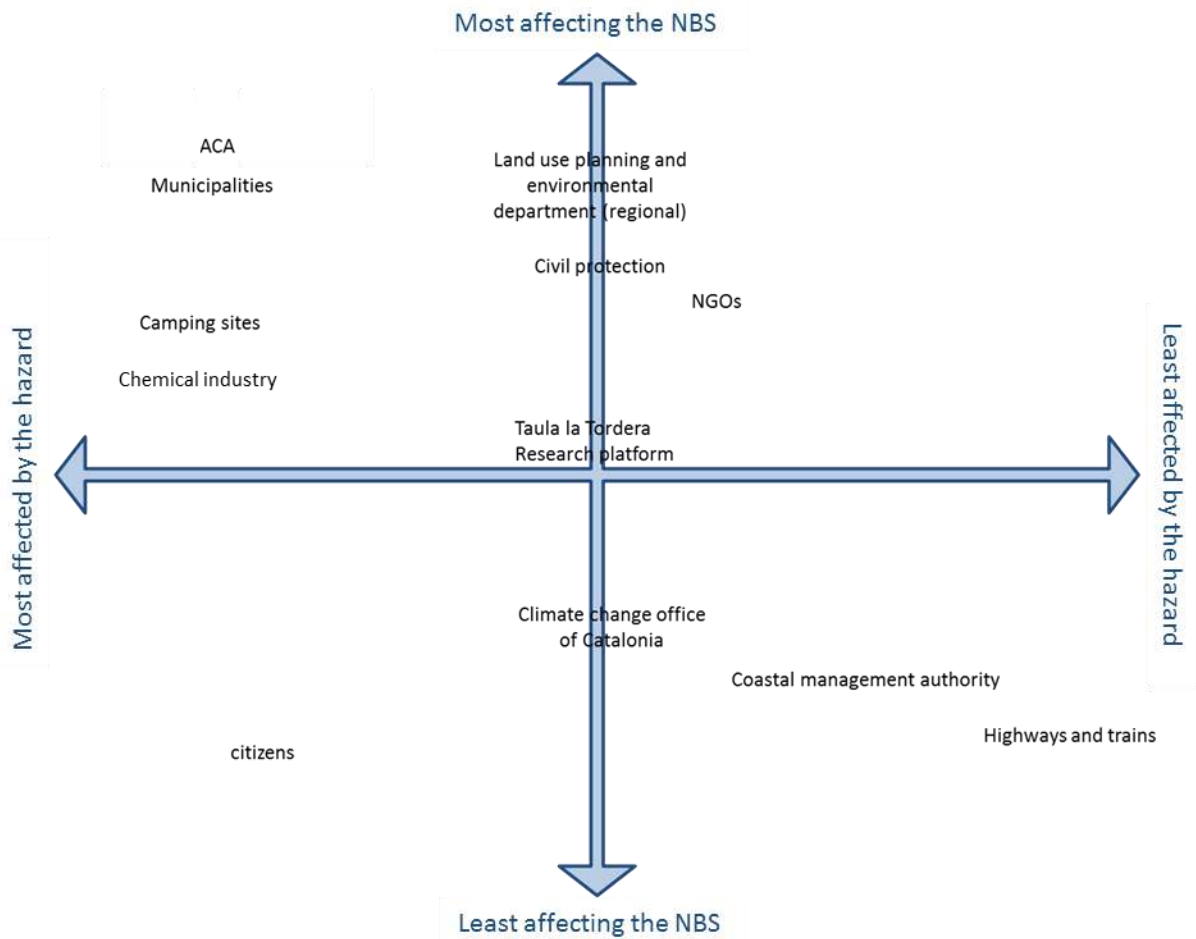


Figure 4.23 Stakeholder Matrix, Tordera River Basin

Some stakeholders were not included in this exercise, for example, the desalination plant, because it is managed by ACA and should rather be taken into account (i.e. that flood risk is not increased) when developing NBS measures.

After filling out the matrix of those affected and those with influence, we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how ACA intends to involve which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.** After we had completed the matrix we moved on to a discussion about the way different stakeholders are/are likely to be involved at different stages of the decision-making process. Once again, because ACA is at the beginning of the process, we discussed how different stakeholders could be ideally involved at different stages of the decision-making process (see **Error! Reference source not found.**). As the problem and the solution have already been defined by ACA alone, we only discussed the stages that lie ahead in the future.

Decision influencing and co-deciding	ACA.	—————>
	Municipalities	—————>
	NGOs	—————>

Consultation		Lan use planning Dept. Env. Dept. Research platform Camp sites	→ → →		Climate change office Chemical industry Campsites
Information provision		Civil protection Climate Change Office Highways and Trains Coastal Management Authority Chemical industry Citizens	→ → → → → →		→
	Co- assess ment	Co-design	Co-implement- ation	Co-operation and maintenance	Co- evaluation and co- monitoring

Table 4.11 Involvement of stakeholders at different stages of the decision-making process, Tordera River Basin

4.3.3 Feedback

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to be involved in the decision-making process.

The following Figure (4.24) provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.

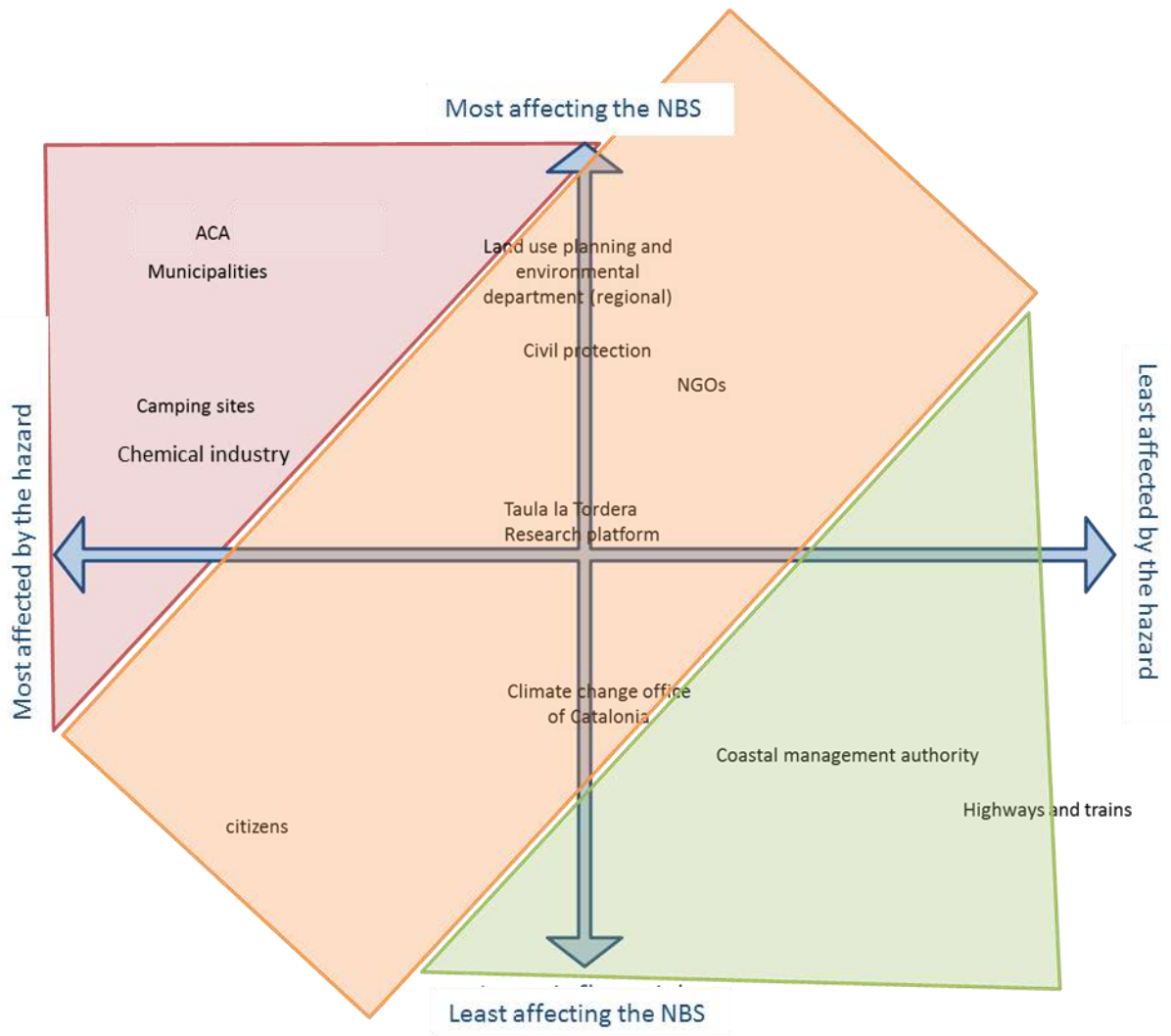


Figure 4.24 Stakeholder matrix with recommendations for level of engagement, Tordera River Basin

Legend

Red: co-deciding

Orange: consultation

Green: information provision

Based on the results of the stakeholder mapping exercise, we can see that it is recommended that a large portion of stakeholders should be prioritised for consultation. Based on **Error! Reference source not found.**, ACA plans to no consult with camping sites but Figure 4.24 suggests that their involvement in co-deciding activities may be required. Also, ACA is currently uncertain about how to go about the involvement of citizens. It was suggested that this responsibility could be taken on by the municipalities because they have a stronger and more established relationship with citizens than ACA. The results of Figure 4.24 suggest that citizens should be involved in consultation in order to avoid conflict or a strengthening of vulnerabilities. Consultation is already foreseen with the land use and environmental departments as well as the research platform but consultation could also be considered with civil protection actors and the Climate Change Office of Catalonia. As already foreseen, information should be provided to the highways and trains as well as the coastal management authority. If the camp sites, chemical industry and the Climate Change Office are going to be involved in the evaluation

and monitoring of the NBS, it is recommended that they at least be consulted if not involved in co-decision processes in regards to what role that could play in this process. Consultation is foreseen with each of these stakeholders.

4.3.4 The strength of current relationships between ACA and other stakeholders.

Mapping the strengths of the existing relationships between ACA and the different stakeholders provided to be a helpful exercise because it allowed for an understanding of who ACA already has a relationship with and not (see Figure 4.25). It also provides information about which other stakeholders might have a strong relationship that ACA can use in order to develop contact with stakeholders which they may not have previously been in close contact with. For example, ACA does not have experience working with citizens but knows that other departments at ACA have experience working with NGOs who work directly with citizens. ACA have a strong relationship with camping sites, for example, because of their work in previous projects (i.e. the ANYWHERE project). Figure 4.25 also provides information about whether the stakeholder is active at the local (L.), regional (R.) and national (N.) level

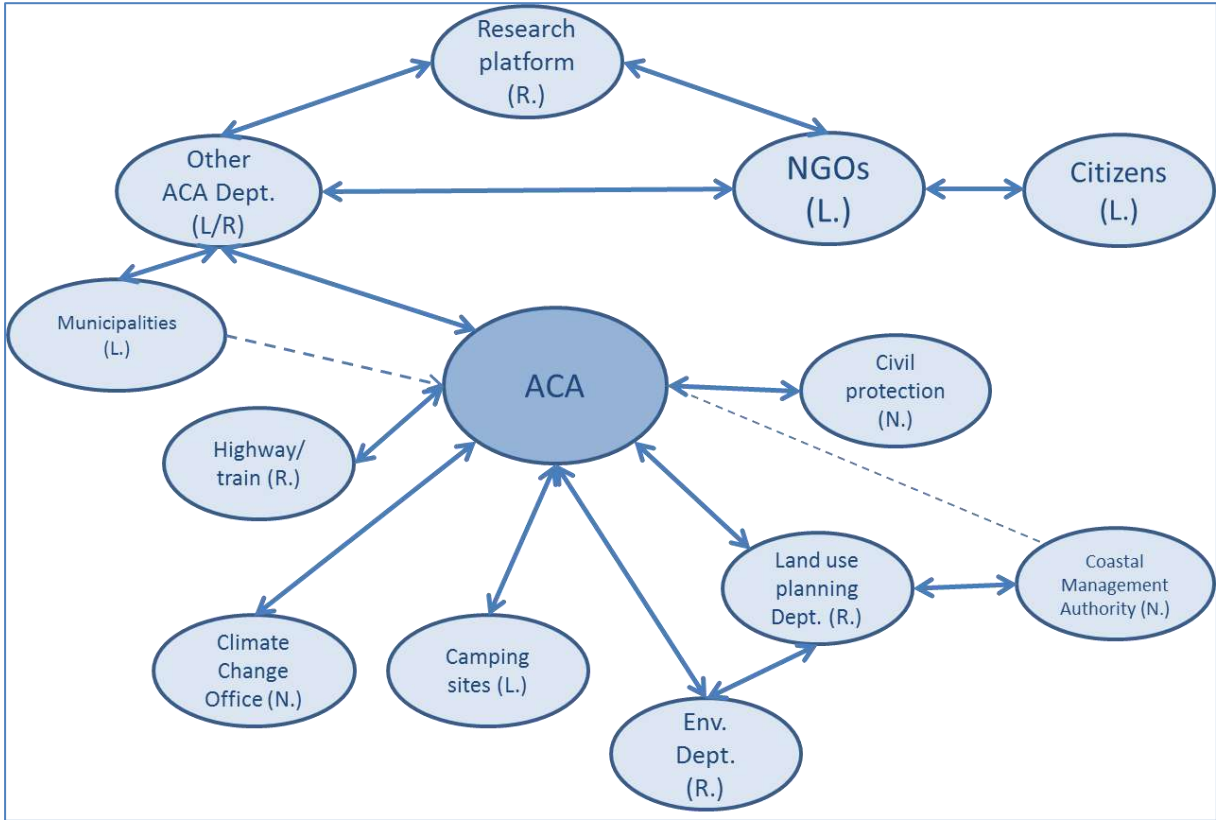


Figure 4.25 Stakeholder network mapping, Tordera River Basin

4.4 DA-4: Portofino Park, Italy

The demonstration sites are located in the Portofino National Park in two sites: San Fruttuoso and Paraggi (see Figure 4.26). Both areas are economically valuable tourist areas, which are at risk from coastal storms, flash flooding and erosion.

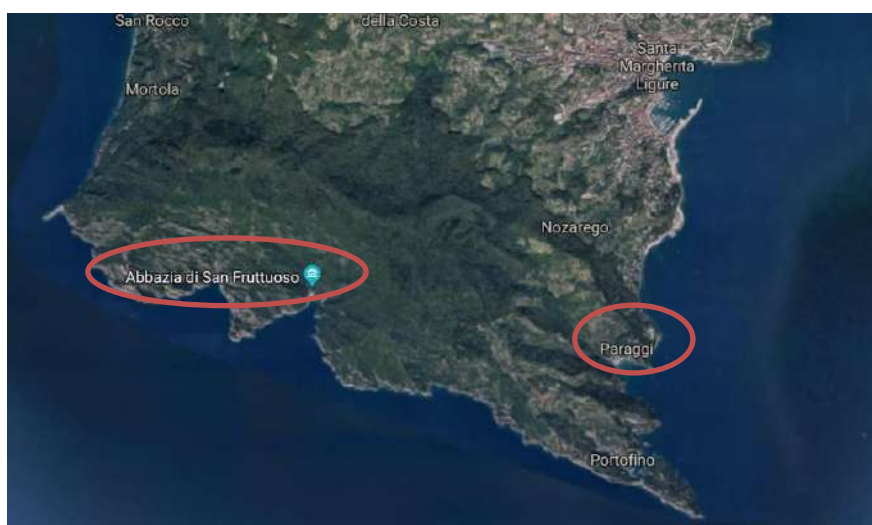


Figure 4.26 Map of the Portofino Demonstrator Site

As a result of the increasing frequency of extreme weather events within the last ten years and the risks that they pose to the lives and livelihoods of those that live in, work in and visit these areas, there has been a recent interest in developing approaches to reduce the damage caused by these events. The locations of these demonstrator sites in a newly proposed national park pose a unique opportunity to test the effectiveness of NBS. Due to the strong interest on retaining the beauty of the national park, implementing NBS might be a promising alternative to grey infrastructure. Therefore, it has been relatively easy to gain support for the restoration of ancient agricultural terraces and reforestation in order to tackle erosion and storm damage.

4.4.1 Portofino's main interests in the RECONNECT project

Based on the aforementioned context, one of the main aims of the Portofino Demonstration site is to use the RECONNECT project as an opportunity to develop a pilot project and a business case for NBS. Due to the acceptance of NBS in the park area, it is believed that this project is a great opportunity to upscale NBS projects in Italy and many other Mediterranean areas with similar contexts. Although, NBS was accepted in the park due to its low intervention in the visual aspects of the landscape (e.g. reforestation and terraced walls are more attractive than concrete walls to protect against erosion), it is assumed that NBS is not likely to be accepted in all context. For example, it is assumed that due to the visual aspects (e.g. people feel safer if they can see a protection measure and will need to be convinced), technical skills and knowledge about grey infrastructure, NBS are at a large disadvantage. In addition, protecting the houses and the infrastructure is extremely valuable for the touristic sector (possibly the most frequented beach in Italy with more than 2 million visitors a year). Property owners in the area are very wealthy and influential; and have established traditional and

informal way of networking, what can be seen as potentially strong veto-player, if not convinced by the NBS.

The potential success of the pilot project in Portofino is seen to present an opportunity in other areas where such measures might not receive the same acceptance and enthusiasm. There is an interest in NBS with relatively short-term impacts (in combination with long-term solutions like forestation). Therefore, having access to evidence-based assessments of the effectiveness and efficiency of NBS is of great importance.

4.4.2 The results of the stakeholder mapping exercises

The following stakeholders were identified in the Portofino demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (see **Error! Reference source not found.**).

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders Sponsors	Lobbyists	Mediators	
SH1: Authorities	Park and natura 2000 Authority	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Civil protection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Municipalities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Regional authorities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Ministry for Cultural Heritage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives	Majority parties	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Minority parties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Property owners (including FAI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Tourists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

	Volunteers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Associations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH4: Private Sector	Technicians	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Tourism facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Parking lots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Guides and Diving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Economic activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Utility companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	Research and university	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media	Journalists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Portofino's proposal

Portofino's uncertainty

Table 4.12 Stakeholder roles in regards to managing the hazard(s), Portofino

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process					
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	Park, natura 2000 Authority	X	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	∨	∨	∨	∨	∨	∨
	Civil protection	<input type="checkbox"/>	X	X	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	∨	∨	∨	∨	∨	∨
	Municipalities	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	∨	∨	∨	∨	∨	∨
	Regional authorities	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	∨	∨	∨	∨	∨	∨
	Ministry for Cultural Heritage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	X	<input type="checkbox"/>		∨	∨		∨	∨
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	∨	∨	∨			
	NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	∨	∨	∨			
	Property owners (including FAI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	X	<input type="checkbox"/>	∨	∨	∨	∨		
	Tourists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Volunteers	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					∨	∨

	Associations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>						✓	✓
SH4: Commercial Sector	Technician	<input type="checkbox"/>	X	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		✓	✓				✓
	Tourism facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
	Transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
	Parking lots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
	Guides and Diving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
	Economic activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
	Utility companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	✓						
SH5: Academia / Research	Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	X	<input type="checkbox"/>	✓	✓	✓				
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
SH6: Media	Journalists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	✓						✓
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

Table 4.13 Summary of the stakeholder groups and roles for the NBS, Portofino

Portofino's proposal Portofino's uncertainties

The Portofino cluster filled out the two rainbow diagrams and a stakeholder matrix in order to answer the questions: *who is affected by and can affect hydro-meteorological hazards* (see Figure 4.27) and *who is affected by and can affect the NBS?* (see Figure 4.28).

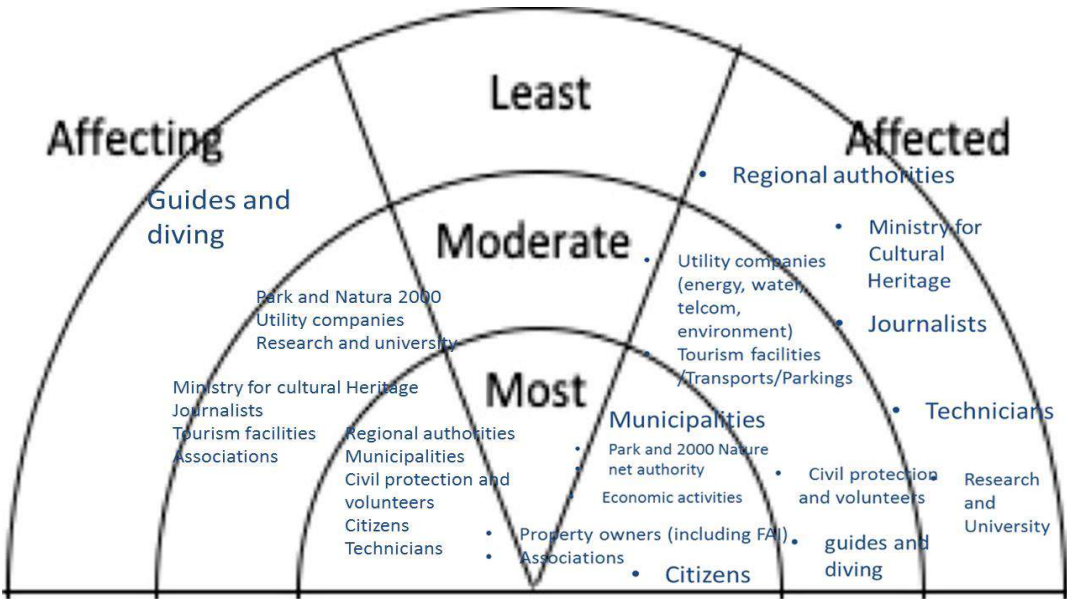


Figure 4.27 Stakeholders affecting and affected by the hazard, Portofino

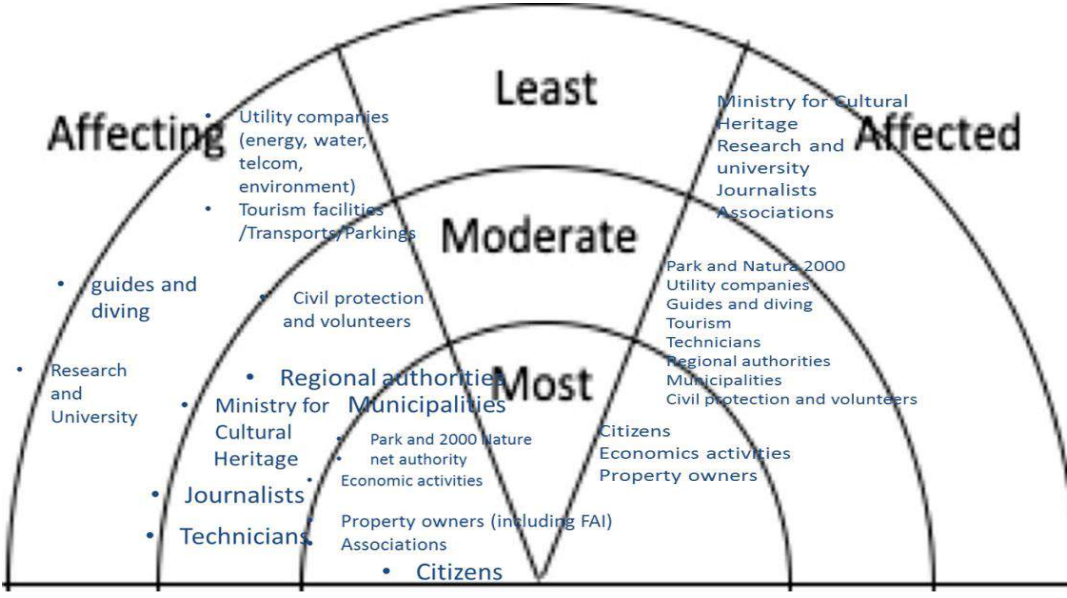


Figure 4.28 Stakeholders affecting and affected by the NBS, Portofino

In Portofino, stakeholders are negatively affected by flood hazards and erosion but not necessarily the NBS itself (i.e. reforestation and the reconstruction of terraces in the park). Therefore, in the following exercise, we discussed who the main stakeholders of the Portofino Demonstrator site might be based on who is affected by flood risk and who has the power to influence decisions related to NBS (see Figure 4.29).

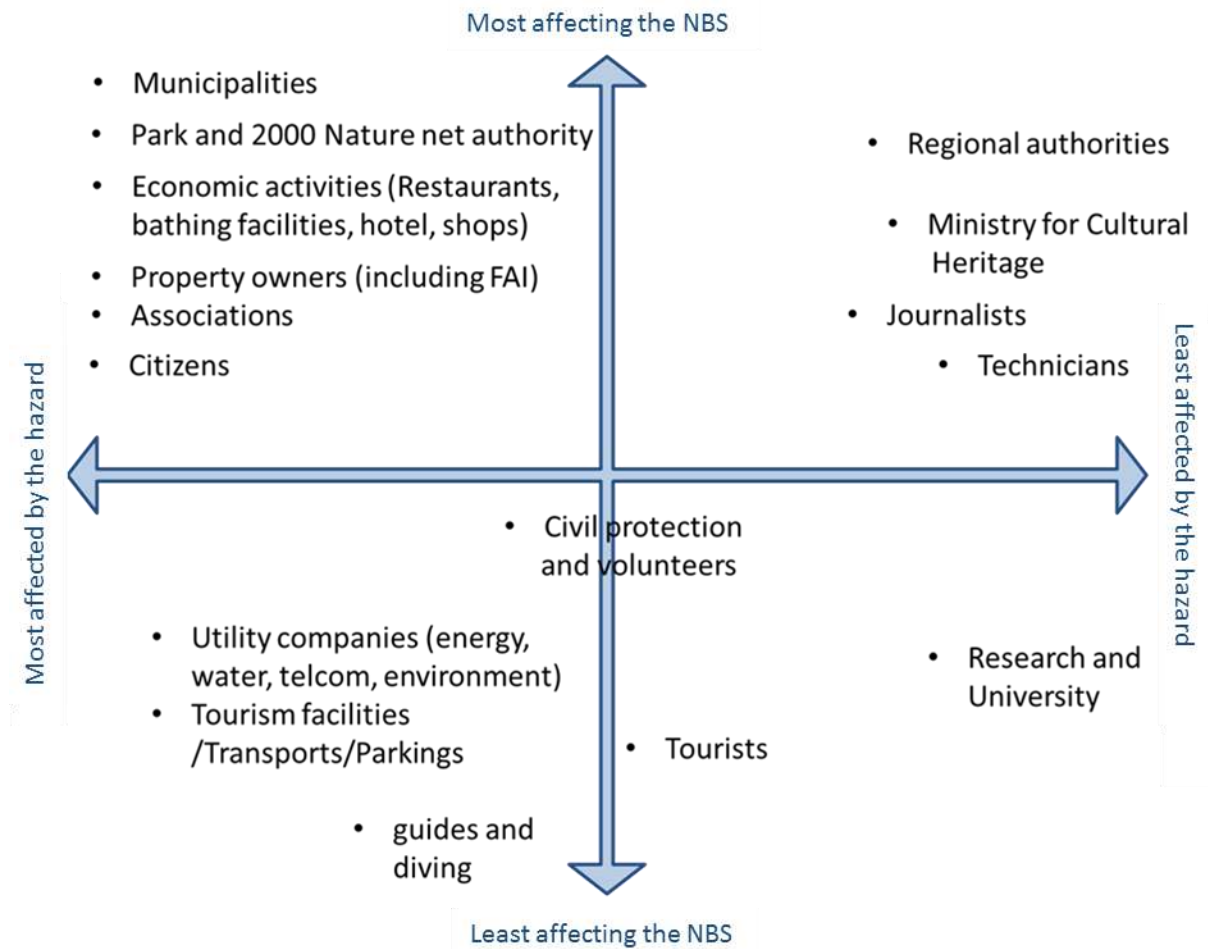


Figure 4.29 Stakeholder Matrix, Portofino

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Portofino intends to involve which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

Decision influencing and co-deciding	<ul style="list-style-type: none"> • Municipalities • Park and Natura 2000 authority • Regional Authorities 	<ul style="list-style-type: none"> • Municipalities • Park and Natura 2000 Authority • Regional authorities • Ministry for Cultural Heritage 	<ul style="list-style-type: none"> • Municipalities • Park and Natura 2000 authority • Regional authorities • Ministry for Cultural Heritage 	<ul style="list-style-type: none"> • Municipalities • Park and Natura 2000 authority 	<ul style="list-style-type: none"> • Municipalities
Consultation	<ul style="list-style-type: none"> • Citizens • Associations • Property owners (including FAI) • Economic activities Tourists • Civil protection and volunteers • Utility companies 	<ul style="list-style-type: none"> • Citizens • Associations • Property owners (including FAI) • Economic activities 	<ul style="list-style-type: none"> • Citizens • Associations • Property owners (including FAI) • Economic activities 	<ul style="list-style-type: none"> • Property owners (including FAI) 	<ul style="list-style-type: none"> • Citizens • Associations • Property owners
Information provision	<ul style="list-style-type: none"> • Citizens • Property owners (including FAI) • Park and natura 2000 Authority • Research and University • Technicians • Journalists • Tourism facilities/ Transports/ Parking lots • Guides and Diving 	<ul style="list-style-type: none"> • Park and natura 2000 Authority • Property owners (including FAI) • Research and university 	<ul style="list-style-type: none"> • Park and natura 2000 Authority • Property owners (including FAI) • Research and university 	<ul style="list-style-type: none"> • Park and natura 2000 authority • Property owners (including FAI) 	<ul style="list-style-type: none"> • Park and natura 2000 Authority • Property owners (including FAI) • Research and university
	Co-assessment	Co-design	Co-implementation	Co-maintenance	Co-evaluation and monitoring

Table 4.14 Involvement of Stakeholders at different phases of the NBS process, Portofino

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

4.4.3 Feedback

Figure 4.30 links the results of the matrix and table to the theory outlined above by providing suggestions for which stakeholders should be involved in co-deciding, consultation and information provision.

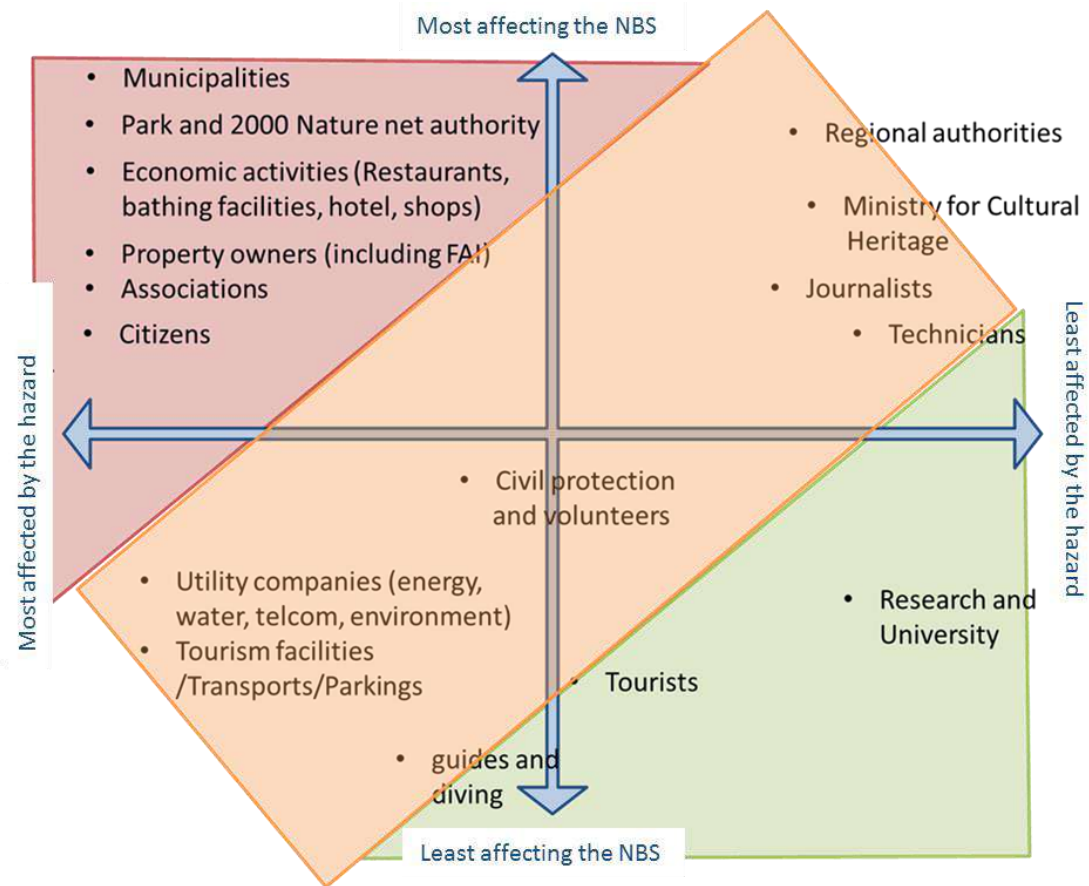


Figure 4.30 Stakeholder matrix with recommendations for level of engagement, Portofino

Legend:

Red: co-deciding

Orange: consultation

Green: information provision

Based on the results of the stakeholder mapping exercise, we can see that there are differences between theory and practice in regards to who Portofino plans to consult with and involve in co-deciding and who “should” be consulted with and involved in co-deciding. This is likely due to power relations. Ministries, authorities and municipalities have influence on the decision-making process as a result of regulations, funding and permits and are required to be in co-deciding processes at each stage of the NBS despite the fact that they are not affected by the risk per se. Portofino has included those who are most affected by the risk and most influential in the consultation group. Reasons for this are institutional structures (i.e. no space and time for co-decision-making processes), cultural expectations/norms (stakeholders believe that only direct and non-transparent contact with decision makers is the valid solution, and also there is a lack of consolidated practices and procedures for co-decision processes).

If stakeholders in the most affected and most influential group are unlikely to reject the NBS, then consultation is likely to be an effective mode of involvement. However, it is important to consider issues, such as conflict, lack of acceptance and whether or not stakeholders should be involved in the maintenance of the NBS after it has been implemented. If any of these points are relevant, it is recommended to consider a more intense involvement of these stakeholders from the beginning of the NBS be that in the definition of the problem and solution or the design/planning stage (Pahl-Wostl *et al.* 2013).

4.4.4 The strength of current relationships between Portofino and other stakeholders.

The following exercise aims to gain an overview of the relationships between stakeholders. It is a useful exercise for considering how the Demonstration Site might be able to get in contact with stakeholder who they, personally, do not have a strong relationship with. As we can see from the results presented in Figure 4.31, below, Portofino already has a strong relationship with most of the stakeholders. This is a great sign and provides a strong basis for stakeholder interactions co-creation throughout the NBS project. In other words, opportunities for interactions with stakeholders who are affected by geo-hydrological risks and who have a strong influence on the success of the NBS are already available for Portofino to ensure that issues related to social vulnerability, acceptance, conflict and NBS delays can be avoided.

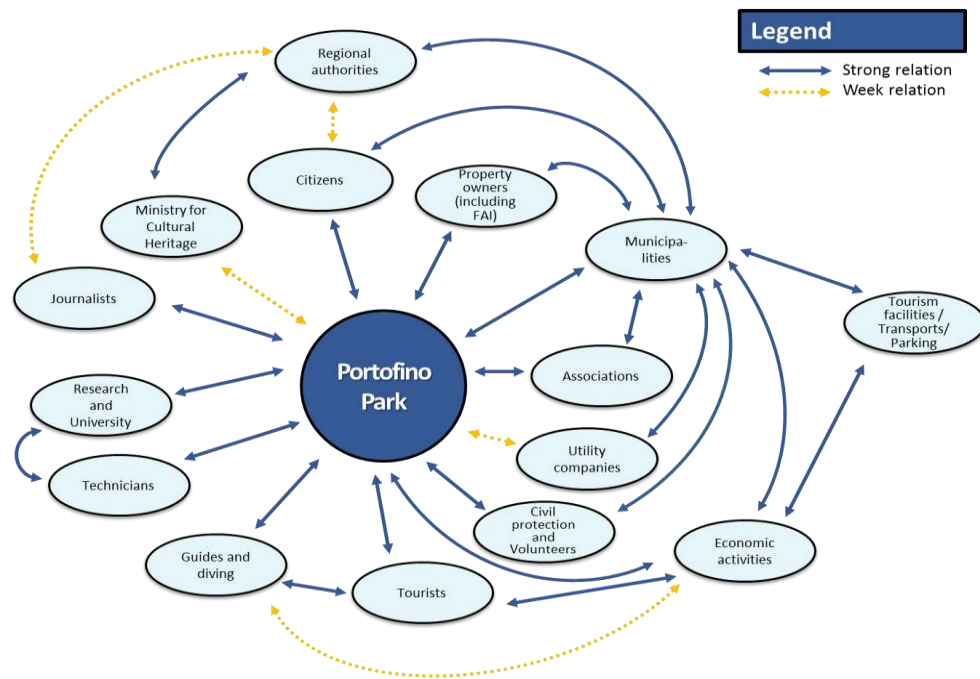


Figure 4.31 Stakeholder network mapping, Portofino

4.5 DB-1: IJssel River Basin, The Netherlands

The demonstration sites are located along the IJssel River in the Netherlands. The project was funded as part of the “Room for the River” Programme (“Ruimte voor de Rivier” - PKRR 2006). The project consists of roughly 300 ha of vegetation in a stretch of approximately 130 kms of river, over 350 owners, and 17 local authorities.

The aim of the project was to remove vegetation from the river’s summer bed in order to increase the velocity of the water travelling from the mountains to the sea (see **Error! Reference source not found.**). The project began in 2014 and was completed in 2018. Specifically, the unofficial

aim was to remove 70% of the vegetation within the project area. The “Stroomlijn” (or Streamline) Project was implemented by the “Courant” (or Current) Team, which consisted of three organisations, including TAUW, Eelerwoude and Bruins en Kwast.

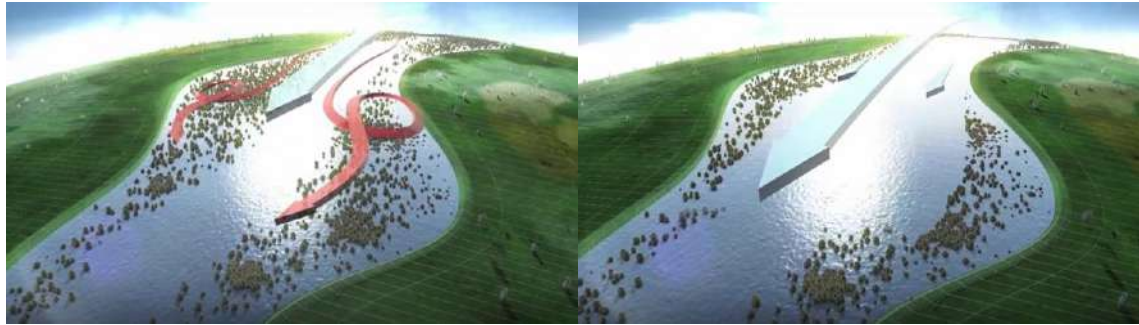


Figure 4.32 Visualisation of project concept: the removal of vegetation from the riverbed to increase water velocity (source D. 2.3).

Communicating with as well as gaining acceptance permission from stakeholders was one of the main objectives of the project. This is because, without the acceptance and permission of stakeholders, it would have been extremely difficult and time consuming to realise the project’s objectives.

Due to the nature of the project; the removal of vegetation, there was resistance to the project. For example, some landowners did not want to change the landscape of their property by removing trees. Additional opposition to the project included environmental NGOs and residents living outside of the area at risk due to criticism about the removal of natural habitats as well as visual aspects of a landscape devoid of trees. Despite the ability of these stakeholders to disrupt and postpone the project, the project was able to successfully reach its targets within four years.

Because large rivers come under the jurisdiction of the national government, the approach to stakeholder engagement was quite top-down. This meant that, if needed, the government could force property owners to comply. However, much effort was spent on consulting with and communicating to stakeholders in order to avoid potential conflicts. And, with the exception of one case (which was excluded in the end because the target of 70% had already been met), all landowners agreed to the clearance of vegetation on their land. Landowner permission was granted based on good will as there was no financial compensation offered for the removal of the vegetation. However, the project did cover the costs of the removal.

The success of the project was seen to depend on a number of factors. Firstly, it was explained that the Dutch culture requires negotiation and stakeholder involvement. The Courant Team realised early on that the success of the project would depend on stakeholder involvement and acceptance. Therefore, the team included so-called “land stewards” (Eelerwoude) who are versed in landownership related law and regulation to conduct meetings with all of the landowners. Originally, three meetings with landowners were planned: 1) to communicate the scope of the project

(e.g. flood risk management) and gain an understanding of how landowners might react to the proposed project (i.e. vegetation removal), 2) to discuss the concept, for example, which trees could be removed and which could remain, and 3) to present the final plan and gain the landowner's signature.

The initial reaction of the landowners was mixed and included anything from “I have been waiting for you to come, what took you so long” and appreciation that the project would remove the vegetation without cost to the landowner, to absolute rejection. The reason for these diverse reactions is in part a result of the type of landowner. Three types of landowners were identified: 1) agricultural landowners, 2) owners of old estates, and 3) recreational organisations such as the State Forest Management, which is the largest landowner in the project site (owner of 52% of the land in the project area). Landowners of old estates receive a tax break from the government for ensuring that 30% of their land is prioritised for nature instead of agriculture and removing vegetation threaten this. Similarly, the recreational organisations profit from natural environments and so had a fundamental objection to the removal of the vegetation. On the other hand, agricultural landowners tended to welcome the removal of vegetation because it meant that the acquired additional land for farming. As a result, most landowners required more than three meetings to obtain their permission for the vegetation removal.

In order to capture the results of discussions with landowners, the stewards used GIS mapping to collect information about which vegetation could and could not be removed (see **Error! Reference source not found.** 4.33). This provided a very efficient way of documenting and planning the implementation of the project.

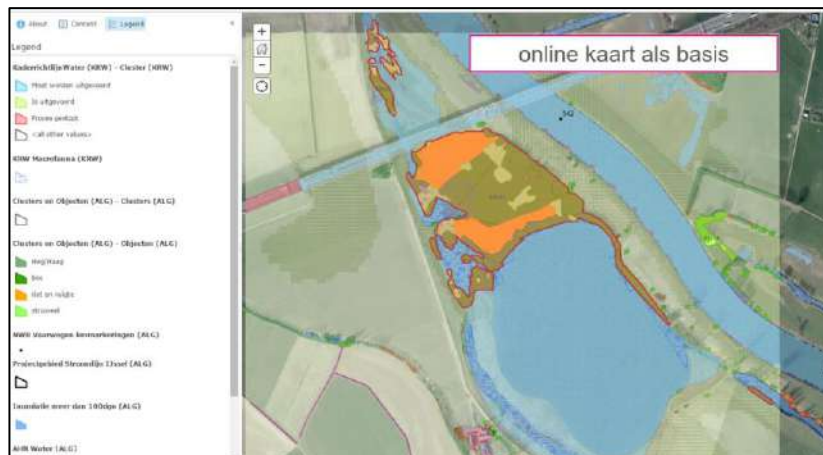


Figure 4.33 Example of the GIS map used during the “Stroomlijn” project (source D2.4.)

Another technique used in the Courant Team's communications strategy for stakeholder engagement were a project website, newsletters and information evenings. This was done because it was foreseen that the removal of vegetation would insight conflict with some groups of society (e.g. the general public as well as environmental NGOs). The aim was to clearly explain the aims of the project and the effect that the removal of vegetation would have on flood risk along the river. Importantly, one of the lessons learnt during the project was the design of the information evening. Based on experience, meetings which offered small tables and face-to-face discussions with the project team where much more effective than a presentation in front of a group. One such meeting ended in conflict as one of the members of the audience challenged the presenter and stifled the potential for consensus between the Courant Team and the audience.

Examples, of the communication material have been made available and will be made available to Demo As and Collaborators upon request.

Other stakeholders involved in the project included municipalities and regional water boards. These institutions had a strong influence on the project as they were able to grant the permissions required to carry out the project. The Ministry of Financial Affairs was also involved due to its role in managing natural habitats and therefore, also granting permits required for carrying out project work (see D2.4. for more detailed information about the instutions responsible for issuing permits).

Importantly, the Dutch Water Authority (Rijkswaterstaat) was the commissioner of the project and was responsible for scoping the project area, deciding how much vegetation should be cleared and was involved in the intitial talks with stakeholders. The Courant Team came in at a later stage in order to impliment the project. However, it was noted in hindsight that it would have been more effective if the team implementing the project was also invovled in talks with stakeholders at the beginning of the project. It is believed that this would have saved a lot of time, effort and misunderstandings.

Another issue that was experienced within the project was maintenance. Three years after some of the vegetation removal has taken place on some properties, little has been done to maintain the riverbed. This is seen to be the case because it was not included in the project's scope and because landowners were not provided with incentives to maintain the cleared land. Such a situation has major implications for the sustainability of the project. Therefore, ensuring that the project is conceptualised from beginning to end and involves all stakeholders in the whole process is recommended in order to ensure the efficiency, effectiveness and sustainabilty of the project.

One of the overall lessons learnt from the Stroomlijn Project was that stakeholder involvement is integral to the project's success and therefore "preventing conflict is better than repairing relationships". In other words, ensuring that stakeholders are involved and accept the project is of crucial importance. In fact, it was estimated that only 20% of the cost of the project was spent on technical aspects of the project. The remaining 80% was invested in gaining permission from municipalities, authorities and landowners and gaining acceptance from critics. Therefore, it is believed that it is worth investing time at the beginning of the project to identify stakeholders and develop a communications strategy. Such strategies could save time and prevent conflicts and misunderstandings between stakeholders.

4.5.1 IJssel's main interests in the RECONNECT project:

The main objective of the IJssel Demonstrator Site is to share the experience and lessons learnt with other demonstrators and collaborators.

4.5.2 The results of the stakeholder mapping exercises

After discussing the context of the IJssel Demonstrator site, the first exercise we conducted was an overview of the stakeholders who are involved in the IJssel Demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (see Table 4.16 Summary of the stakeholder groups and roles for the NBS, IJssel River Basin

In addition stakeholders were mapped in regards to their ability to affect as well as those who are affected by the hazard (see **Error! Reference source not found.** 4.34) and stakeholder who can affect and who are affected by the NBS (see Figure 4.35).

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders Sponsors	Lobbyists	Mediators	
SH1: Authorities	National Water Board	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Ministry of Financial Affairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Regional Water Boards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Municipalities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Agricultural landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Old estates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Residents outside the dikes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Recreational areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	NGO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH4: Private Sector	SBB StaatsBosBeheer (National Government Forestry maintenance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Courant	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
SH5: Academia / Research		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SH6: Media	Local newspapers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.15 Stakeholder groups and roles in regards to the hazard, IJssel River Basin

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process					
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	National Water Board	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓				
	Ministry of Financial Affairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓				
	Regional Water Boards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓				
	Municipalities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓				
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH3: Civil Society	Agricultural landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓			
	Old estates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓			
	Residents outside the dikes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓			
	Recreational areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓			
	NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓			

SH4: Commercial Sector	SBB StaatsBosBeheer (National Government Forestry maintenance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			✓	✓		
	Courant	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓		
SH5: Academia / Research		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH6: Media	Local newspapers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.16 Summary of the stakeholder groups and roles for the NBS, IJssel River Basin

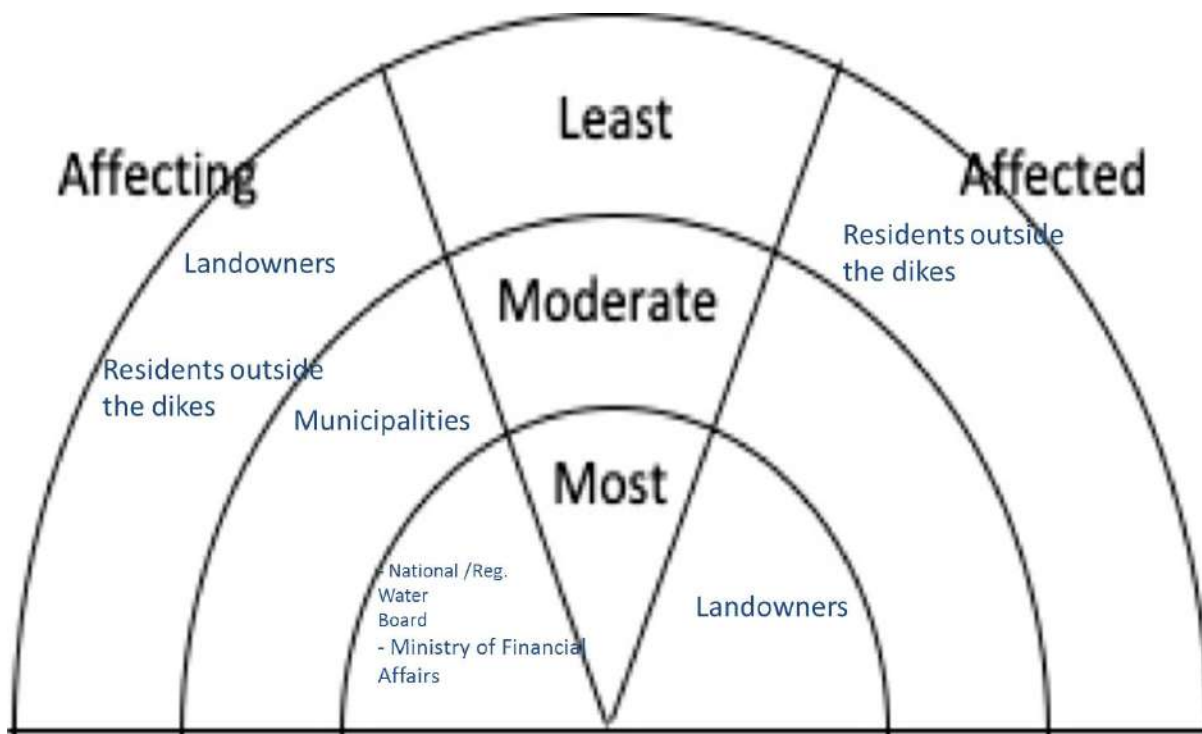


Figure 4.34 Stakeholders affecting and affected by the hazard, IJssel River Basin

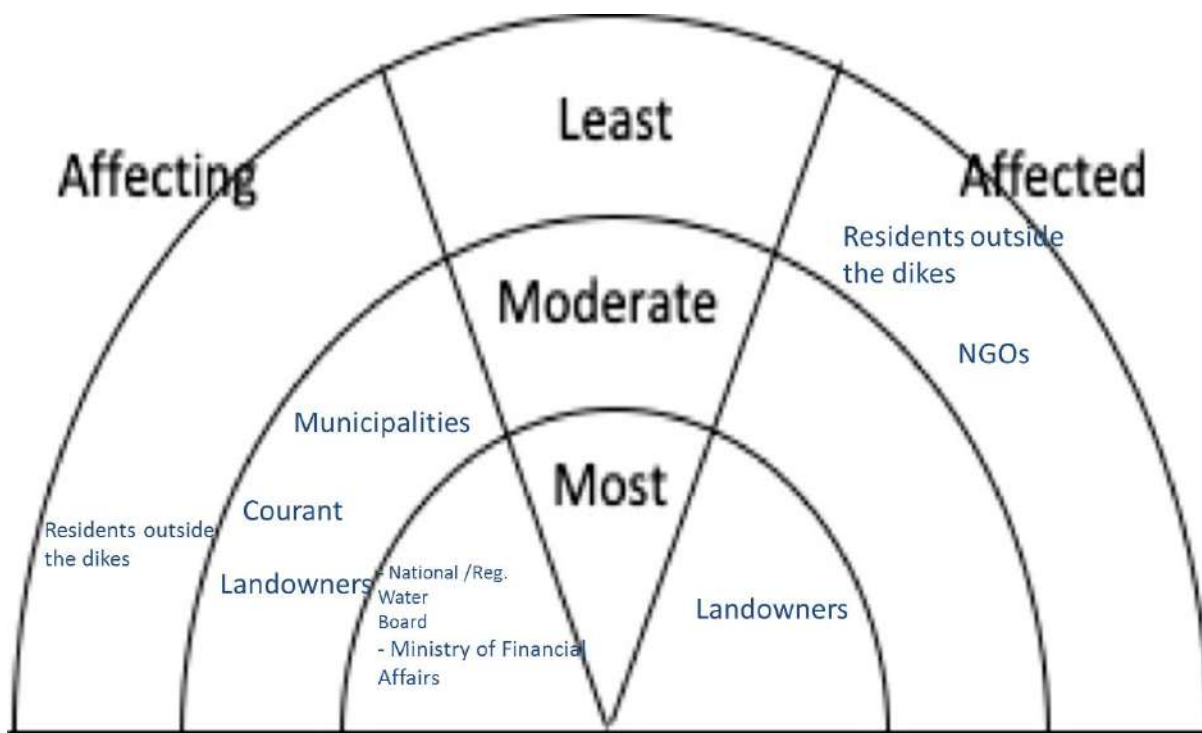


Figure 4.35 Stakeholders affecting and affected by the NBS, IJssel River Basin

When filling in the Stakeholder Matrix in the other demonstrator sites, we mostly focused on stakeholder affected by the *hazard* rather than those affected by the *NBS*. However, we quickly realised that it did not make sense to focus on the hazard as landowners are affected by the hazard regardless of whether the vegetation is removed or not (see Figure 4.36). The people

who are likely to benefit from the reduction in flood risk provided by this project are those who live behind the dikes.

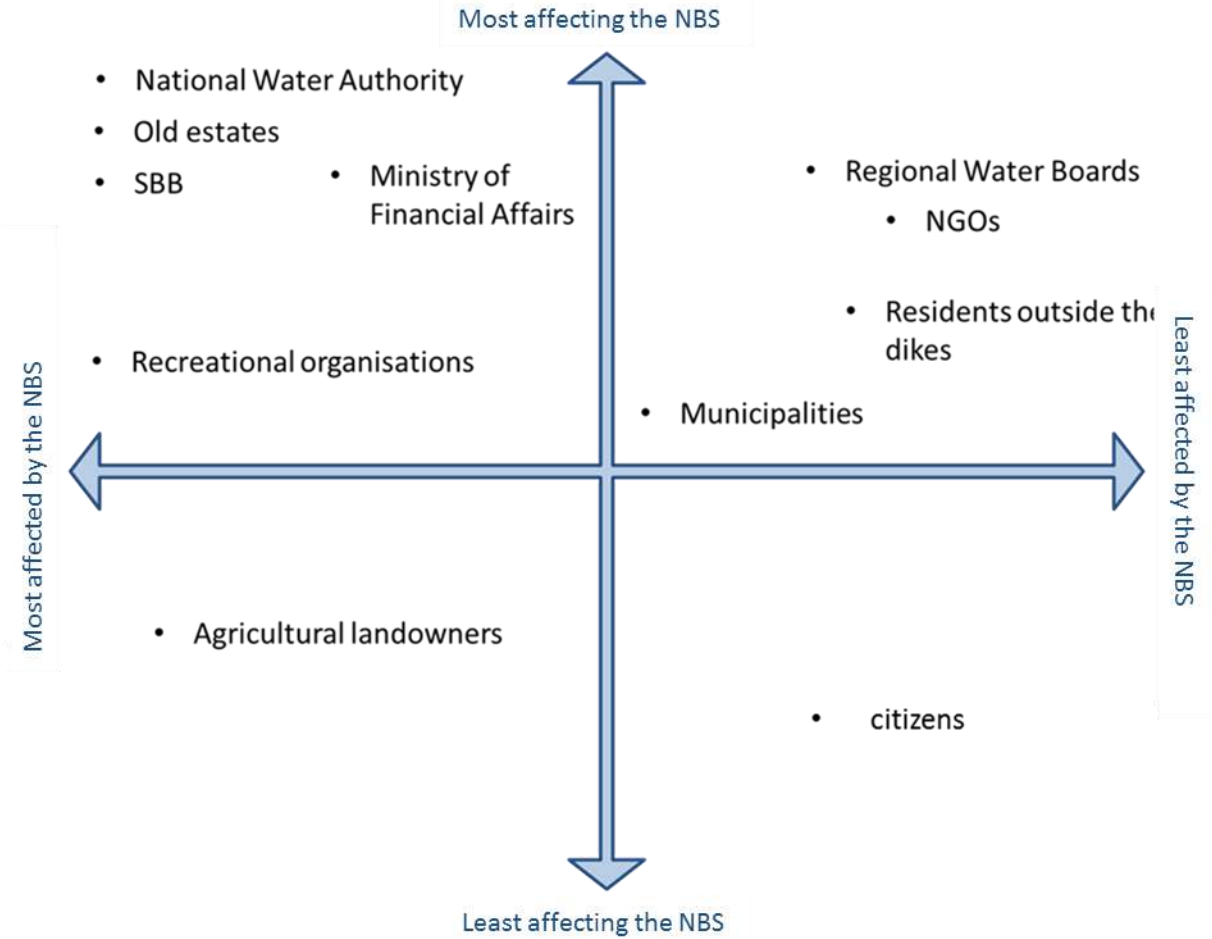


Figure 4.36 IJssel Stakeholder Matrix, IJssel River Basin

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how IJssel involved which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

The following exercise aimed to document the ways in which different stakeholders were involved at different stages of the decision-making process (see **Error! Reference source not found.**).

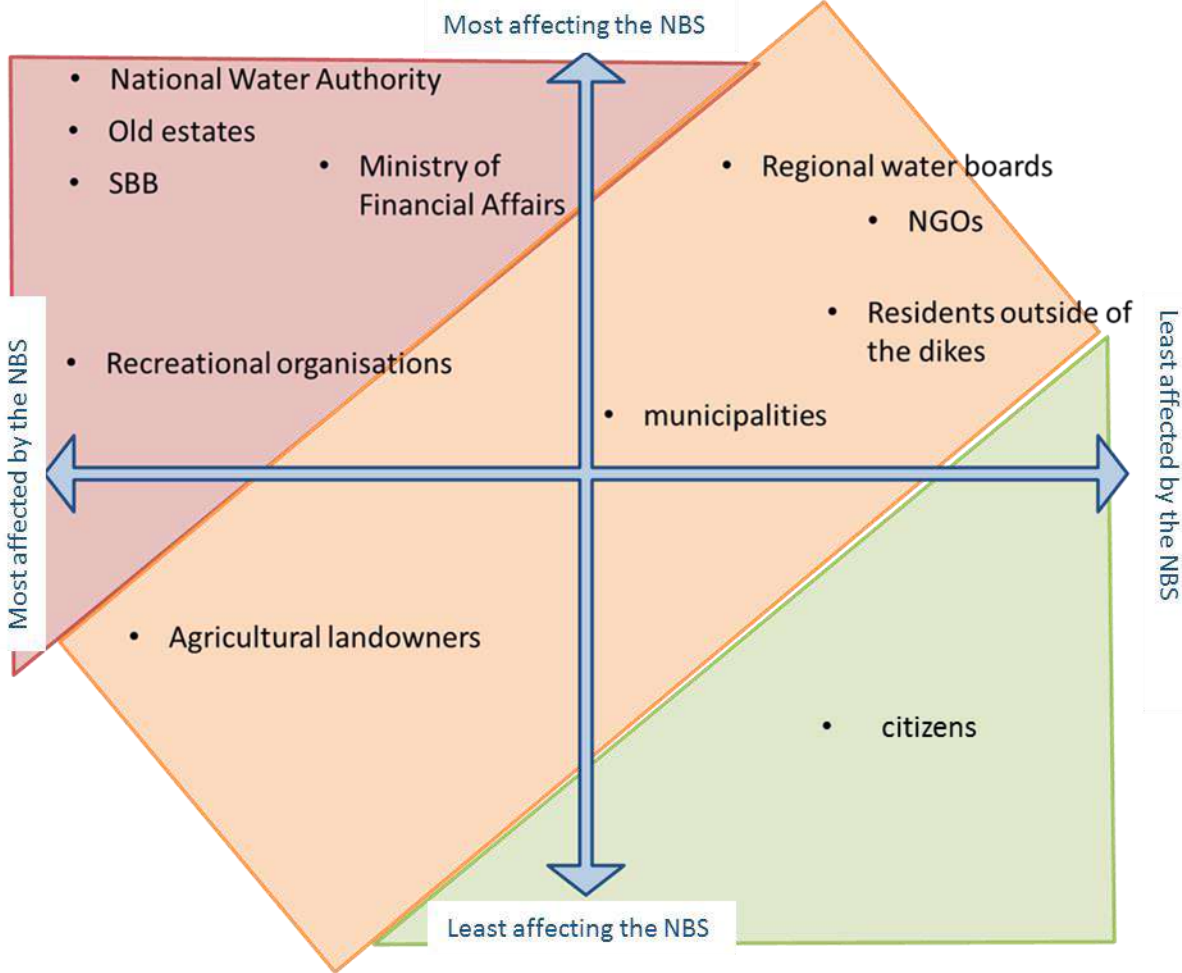
Decision influencing and co-deciding	National Water Authority	<ul style="list-style-type: none"> • Courant Team (TAUW) • National Water Authority • Regional Water Board • Municipalities • Ministry of Financial Affairs Permits from these organisations were required SBB	Courant Team The Courant Team took care of the removal of vegetation	No maintenance foreseen in this project	Courant Team During the project in regards to documenting the results of the consultation with landowners in GIS maps National Water Authority After the implementation of the project. Monitoring and evaluation methods are unknown by TAUW
Consultation	<ul style="list-style-type: none"> • National Water Authority • Regional Water Board • Municipalities • Ministry of Financial Affairs The National Water Authority consulted with all of the above stakeholders	<ul style="list-style-type: none"> • Landowners Were involved in 3 rounds of discussions in order to select vegetation to be cleared and gain their permission. Includes recreational areas (specific type of landowner)			
Information provision	<ul style="list-style-type: none"> • Landowners Were informed about the project and its aims.	<ul style="list-style-type: none"> • NGOs • Citizens • Residents outside of the dikes A communications strategy was developed to communicate the purpose and aims of the project.			
	Co-assessment	Co-design	Co-implementation	Co-maintenance	Co-evaluation and co-monitoring

Table 4.17 Involvement of stakeholders at different stages of the decision-making process, IJssel River Basin

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to be in the decision-making process.

4.5.3 Feedback/ lessons learnt

Figure 4.37 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



- Legend**
Red: co-deciding
Orange: consultation
Green: information provision

Figure 4.37 Stakeholder matrix with recommendations for level of engagement, IJssel River Basin

Based on the results of the stakeholder mapping exercise, we can see that reality is more complicated than theory. In other words, due to the shift in responsibility from the National Water Authority to the Courant Team after the conception of the project, the Courant Team had little influence on who was involved in the definition of the problem and solution. Furthermore, due to institutional structures, it was not possible to involve landowners in co-decision-making processes in which they had the power to stop the project. Instead, landowners were given the opportunity to discuss which vegetation could be removed rather

than whether vegetation should be removed at all. In cases where landowners refused, the government could have moved in and forced them to comply. However, this project shows that consultation can be a very successful way of gaining acceptance of NBS. After all, the project was able to successfully meet its target of removing 70% of the vegetation within the project area without having to use government power to force landowners to comply.

4.6 DB-2: Inn River Basin, Austria

The catchment is located near Innsbruck, Austria, in south-west direction. The overall catchment comprises of the torrential catchments Geroldsbach (12 km²) and Marbach (1.2 km²) located upstream different parts of the municipality of Götzens.

From there, the creek flows further downstream and contributes to the River Inn which has a catchment area of ~5700 km² at this location. The focus of this demonstrator site is on the upstream part of the Geroldsbach until it reaches Götzens and addresses the interaction between urban and torrential features in alpine environment. This Demonstrator Type B site comprises different types of NBS being installed in the torrent since the early 1950s. The NBS installed over the last decades included: Afforestation of high-altitude areas; buffer strips and hedges along water courses; greening; protection forest management (see Figure 4.38).

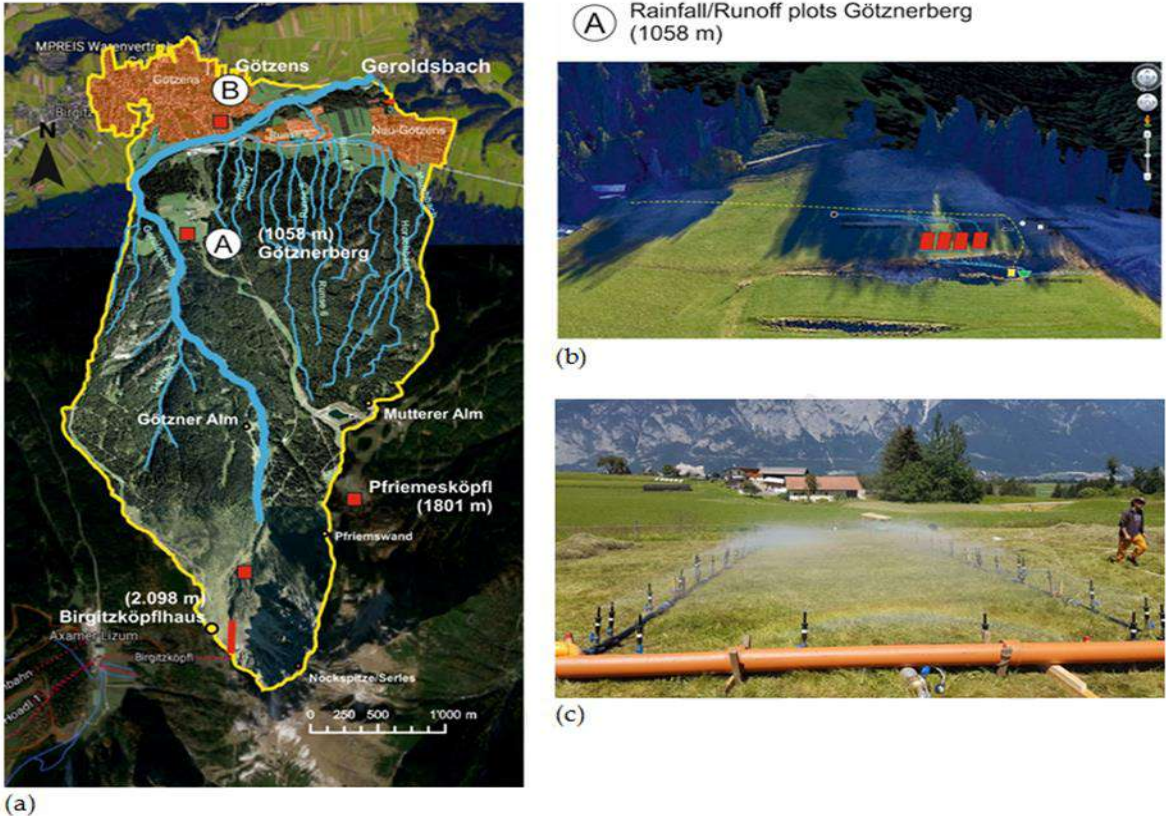


Figure 4.38 (a) Overview on the torrential/urban catchment, (b) (c) setup of the field test site for surface runoff testing (source: D.2.3)

4.6.1 Götzens' main interests in the RECONNECT project:

Like the majority of torrential catchments in Austria, the catchment is ungauged where the installation of basic monitoring equipment is planned in frame of the project. This catchment might be representative for this part of the Alps (about 10 km², thousands of these small rivers exist, often above villages and densely populated cities). The modelling is supposed to show the effect of reforestation on flooding in events of heavy rain in detail. The influence of climate change and how to predict heavy rain events is of major interest for the demonstrator.

The demonstrator is especially interested in data management and validation and knowledge sharing about monitoring; especially on NBS at sites at the intersection of rural to urban sections of a catchment.

4.6.2 The results of the stakeholder mapping exercise

The hydro-meteorological risk perceived at this demonstrator site in Innsbruck is heavy rain and flooding by the small river of Geroldsbach. Flooding might be caused by high tide in the river Inn as well. The affected cities of Götzens and Innsbruck have, as most municipalities in the Alps, a century long history of risk awareness and local measurements. The public national Austrian Service for Torrent and Avalanche Control is responsible since 1884 to provide solutions for the protection of residents (after a serious and deadly flood event). Looking at perceptions in an historic perspective the major risk around the important city of Innsbruck was and still is deriving from avalanches. Torrential rivers are often seen as secondary threat in Austria, but as urbanised areas spread out into rural catchments these perceptions are subject to change. There are 15 rivers around Innsbruck classified as torrential. The railway, the highway and a prison in the Inn valley are public infrastructures at risk here.

Nature based solutions (NBS) were discussed by the Innsbruck demonstrator team; one focal point are standardized engineer-biological measures. Reforestation is seen to have benefits for biodiversity, especially at the beginning. Restoring ecosystems in general is important for implementing the EU WFD and the ecological water quality status. NBS have socio-economic benefits e.g. on job market, as reforestation can provide long term jobs in sustainable forest management.

After flooding in 1882 the Austrian state founded the new institution, the historical processor of today's Wildbach and Lawinenverbauung (WLV) and looked towards solutions developed in France, where reforestation is a major successful measure with valuable social-economic co-benefits. It was discussed that NBS discourses in an historic perspective come and go, follow similar patterns, interests, perceive similar benefits like today. Periods with preference for nature based solutions like today in Austria are followed by periods with a strong belief in engineering and technical solutions.

Municipal politics are not seen as important drivers for NBS. It is believe that instead, the interest in NBS is event-driven. It is usually the national level that relevant instruments like flood risk management plans or forest supervisors are established and then implemented in each municipality.

Altogether, the following stakeholders were identified in the Innsbruck demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (see **Error! Reference source not found.**).

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders Sponsors	Lobbyists	Mediators	
SH1: Authorities	Innsbruck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Municipality Götzens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Wildbach- und Lawinenverbauung (WLV) ⁵	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Highway Company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Railway Company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	“Subsidising Directives”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives	Mayor of Götzens	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Citizens/Tax payers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Exposed residents in the catchment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Landwoners in the catchment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH4: Private Sector	Fishing/Hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH5: Academia / Research		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Table 4.18 Stakeholder groups and roles in regards to the hazard, Götzens.

⁵ Austrian Service for Torrent and Avalanche Control

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role						Stage of the NBS process						
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	Innsbruck	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓					
	Highway Company	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓		✓		
	Railway Company	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓		✓		
	Municipality Götzens	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓					
	Wildbach- und Lawinenverbauung (WLV) ⁶	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓		
SH2: Political Representatives	Mayor of Götzens	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓					
	Citizens/tax payer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓					
SH3: Civil Society	Exposed citizens in the catchment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓		
	Land owners in the catchment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓		
SH4: Commercial Sector	Fishing/ Hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓		

⁶ Austrian Service for Torrent and Avalanche Control

SH5: Academia / Research		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						✓	✓
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
SH7 Inter-/Trans-national organization		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

Table 4.19 Summary of the stakeholder groups and roles for the NBS, Götzens

The Innsbruck cluster agreed on the two rainbow diagrams and a stakeholder matrix in order to answer the questions: *who is affected by and can affect hydro-meteorological hazards* (see **Error! Reference source not found..**) and *who is affected by and can affect the NBS?* (see Figure 4.39 and Figure 3.40).

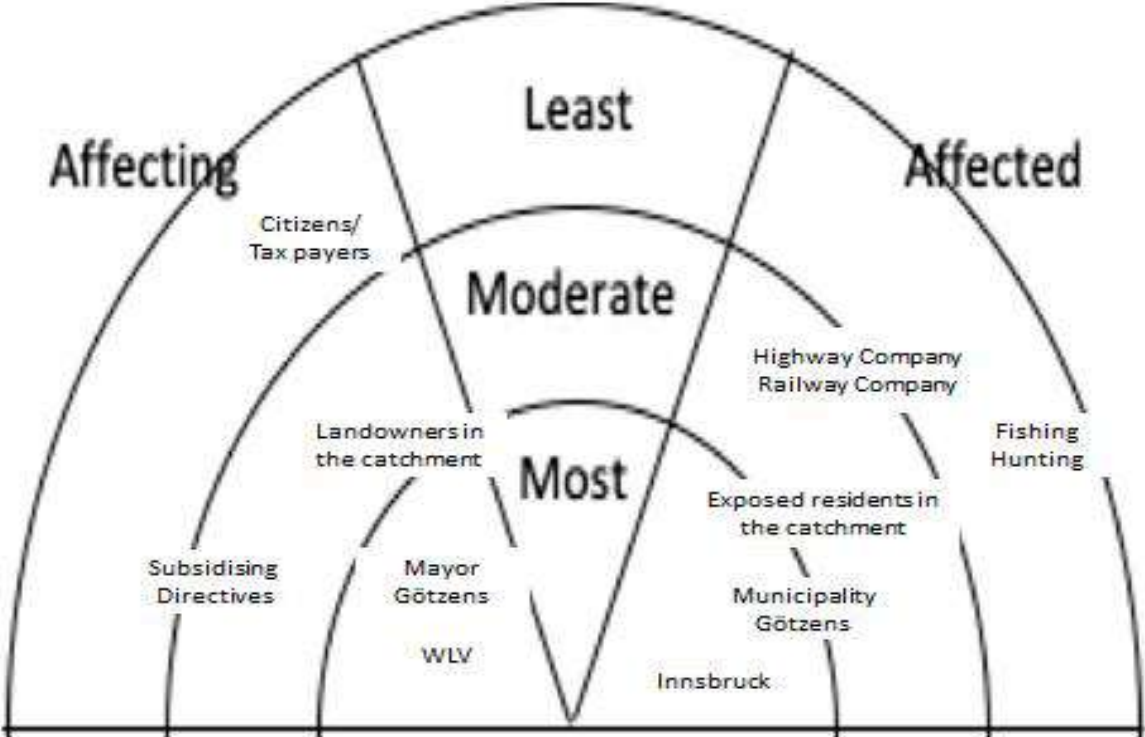


Figure 4.39 Stakeholders identified as affecting and being affected by the hazard , Götzens

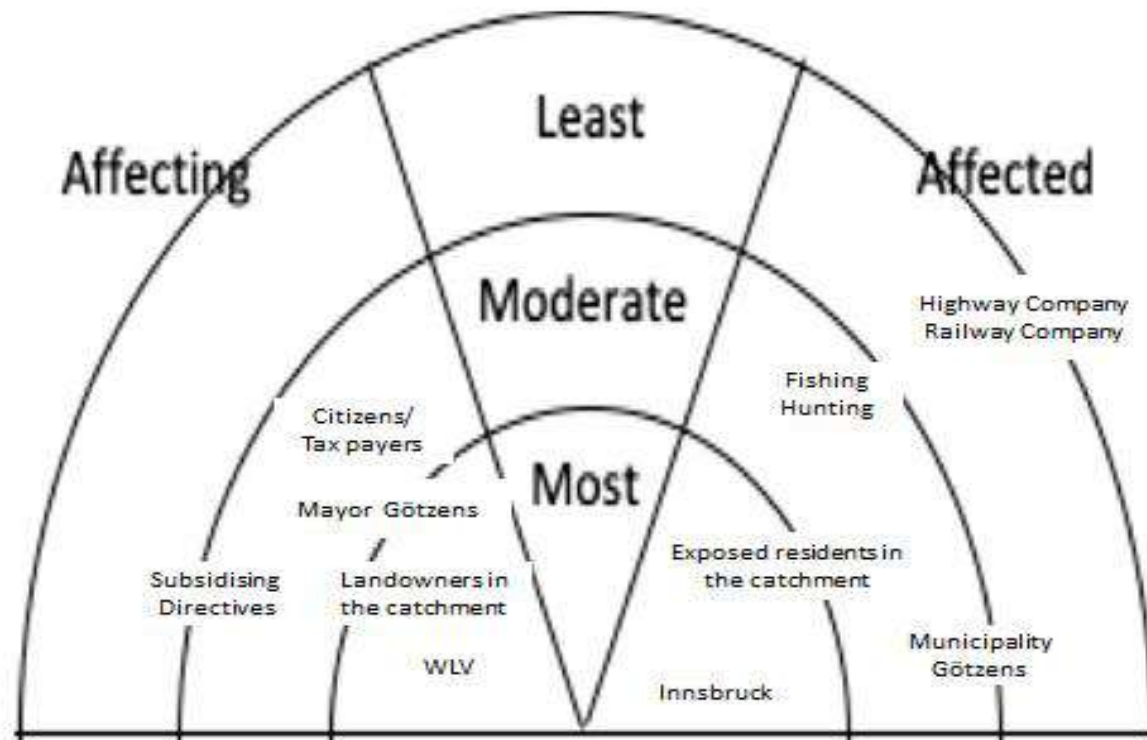


Figure 4.40 Stakeholders identified as affecting and being affected by the NBS, Götzens

The following matrix focuses on mapping stakeholders who are affected by flooding as well as who were influential in the NBS decision-making process (see Figure 4.41).

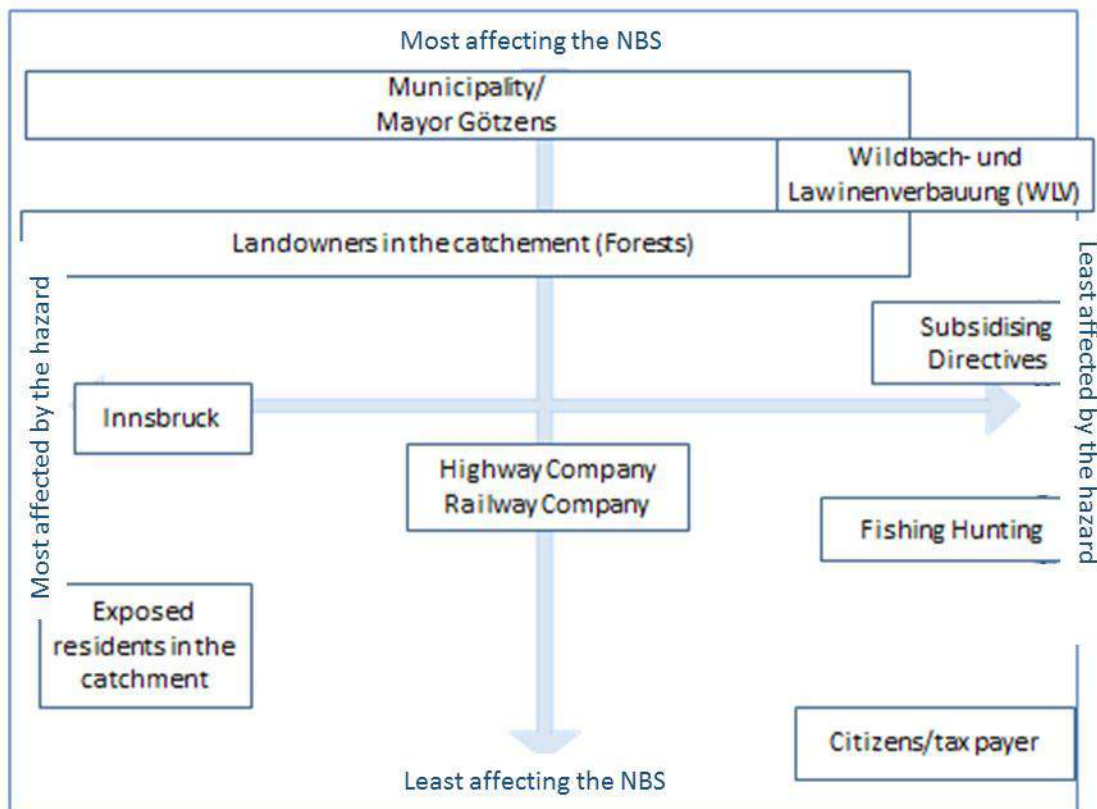


Figure 4.41 Stakeholder Matrix, Götzens

After filling out the matrix of those affected and those with influence we followed up by asking for the extent of stakeholder involvement at different phases of the NBS. We documented how Innsbruck involved which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

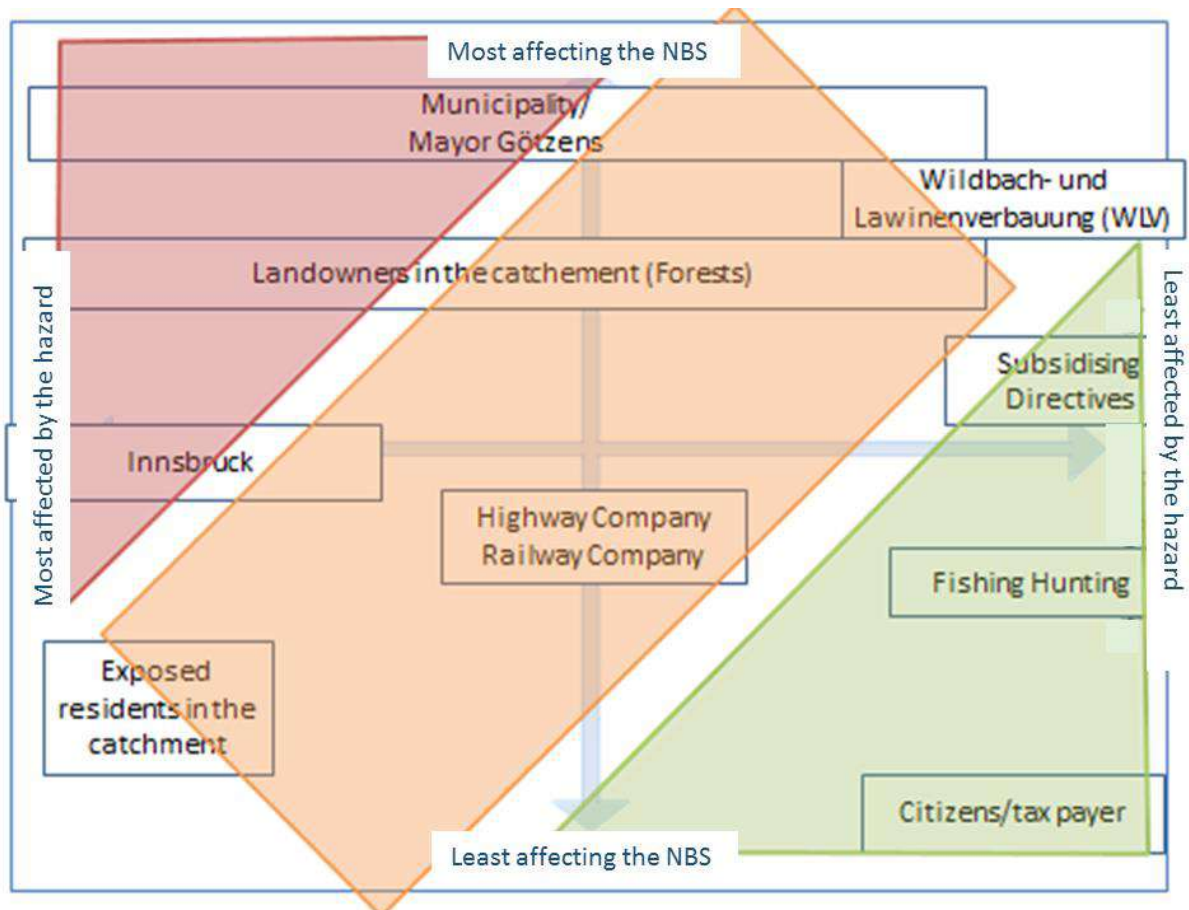
Decision influencing +co-deciding	Municipality of Götzens Landowners in the catchment WLW	Landowners in the catchment WLW	Landowners in the catchment WLW	Landowners in the catchment WLW	
Consultation	Highway company Railway company Innsbruck				
Information provision	Exposed residents				
	Co-assessment	Co-design	Co-implem.	Co-operation co-maintena.	Co-evaluation co-monitoring

Table 4.20 Involvement of stakeholders at different stages of the decision-making process, Götzens

4.6.3 Feedback/ lessons learnt

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

Figure 4.42 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



Legend

Red: co-deciding

Orange: consultation

Green: information provision

Figure 4.42 Stakeholder matrix with recommendations for level of engagement, Götzens

Based on the results of the stakeholder mapping exercise, we can see that the landowners in the catchment, the municipality with the mayor of Götzens and the city of Innsbruck (the stakeholders covered by the red field) are recommended to be involved in co-deciding activities as they were in practice (see Table 4.20). The Austrian Service for Torrent and Avalanche Control (responsible for the measures), the railway and the highway company and the citizens exposed to the risk in the catchment (stakeholders covered with orange) should still be consulted frequently at the stages co-maintenance and co-monitoring to secure the long-term acceptance of this NBS. The other stakeholders like citizens in the catchment in general and interest groups for fishing and hunting (covered with green) should at this stages still be regularly provided with information to avoid the impression of ignorance at a later stage of the co-creation cycle for this NBS. As the implementation of the NBS took place in the 1950s, further research would have to be conducted to learn from the early co-creation stages at this demonstrator site.

4.7 DB-3: Greater Aarhus, Denmark

The demonstration site Egå Engsø (Lake Egå) lies in a low situated and former drained area immediately north of Aarhus. The area now consists of a shallow lake surrounded by meadows. The purpose of establishing the wetland Egå Engsø was to reduce the nitrogen supply to Aarhus Bay, to improve the natural conditions in and around Egådalen (the valley of Egå) and to reduce the flood risk from the river Egå. In addition, the wetland provides the basis for a better recreational utilization of the area (see Figure 4.43).



Figure 4.43 The shallow lake Egå Engsø surrounded by grazed meadows looking southeast. The bay of Aarhus in the background.

The demonstration site Lystrup is a suburb that lies on a hillslope just north of Egå Engsø in the catchment-area of river Egå. Between Lystrup and Egå Engsø the landscape is intersected by a highway that lies as a barrier disturbing the biological and hydrological life.

The **hydro-meteorological risk** at this demonstrator site in Aarhus is heavy rain. An extreme event in summer 2012 flooded the highway and private property next to the suburb of Lystrup. This event made decisions-makers in the city council think about new solutions. **Nature Based Solutions (NBS)** here are understood as smart combinations of green and grey infrastructure. In Lystrup there were 12 small measurements implemented as part of one master plan. In addition the new lake on the other side of the highway is part of the demonstrator, but it has been created mainly to store nitrogen in the course of implementing the EU WFD.

4.7.1 Aarhus's main interests in the RECONNECT project:

The aim of the Aarhus demonstrator is to improve the monitoring of the site to measure effect of NBS on health issues, education, property values, leisure and recreation, public acceptance and trust, biodiversity, property values. The Aarhus demonstrator team hopes to receive inspiration in regards to monitoring from other demonstrators. Next to the arrival of trout in the lake, also other parameters have been monitored around Egå Engsø (e.g. birdlife, terrestrial biodiversity, grazers influence on biodiversity).

4.7.2 The results of the stakeholder mapping exercise

The Magistrat of Aarhus, the city government, had the political will to implement NBS after the heavy rain event in summer 2012. As a result, necessary decisions were made and financing organised. Backed by this political decisions administration staff could develop practical solutions for implementation. Today this support is not there anymore for the monitoring tasks at the demonstrator site.

A core stakeholder is the Aarhus water utility. The city council initially decided to finance and implement the NBS by transferring a grant to the water utility. The water utility is for example negotiating with the farmers and other landowners about land use restrictions, access to private property and compensations. If private landowners allow water retention on their properties, this can be compensated by the water utility (e.g. reduction of connecting fees). The spending of the water utility are supervised by the national utility council, as the water utility is only allowed to finance water management related tasks.

All famers around the Egå Engsø Lake and the residents at the former river basin, agreed to land change and or compensation. The farmers in Lystrup accepted compensation. The national lobby for farmers is in favour of these kinds of deals as usually the individual farmer profits. But some farmers might stay resistant as they perceive their land as holy.

Civil society groups (e.g. fishing club and environmental NGOs) participated in the formal consultation process and the additional participatory processes.

The participatory process followed the existing Aarhus model for citizen involvement (see <https://aarhus.dk/media/6603/policy-for-active-citizenship.pdf>). It was developed and conducted by the local university. Every resident around the NBSs was integrated and the process is perceived that it developed new trust. Solutions like the cattle on the public meadow were found, in the interest of the municipality and the residents at the same time.

Altogether, the following stakeholders were identified in the Aarhus demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in in the NBS (see Table 4.22).

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders / Sponsors	Lobbyists	Mediators	
SH1: Authorities	Road Department	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Green management department	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Environmental agency in Aarhus	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Utility services	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives	City Council	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Local Common advisories (Associations of NGOs) ⁷	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Residents (landowners, private households)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Environmental NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Museum of Archeology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Natural history museum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH4: Private Sector	Farmers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Private business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Consulting Engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Construction firms Entrepreneurs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH5: Academia / Research	University	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

⁷ This stakeholder was added by the Aarhus's cluster after the mapping exercise and is not represented in the matrix or the rainbows.

SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.21 Stakeholder groups and roles in regards to the hazard, Aarhus

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process						
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation	
SH1: Authorities	Road Department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		✓					✓
	Green management department	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓			
	Environmental agency in Aarhus	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	✓	✓	✓		✓	✓	
	Utility services	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓	✓	✓	✓
	Schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							
SH2: Political Representatives	City Council	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
	Local Common advisories (Associations of NGOs) ⁸	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							
SH3: Civil Society	Residents (landowners, private households)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	✓	✓					
	Environmental NGOs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	✓						

⁸ This stakeholder was added by the Aarhus's cluster after the mapping exercise and is not represented in the matrix or the rainbows.

	Museum of Archeology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Natural history museum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓				
SH4: Commercial Sector	Farmers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Private business	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	Consulting Engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	✓	✓				
	Construction firms Entrepreneurs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓			
SH5: Academia / Research	University	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	✓	✓				✓
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.22 Summary of the stakeholder groups and roles for the NBS, Aarhus

The Aarhus cluster agreed on the two rainbow diagrams and a stakeholder matrix in order to answer the questions: *who is affected by and can affect hydro-meteorological hazards* (see Figure 4.44) and *who is affected by and can affect the NBS?* (see Figure 4.45).

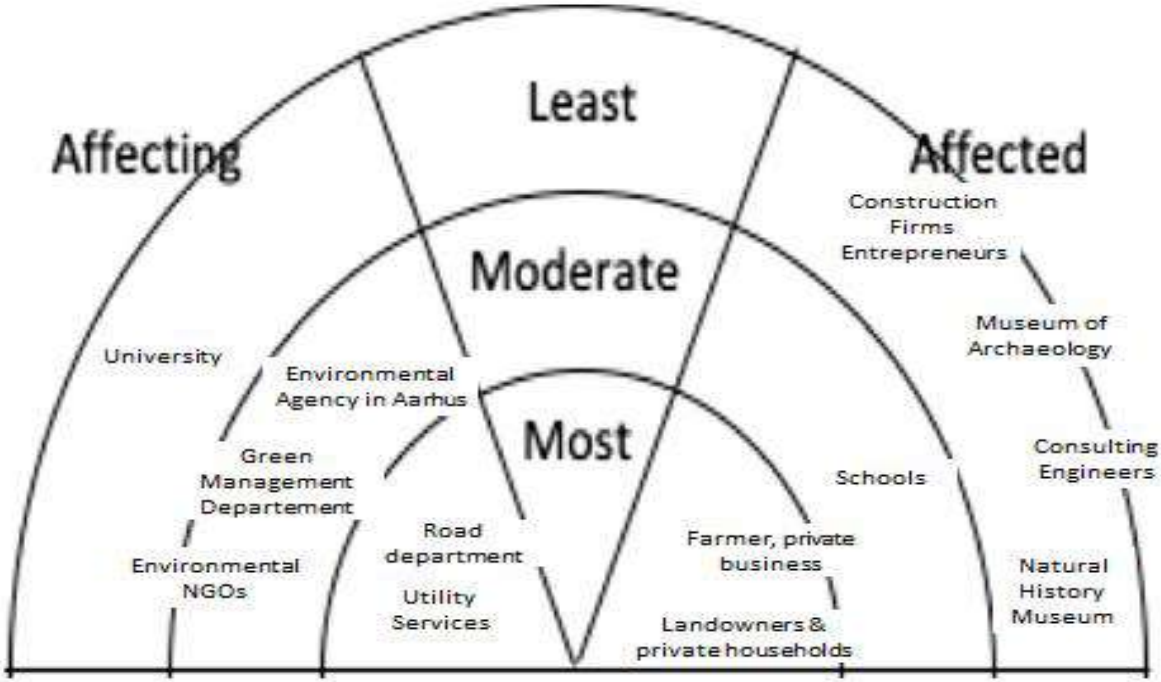


Figure 4.44 Stakeholders identified as affecting and being affected by the hazard, Aarhus



Figure 4.45 Stakeholders identified as affecting and being affected by the NBS, Aarhus

The following matrix focuses on mapping stakeholders who are affected by flooding as well as who were influential in the NBS decision-making process (see Figure 4.46).

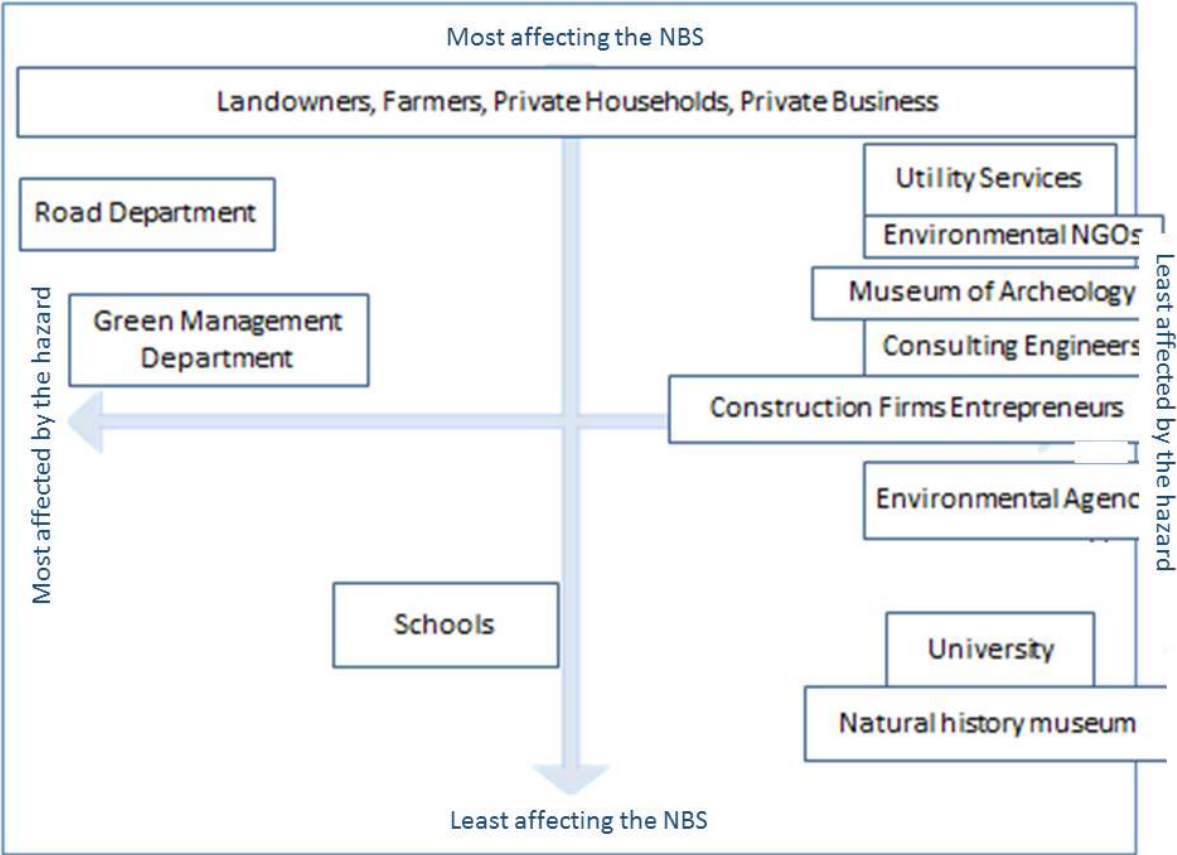


Figure 4.46 Stakeholder Matrix, Aarhus

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Aarhus involved which stakeholders at which stage of the decision-making process (see **Error! Reference source not found.**).

The following exercise aimed to document the ways in which different stakeholders were involved at different stages of the decision-making process (see **Error! Reference source not found.**).

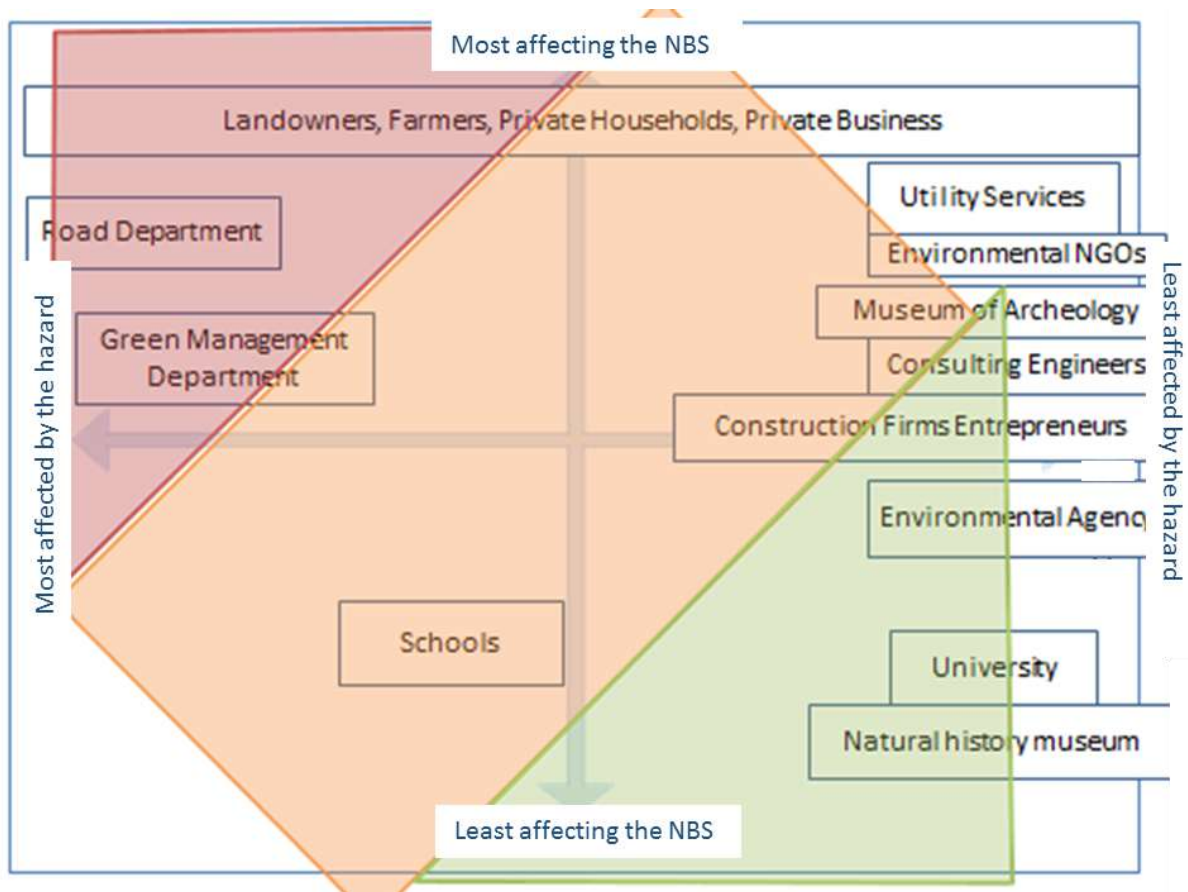
Decision influencing and co-deciding	<ul style="list-style-type: none"> • Utility Services (water) • Environmental Agency in Aarhus 	<ul style="list-style-type: none"> • Utility Services (water) 	<ul style="list-style-type: none"> • Utility Services (water) • Green management department • Road Department 	<ul style="list-style-type: none"> • Utility Services (water) • Green management department • Road Department 	<ul style="list-style-type: none"> • Utility Services (water)
Consultation	<ul style="list-style-type: none"> • Consulting Engineers • University • Green management departmen • Road Department 	<ul style="list-style-type: none"> • Consulting Engineers, University • Environmental Agency in Aarhus • Natural History Museum • Green management department • Road Department, • Landowners & private households • Environmental NGO's • Schools 	<ul style="list-style-type: none"> • Consulting Engineers • Construction Firms • Natural History Museum 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • University • Environmental Agency in Aarhus • Landowners & private households • Environmental NGO's
Information provision	<ul style="list-style-type: none"> • Environmental NGO's • Landowners & private households, 	<ul style="list-style-type: none"> • Environmental NGO's • Landowners & private households, 			<ul style="list-style-type: none"> • Environmental NGO's • Landowners & private households,
	Co-assessment	Co-design	Co-implementation	Co-operation and co-maintenance	Co-evaluation and co-monitoring

Table 4.23 Involvement of stakeholders at different stages of the decision-making process, Aarhus

4.7.3 Feedback/ lessons learnt

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

Figure 4.47 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



Legend

Red: co-deciding

Orange: consultation

Green: information provision

Figure 4.47 Stakeholder matrix with recommendations for level of engagement, Aarhus

Based on the results of the stakeholder mapping exercise, we can see that some but not all of the most influential and the most affected stakeholders covered by the red field were integrated with a co-deciding position into three all stages of co-creation in this NBS. Landowners, private households, farmers and private businesses, also covered with red, have - according to the table - only been informed or sometimes consulted. The water utilities (covered with orange)

was in a co-deciding position at all stages, as it was not perceived as affected by the risk, but influential because it offers important financing mechanism. As Aarhus organised the participatory processes carefully and the acceptance and success of the NBS seems to be very high, it would be interesting to explain differences between theory and practice here more carefully.

4.8 DB-4: Thur River Basin, Switzerland

In 2012 a federal law was installed requesting an increasing emphasis on river revitalization in Switzerland and also specifying the sharing of costs between the federal government and the Kantons. It states that 2/3 of the costs should be covered by the federal government and 1/3 of the costs need to be covered by the Kantons. The federal government prioritizes projects within Switzerland and invests 60 Million Swiss Franks every year on river revitalizations projects for the next 80 years. Currently several projects are implemented along the Thur River.

In RECONNECT the focus is on a demonstration site that is located at the Thur River at the border between the Kanton Thurgau and Zürich (see Figure 4.48). The idea of the project was to combine structural measures with the idea of river restoration to enhance flood protection, restore ecological functions, and reduce erosion of the riverbed (see Figure 4.49). The plan was realized from 1993 to 2002 (Seidl and Stauffacher, 2013⁹).

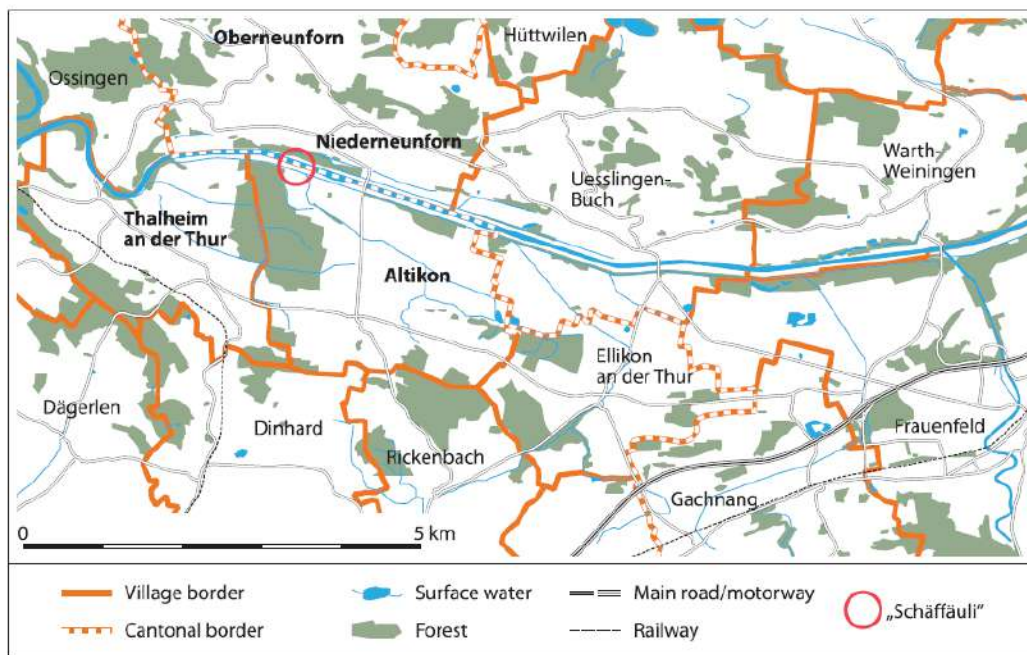


Figure 4.48 Map of the area around the restoration project, including the affected municipalities, Thur River Basin

Source: Seidl and Stauffacher, 2013

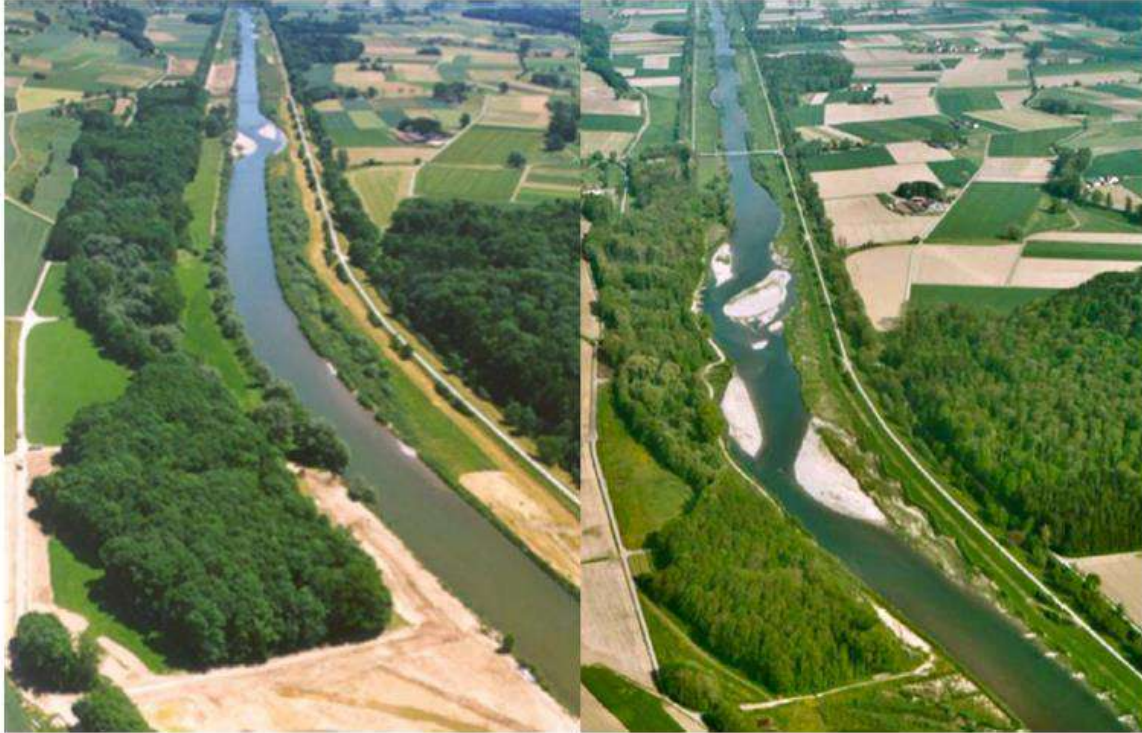


Figure 4.49 Condition at the Thur section (left) before and (right) after the restoration.

Source: : Seidl and Stauffacher, 2013

4.8.1 Thur River Basin's main interests in the RECONNECT project:

Currently, the Thur catchment monitoring, evaluation and flood protection system is under development. It is the main interest of the Thur River Basin team to create an adaptive, self-learning monitoring system that is linked to a real-time distributed model. The goal is to have an optimized flood protection plan with early warning system in place for the hydrological response units which constitute the entire Thur catchment. Beside flood protection, the second overall goal is efficient water distribution during wet conditions in the form of artificial groundwater recharge to account for dry conditions and water shortage.

4.8.2 The results of the stakeholder mapping exercise

It became apparent during the mapping process that stakeholders are no longer affected by hazards. Therefore, the mapping focused on how stakeholders are affected by or affecting the implementation process of the NBS in the demonstration site.

The Kantons are generally responsible for the planning, implementation and maintenance of river restoration projects in Switzerland. They are therefore the organisation with the highest influence in the demonstration site. More specifically, it is the Amt für Umwelt (Office for Environment) in the Kanton Thurgau and the Amt für Abfall, Energie und Luft (Office for Waste, Energy and Air). They prepare the decisions and execute them. They are thus most affected and affecting NBS in the demonstration site.

They also influenced relevant decisions prior to the actual planning phases. Most importantly, the offices explored land tenure titles at the site the river restoration project was supposed to be implemented (i.e. whether land was in the possession of the Kanton or whether it needed to

be bought up or traded with other land parcels). The aim was to anticipate possible resistance at an early stage of the project development. After questions related to land tenure had been clarified, a project plan was developed by the offices, tenders were announced and a pre-project was conducted (its a test-case prior to the actual implementation of the project). In a next step, members of the public were consulted (the so called Vernehmlassung). Therefore, all relevant planning documents are made public and actors potentially affected by an NBS are asked to hand in their concerns within a given time period (e.g. eight weeks).

After this period ended, all concerns need to be considered and balanced. If there are serious concerns, a project needs to be adapted. Public consultation can also result in the cancellation of project.

Most affected by the river restoration is the Municipality of Neunforn (see figure 4.47). The municipality was concerned that part of its water provision would be at risk through the project. One pumping well is located close to the river and a large percentage of the pumped water is infiltrating river water. Fact is that during river restoration, the river is given more space. This means that potentially the infiltrating river water has less time during its passage through the subsurface. In Switzerland, by law the water has to be in the subsurface for at least 10 days before it can be pumped as drinking water. These concerns were also valid, as it turned out after the NBS was implemented. Based on the concerns of the municipality and the actual manifestation of water problems after the NBS was implemented, water provision was diversified and more wells were opened up. This was financially supported by the Kanton. With this solution, the well close to the river is not used during high flow events. This ensures that the water pumped through this well is in the subsurface at least for 10 days.

Farmers were also affected by the project. While farmers next to the NBS were compensated prior to the project and their concerns were already considered in the planning and implementation phase, it turned out after the implementation of the project, that farmers more distanced to the river were also affected, as the river would cut deeper into the landscape as expected putting the land of farmers at risk (i.e. erosion of farm land). Therefore, an additional stone wall was raised to protect the exposed farm land. Underlying the project is thus a learning process. Relevant is also the availability of additional financial resource to take adaptive measures after the implementation of the NBS.

In addition, a riparian forest is located north of the project site. This forest is of “national relevance” and is an important aspect of a protection scheme, which falls under the responsibility of the federal government. Therefore, the responsible office on the level of the Kanton was also consulted in the decision-making process to ensure that the forest would be flooded more regularly as a result of the river restoration project.

Citizens close to the project were affected in different ways. Citizens were positive as the restoration increased the attractiveness of the natural environment and also increased biodiversity (little ring blowers started to settle in the area, which please bird watchers and others). However, an increasing influx of tourists as a result of the restoration of the area, was not so positively received by the local population.

Altogether, the following stakeholders were identified in the Thur River Basin demonstrator site in regards to their roles in the NBS (see **Error! Reference source not found.**).

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role						Stage of the NBS process						
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	Kanton: Office of Environment/Office of Waste, Water, Energy and Air	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Forest Office	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Municipalities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH3: Civil Society	Agricultural landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH4: Commercial Sector		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	ETH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SH7: International and transnational organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.24 Summary of the stakeholder groups and roles for the NBS, Thur River Basin

The Thur River Basin demonstrator agreed on the two rainbow diagrams and a stakeholder matrix in order to answer the questions: *who is affected by and can affect the NBS?* (see Figure 4.50 and Figure 4.51).

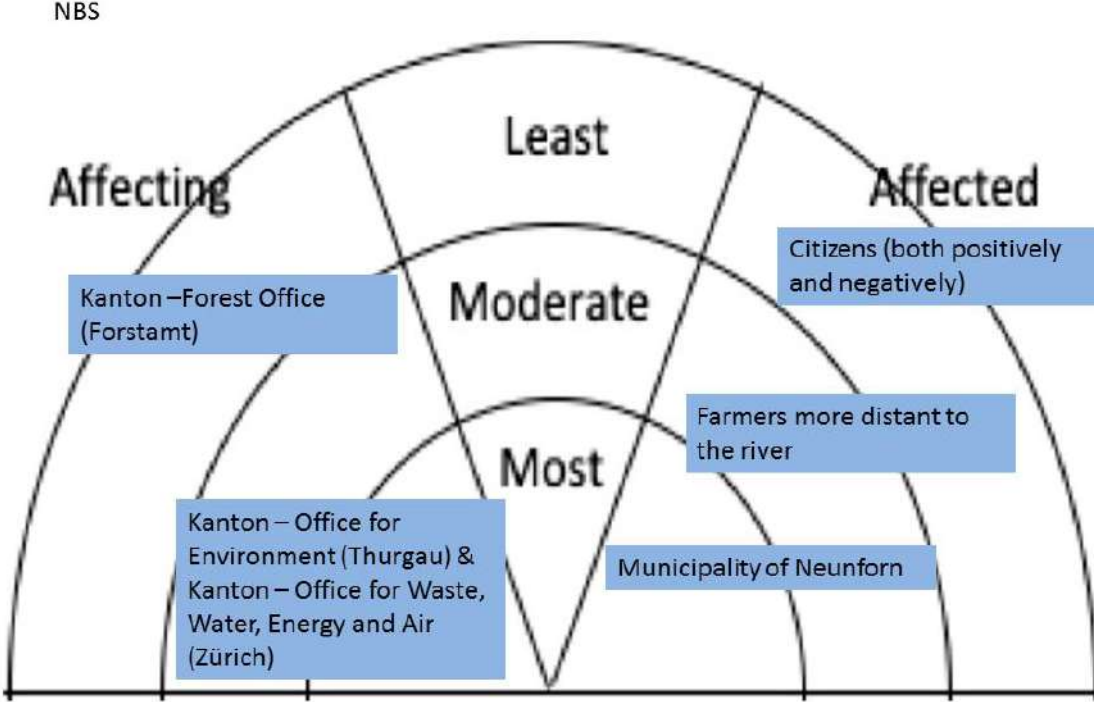


Figure 4.50 Stakeholders identified as affecting and being affected by the NBS, Thur River Basin

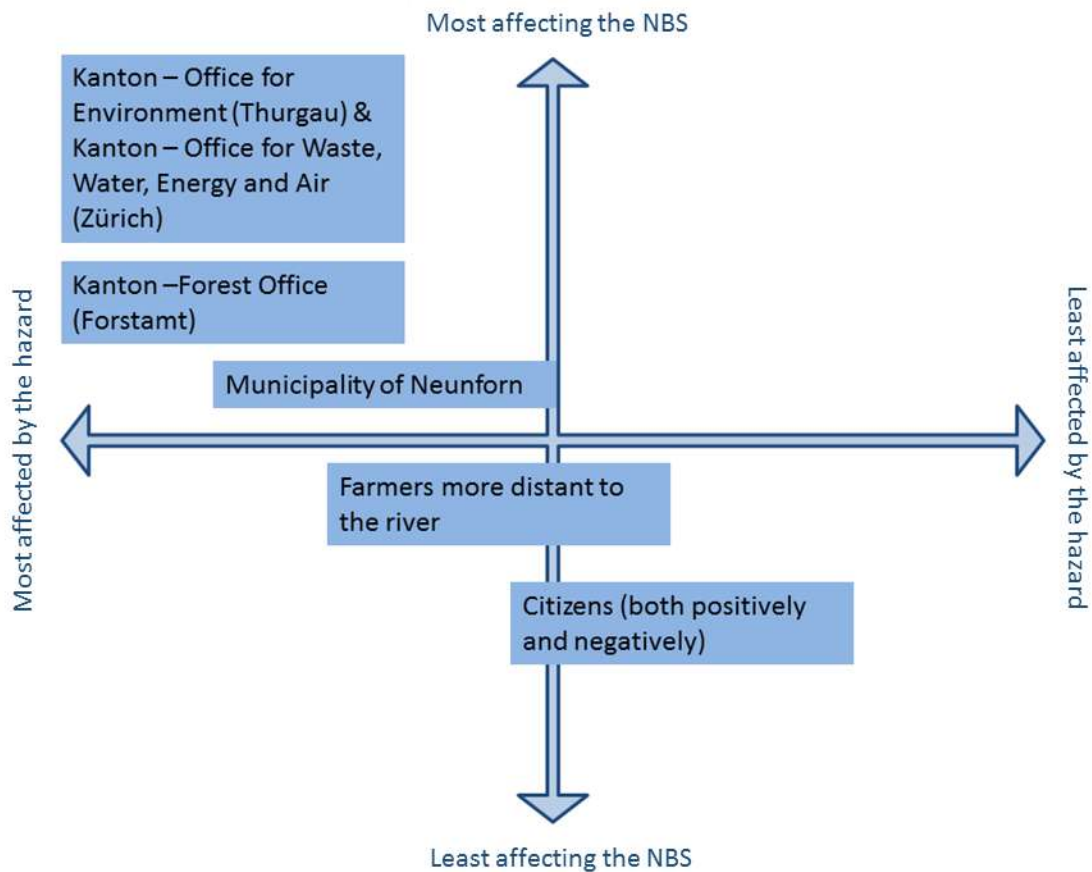


Figure 4.51 Stakeholder Matrix, Thur River Basin

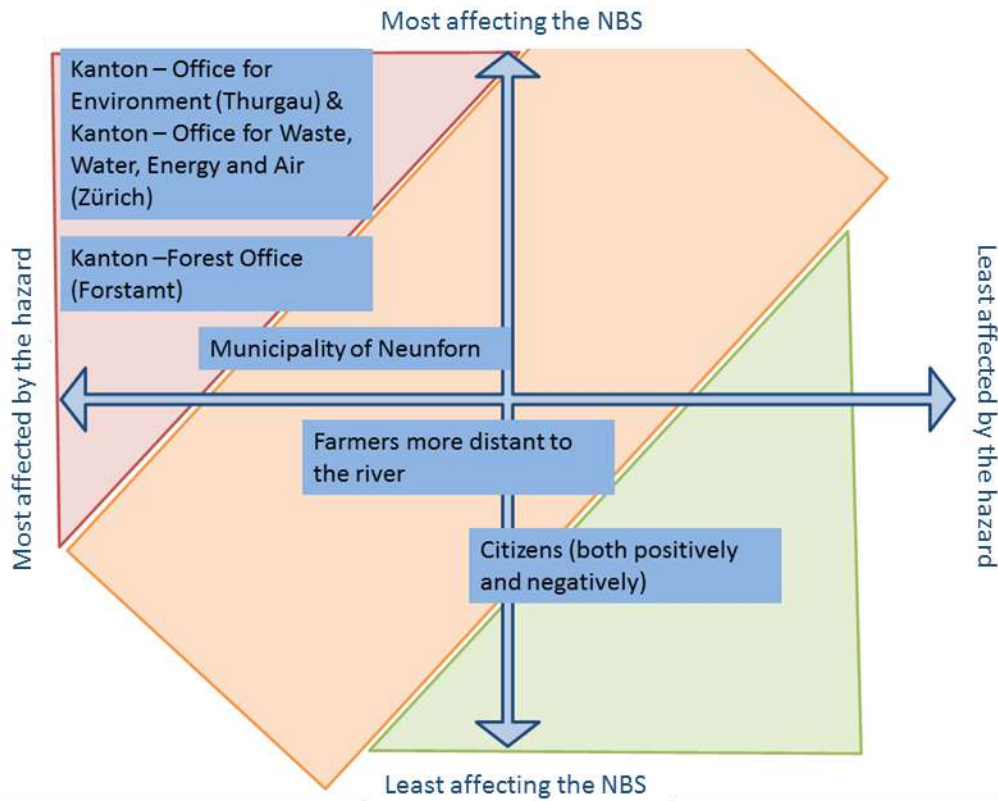
After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Thur River Basin involved which stakeholders at which stage of the decision-making process (see **Error! Reference source not found.**).

Decision influencing and co-deciding	<ul style="list-style-type: none"> Kanton: Office of Environment Kanton: Office for Waster, Water, Energy and Air 	<ul style="list-style-type: none"> Kanton: Office of Environment Kanton: Office for Waster, Water, Energy and Air 	<ul style="list-style-type: none"> Kanton: Office of Environment Kanton: Office for Waster, Water, Energy and Air 	<ul style="list-style-type: none"> Kanton: Office of Environment Kanton: Office for Waster, Water, Energy and Air 	<ul style="list-style-type: none"> Kanton: Office of Environment Kanton: Office for Waster, Water, Energy and Air
Consultation		<ul style="list-style-type: none"> Inhabitants of affected municipalities Forest office Affected farmers 	<ul style="list-style-type: none"> Forest office Affected farmers 	<ul style="list-style-type: none"> Forest office Affected farmers 	
Information provision	<ul style="list-style-type: none"> Communal assembly to inform interested member of the public 				<ul style="list-style-type: none"> Empirical study conducted focusing on the perception of the river restoration project by members of the public
	Co-assessment	Co-design	Co-Implementation	Co-operation and co-maintenance	Co-monitoring and co-evaluation

Table 4.25 Involvement of stakeholders at different stages of the decision-making process, Thur River Basin

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

Figure 4.52 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



Legend:

Red: co-deciding

Orange: consultation

Green: information provision

Figure 4.52 Stakeholder matrix with recommendations for level of engagement, Thur River Basin

4.8.3 Feedback/ lessons learnt

Based on the results of the stakeholder mapping exercise, we can see that there are hardly any differences between theory and practice. Those actors most affected by NBS were also involved in co-decision-making processes during the realisation of the NBS; similarly less affected were at least consulted.

4.9 DB-5: Les Boucholeurs, France

In the aftermath of the storm, Xynthia in 2010, which occurred at night and flooded the village of Les Boucholeurs (around 600 houses) (see Figure 4.53) with a 6 metre storm surge, a group of municipalities (Châtelailon-Plage, Yves, Aix and Fouras) came together to implement the flood risk management strategy, PAPI. The **hydro-meteorological risk** at this demonstrator site is another storm surge event.

Six people died in the storm. This was said to be largely because of the timing of the flood and the security systems in newer houses that automatically locked in response to the flood waters, making it impossible for people to flee. The economic viability of oyster farms, which are a large contributor to the local economy, was threatened as a result of the flood.

In the aftermath of the flood, the state called a state of emergency and residents were compensated. However, the storm surge also resulted in changes to the flood risk zones. A new colour was added to the flood risk maps in addition to red and yellow; that colour was black. All dwellings within the black area were subject to removal. This included housing and the oyster farms. This situation resulted in protests from local residents and farmers. In the end, the protests were successful and the black areas were reclassified as red, which meant that no new dwellings could be built but the existing buildings could remain.

After the storm surge, as part of the **Nature based solution (NBS)**, existing flood walls (see Figure 4.53) were reconstructed and raised. No new walls were built. In addition to the flood walls, the oyster farmers are now considered to provide retention in the case of river and ground water flooding. Retention is also provided by a marshland which is also a Natura 2000 protected reserve. This combination of grey, green and blue measures is seen as the NBS to ensure a more holistic and effective flood protection than using grey solutions alone.

In addition, an influential NGO (SILYCAF) has made a large effort to raise risk awareness of storm surges as well as river and ground water flooding in Les Boucholeurs. It is part of the NBS at this demonstrator site, in order to ensure locals know what they can do to prepare and protect themselves in the event of a storm surge or flood.



Figure 4.53 Picture of Les Boucholeurs

4.9.1 Les Boucholeurs' main interests in the RECONNECT project:

The main interest that Les Boucholeurs has in the RECONNECT project is to learn more about potential indicators for monitoring biodiversity. Stakeholder narratives for all the demonstrators would be interesting. Up-scaling potential of this demonstrator/NBS might exist, with many villages along the European Atlantic coast experiencing similar risks.

4.9.2 The results of the stakeholder mapping exercises

After discussing the context of the Les Boucholeurs Demonstrator site, the first exercise we conducted was an overview of the stakeholders who are involved in the Les Boucholeurs Demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (see **Error! Reference source not found.**). In addition stakeholders were mapped in regards to their ability to affect as well as those who are affected by the hazard (see Figure 4.54) and stakeholder who can affect and who are affected by the NBS (see Figure 4.55).

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders Sponsors	Lobbyists	Mediators	
SH1: Authorities	The Mayor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	State	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	SILYCAF (NGO)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH4: Private Sector		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH5: Academia / Research	Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Table 4.26 Stakeholder groups and roles in regards to the hazard, Les Boucholeurs

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process					
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation
SH1: Authorities	The Mayor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	↙	↙	↙	↙	↙	↙
	The state	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	↙	↙	↙	↙	↙	↙
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		↙	↙	↙		
	SILYCAF (NGO)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	↙	↙	↙		↙	↙
SH4: Commercial Sector		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH5: Academia / Research	Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		↙	↙	↙	↙	↙
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.27 Summary of the stakeholder groups and roles for the NBS, Les Boucholeurs

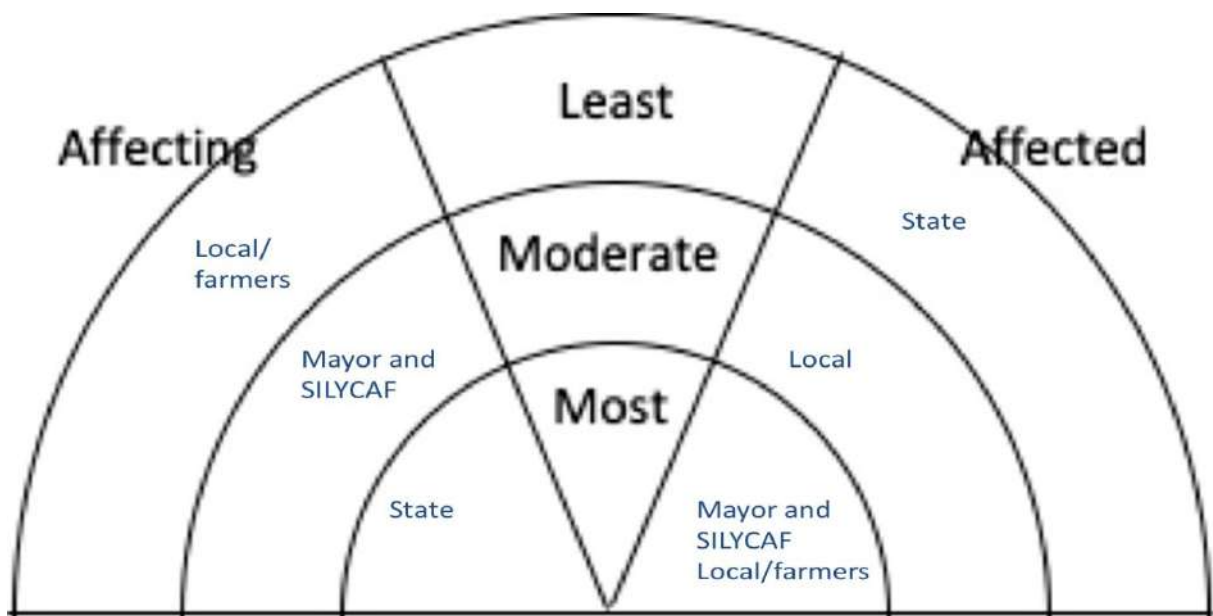


Figure 4.54 Stakeholders identified as affecting and being affected by the hazard, Les Boucholeurs

Figure 4.54 shows that stakeholders who are able to influence the hazard, through their management decisions, are not the same stakeholders who are actually affected when a storm surge/flood occurs. Local stakeholders include residents and farmers, the Mayor of Les Boucholeurs has a lot of political power in this community and is able to influence decision-making processes. The mayor works closely together with the NGO, SILYCAF, and the oyster farmers. The state is responsible to flood risk management and finances the reconstruction of the wall.

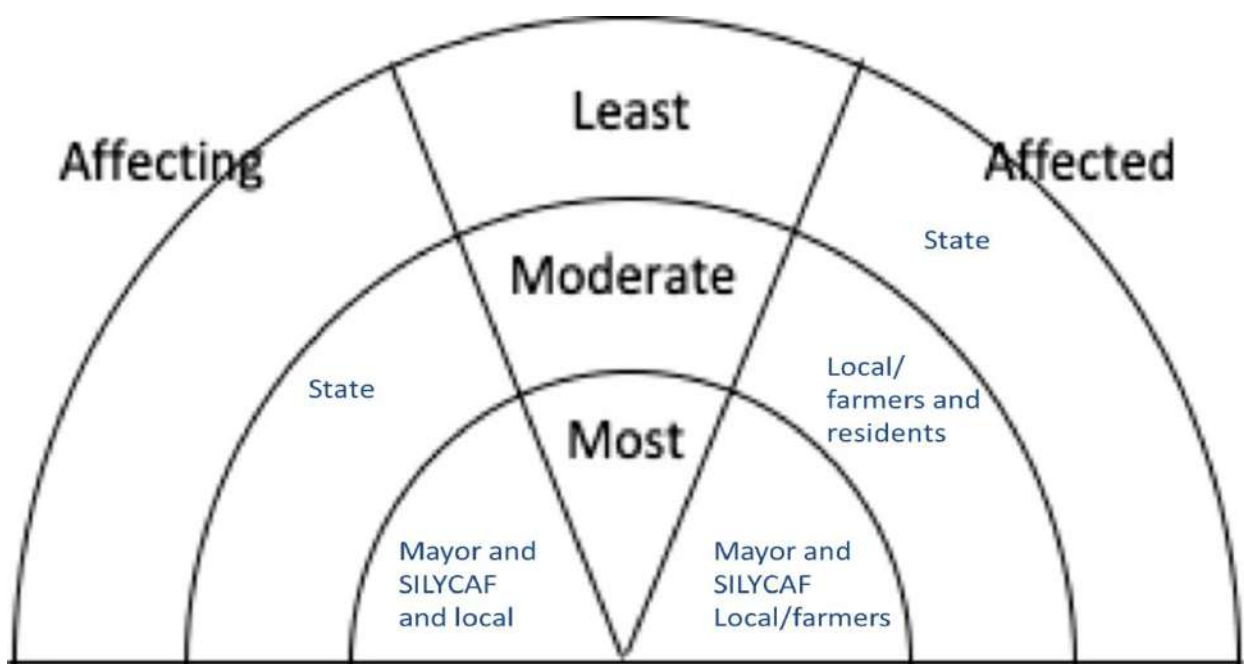


Figure 4.55 Stakeholders identified as affecting and being affected by the NBS, Les Boucholeurs

In contrast to Figure 4.54, Figure 4.55 shows that those who are most influential in regards to decisions related to the NBS are also the same stakeholders who are affected by the NBS. This is because the farmers and residents, for example, were able to influence the decisions related to the flood risk zoning.

After completing this exercise we conducted another which presented the information about influential and affected stakeholders in a slightly different way). We briefly discussed whether we wanted to focus on stakeholders affected by the NBS or stakeholders affected by the hazard and quickly decided that it made sense to focus on the hazard because that is the motivation factor driving the NBS.

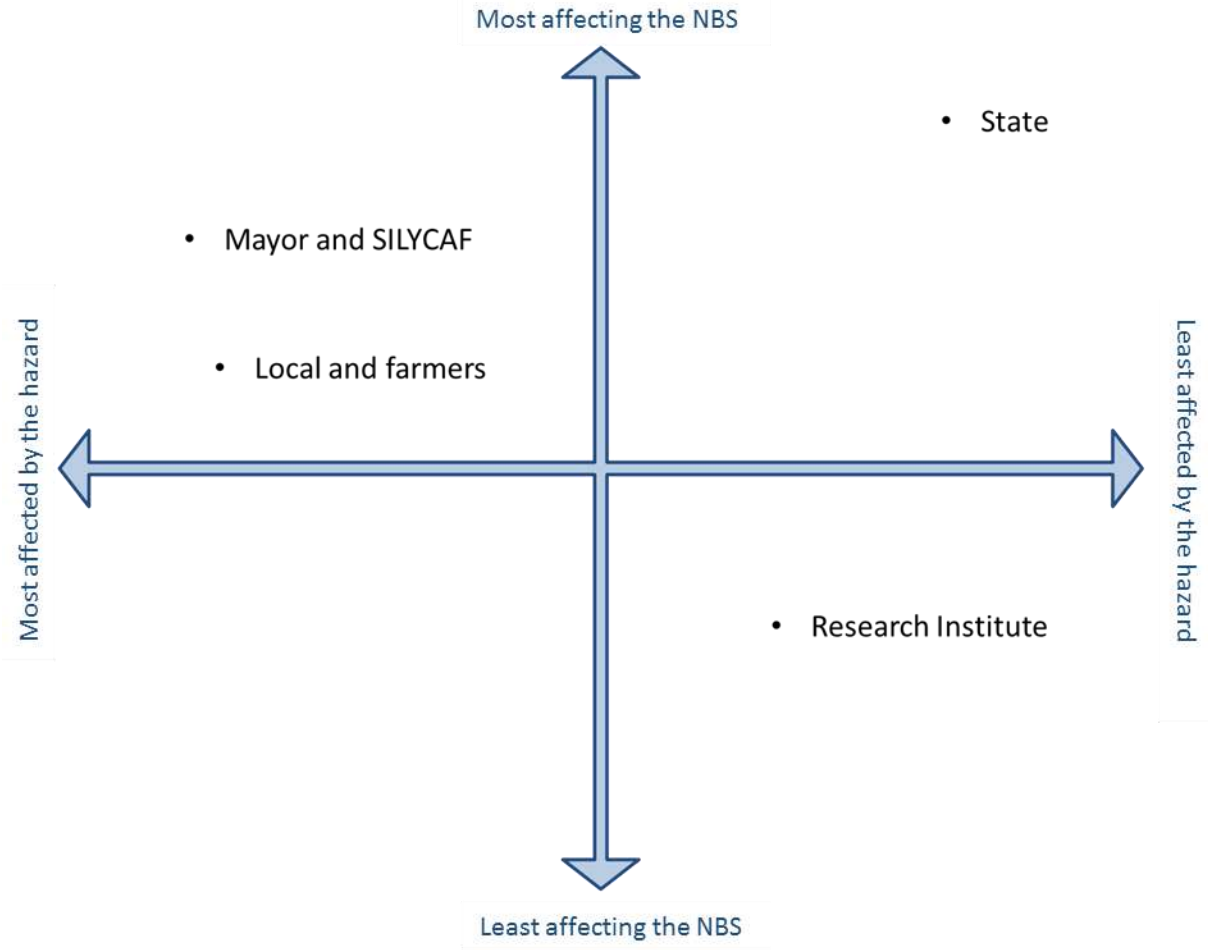


Figure 4.56 Stakeholder Matrix, Les Boucholeurs

After filling out the matrix of those affected by the hazard and those with influence on the NBS decision-making process, we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how Les Boucholeurs involved which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

The following exercise aimed to document the ways in which different stakeholders were involved at different stages of the decision-making process (see **Error! Reference source not found.**).

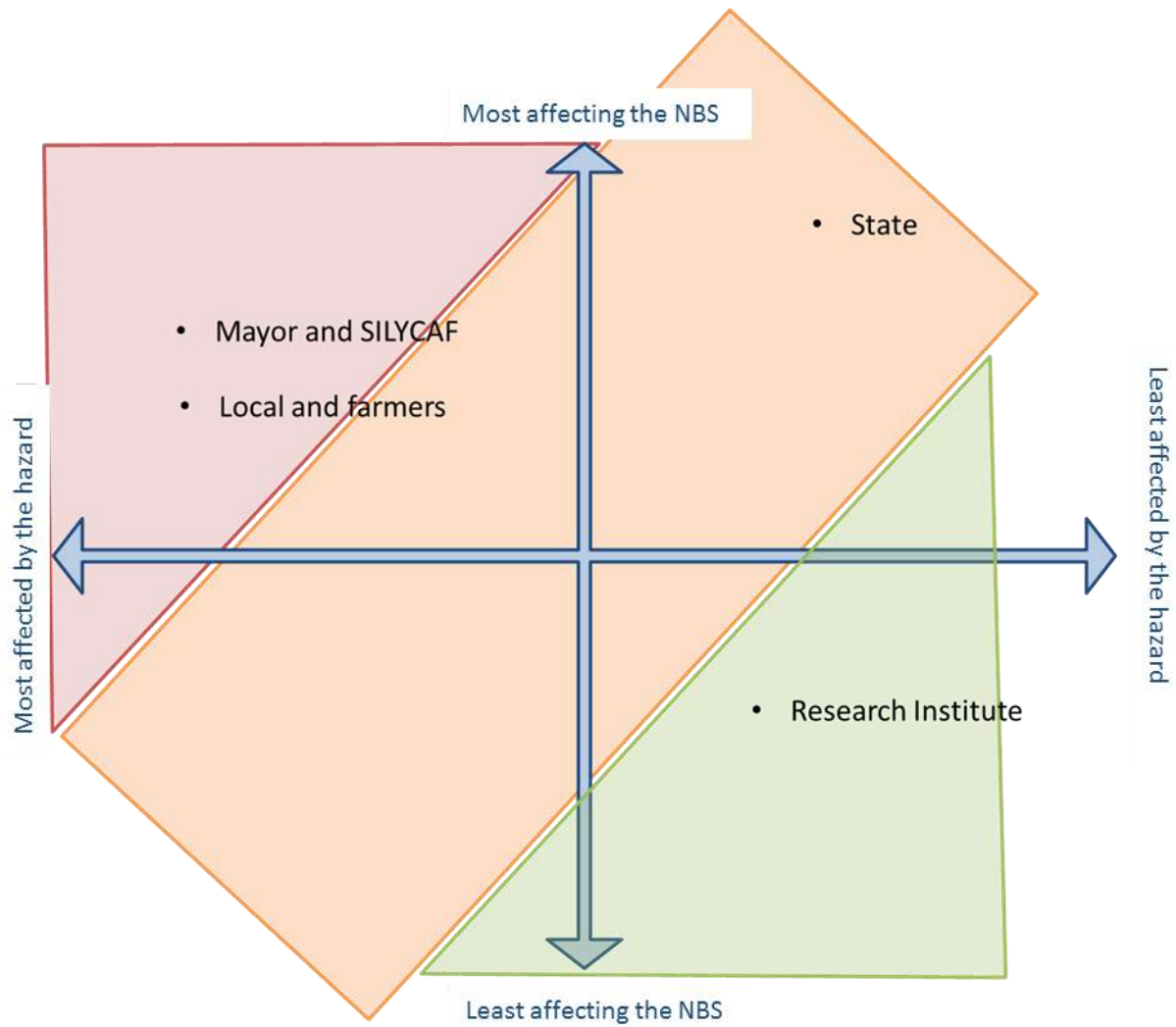
Decision influencing and co-deciding Consultation	State (Mayor) NGO (SILYCAF)	State (Mayor)	State (Mayor)	State (Mayor)	Research
	State provides permission and financial support and permission and consulted with locals and farmers	State provides permission and financial support and permission and consulted with locals and farmers	State provides permission and financial support and permission with locals and farmers	Locals (responsible for closing the flood gates during a flood)	
Information provision	Locals	Locals			Research (providing the result to the mayor and SILYCAF)
	Co-assessment	Co-design	Co-implementation	Co-operation and co-maintenance	Co-evaluation and co-monitoring

Table 4.28 Involvement of stakeholders at different stages of the decision-making process, Les Boucholeurs

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

4.9.3 Feedback/ lessons learnt

Figure 4.57 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



Legend

Red: co-deciding

Orange: consultation

Green: information provision

Figure 4.57 Stakeholder matrix with recommendations for level of engagement, Les Boucholeurs

Based on the results of the stakeholder mapping exercise, we can see that the positioning of the stakeholders in the matrix and the engagement of the stakeholders at each stage of the decision-making process is in line with the suggestion of how to engage stakeholders in order to avoid conflict and delays.

4.10 DB-6: Var River Basin, France

The demonstration sites are located along the Var River in the Southern French city of Nice (see Figure 4.58).



Figure 4.58 Picture of Var Éco-Vallée

The Var valley is exposed to several types of natural risks -floods, forest fires, earth quakes, landslides. The **hydro-meteorological risk** is taken into account and addressed with a range of preventive measures. A flood prevention plan (PPRI) applies to the whole Var valley. Two plans for flood prevention (PAPI) are carried out. For the sensitive zone situated behind protective dikes, an in-depth study phase (schéma de cohérence hydraulique et d'aménagement d'ensemble (SCHAE)) launched by the Public Planning Institution (EPA) to integrate flood risk awareness into urban planning. There are eco-exemplary guidelines and other environmental indicators to ensure the project's environmental foundation.

Nature Based Solutions (NBS) and other flood reduction measures at the Var are conducted downstream at the Ecovalley plains. According to our mapping exercise, there are no stakeholders or measurements upstream who/which a reducing or increasing the risk of flooding. The whole catchment of the Var is managed by the administration of the Department (e.g. dike construction) (the water board on river basin scale is responsible for the whole basin of Rhone).

4.10.1 Var's main interests in the RECONNECT project:

The Polytech Nice-Sofia Antipolis is supporting the NBS by monitoring ground water levels and collecting data for a flood resilience indicator. University of Nice would be interested in monitoring co-benefits for biodiversity around the demonstration site. For Demonstrator B Nice a NBS can be a combination of grey, blue and green infrastructure, e.g. "green dikes". At demonstrator Var the river runs freely in between dikes most of the year and creates habitats untouched by humans for decades. As water is standing or slower in summer problems with mosquitoes arise for residents.

4.10.2 The results of the stakeholder mapping exercises

After discussing the context of the Var Demonstrator site, the first exercise we conducted was an overview of the stakeholders who are involved in the Var Demonstrator site in regards to their roles in the management of the hazard(s) (see **Error! Reference source not found.**) as well as their role in the NBS (see **Error! Reference source not found.**).

Nice is the capital of Departement Alpes-Maritimes. The municipality of Nice and neighbouring 47 municipalities are part of the metropolitan region Métropole Nice Côte d'Azur.

The construction of the “Var Éco-Vallée”, a completely new, so-called “smart” suburb in the West of Nice is a flagship project of the national government in Paris. The status of “Operation of National Interest” highlights the State’s commitment to the project, which is one of the largest OIN’s (Opération d’Intérêt National) in France (see homepage Nice ecovalley <http://www.ecovallee-plaineduvar.fr>). Major decisions on financial resources are made on the national state level.

The mayors of fifteen municipalities (Bonson, Carros, Castagniers, Colomars, Gattières, Gillette, Levens, Le Broc, La Gaude, La Roquette-sur-Var, Nice, Saint-Blaise, Saint-Jeannet, Saint-Laurent du Var and Saint-Martin du Var) come together within a Mayors' Council. The EPA offers its expertise to the communes whose projects are included in the Eco-Vallée.

Following the Niceecovalley-Homepage the flagship project has a “shared governance structure and a collaborative decision making process”. The governing body, established by the national government, is the “Administrative Council of the EPA Plaine du Var”. It consists of state representatives, one of the municipalities, and one for partner institutions (CCI, University) and the Caisse des dépôts and consignment (provider of funding).

In addition to the governance of the Niceecosvallee there is living and politicised tradition of formal consultation in these kinds of large infrastructure project in France. So many specifics of the urban development have been commented by the citizens of Nice and the metropolitan region.

Stakeholder Group	Name, Position and Organisation	Role							
		Decision-maker	Implementers	Coordinators	Expert Knowledge	Funders Sponsors	Lobbyists	Mediators	
SH1: Authorities	The State	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Municipality Nice	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Other municipalities/communes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	EPA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Financial institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

SH4: Private Sector		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH5: Academia / Research	Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 4.29 Stakeholder groups and roles in regards to the hazard, Var Éco-Vallée

Stakeholder Group (SH)	Name, Position (if relevant) and Organization (if relevant)	Role							Stage of the NBS process						
		Decision-makers	Implementers	Coordinators	Providers of expert knowledge	Funders/Sponsors	Lobbyists	Mediators	Assessment and planning	Design	Implementation	Operation & Maintenance	Monitoring	Evaluation	
SH1: Authorities	The State	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓						
	Municipality Nice	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓	✓	✓	✓
	Other municipalities/communes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓	✓	✓	✓
	EPA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	✓	✓	✓	✓	✓	✓	✓
	Financial institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			✓				
SH2: Political Representatives		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
SH3: Civil Society	Citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		✓	✓	✓			
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							

		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH4: Commercial Sector		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH5: Academia / Research	Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		✓	✓	✓	✓	✓
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH6: Media		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
SH7: International and transnational organizations		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Table 4.30 Summary of the stakeholder groups and roles for the NBS, Var Éco-Vallée

In a next step, we discussed the stakeholders who are able to affect as well as those who are affected by the hazard (see Figure 4.59) and stakeholder who can affect and who are affected by the NBS (see Figure 4.60).

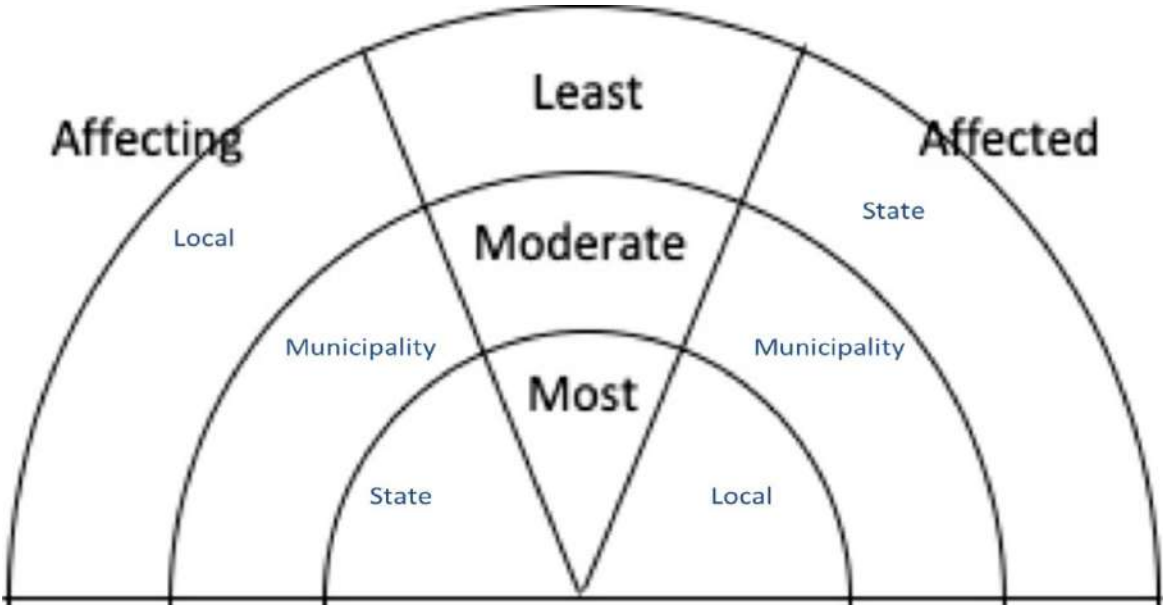


Figure 4.59 Stakeholders identified as affecting and being affected by the hazard , Var Éco-Vallée

Figure 4.59 shows that in regards to the hazard, those who have influence over the management of floods are not those who are affected. Local stakeholders include residents and state stakeholders include the members of the Administrative council of the EPA Plaine du Var.

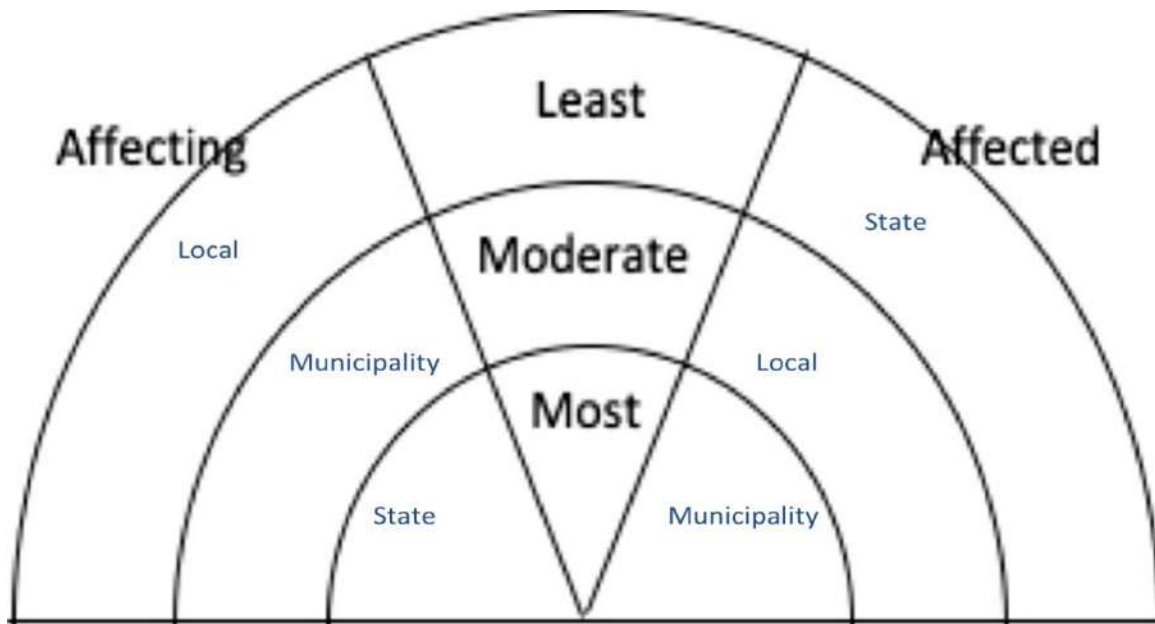


Figure 4.60 Stakeholders identified as affecting and being affected by the NBS, Var Éco-Vallée

Figure 4.60 shows that although the state has a large influence on the outcomes of decisions related to NBS, it is the municipality that is most affected (both positively and negatively) by the decisions that are made.

After completing this exercise we conducted another which presented the information about influential and affected stakeholders in a slightly different way (see Figure 4.61). We briefly discussed whether we wanted to focus on stakeholders affected by the NBS or stakeholders affected by the hazard and quickly decided that it made sense to focus on the hazard because that is the motivation factor driving the NBS.

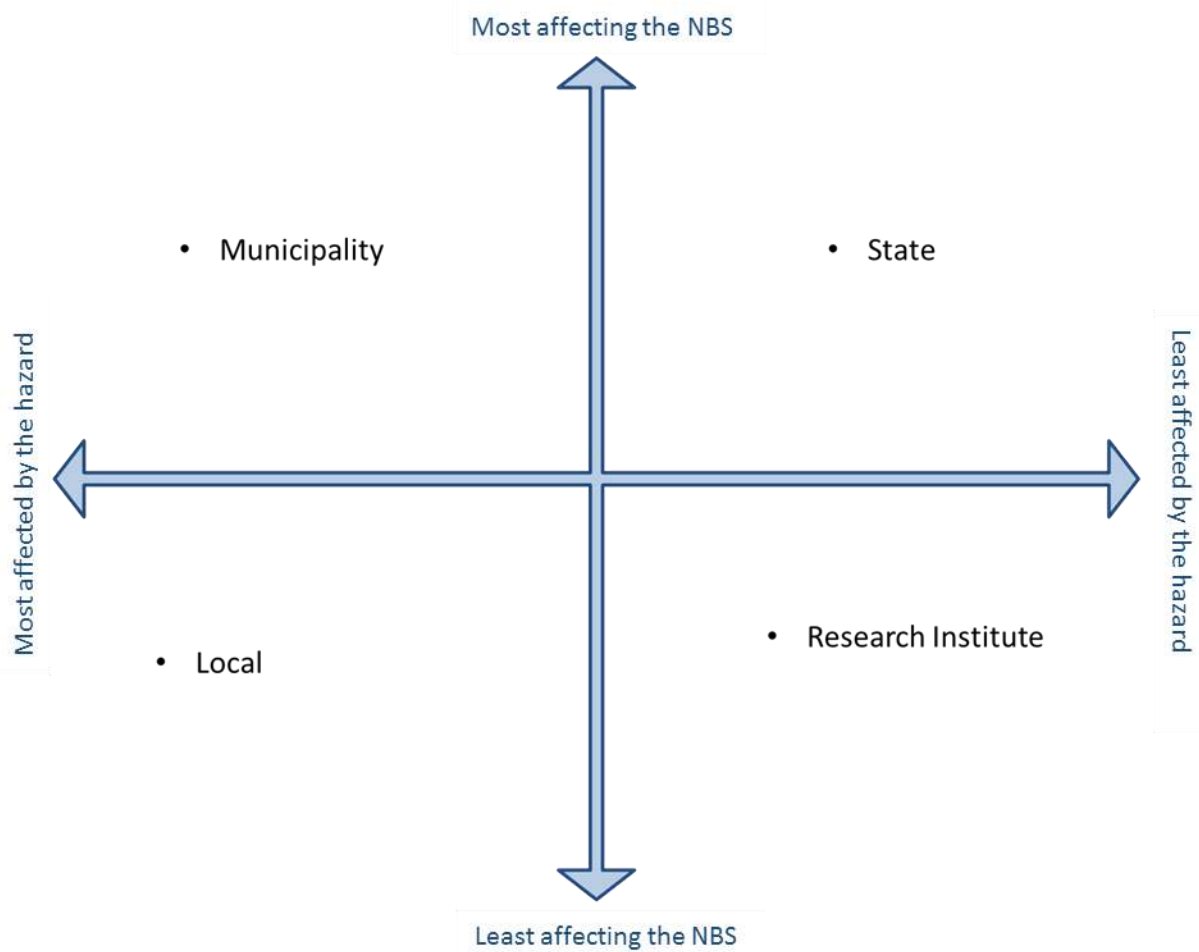


Figure 4.61 Stakeholder Matrix, Var Éco-Vallée

After filling out the matrix of those affected and those with influence we moved on to discuss the extent of stakeholder involvement at different phases of the NBS. We documented how IJssel involved which stakeholders at which stage of the decision-making process in a table (see **Error! Reference source not found.**).

The following exercise aimed to document the ways in which different stakeholders were involved at different stages of the decision-making process (see **Error! Reference source not found.**).

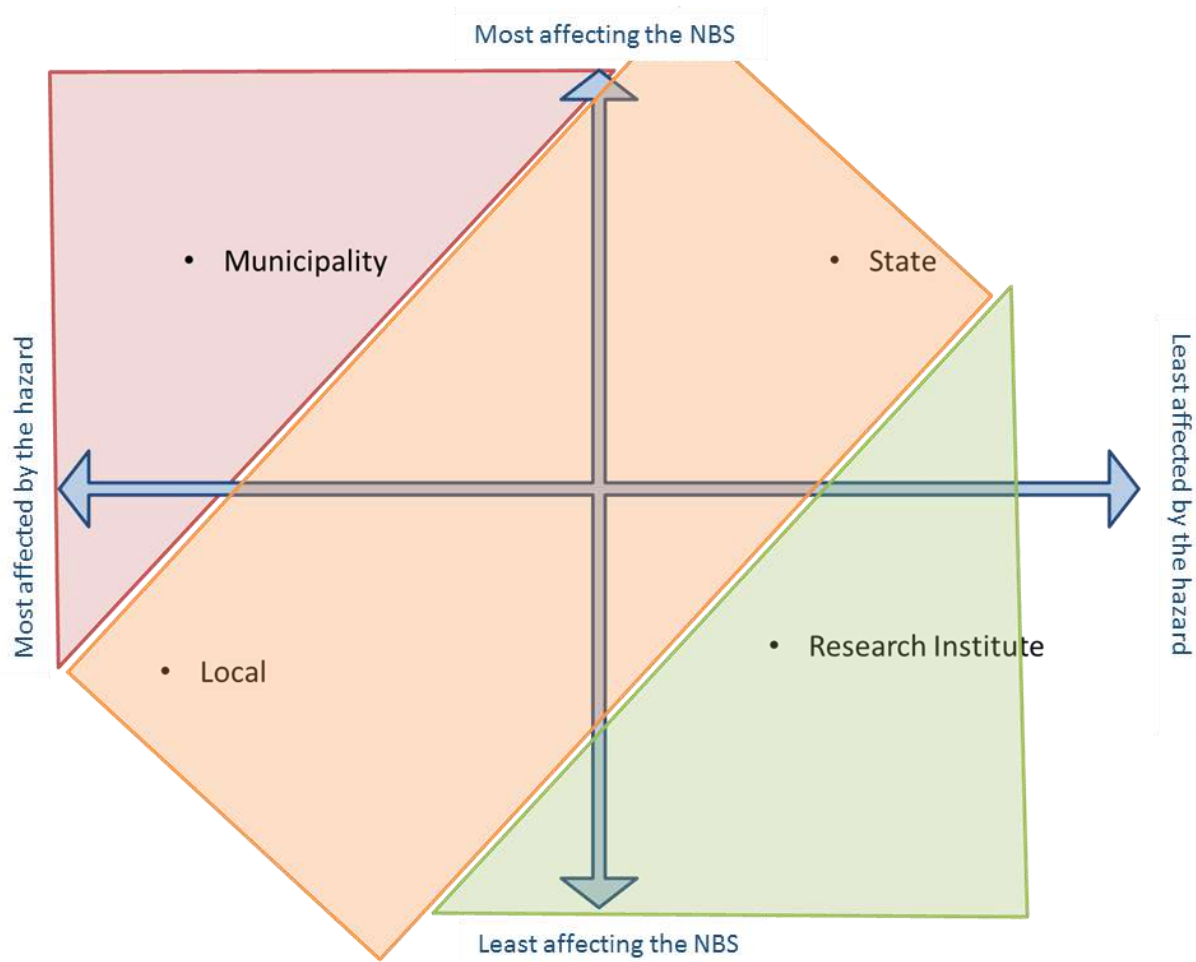
Decision influencing and co-deciding	State	State	State (financial institute) and municipality (EPA through the regulation of construction)	Municipality (EPA)	Municipality (EPA)
Consultation	Municipality	Municipality	Municipality (EPA) consulted with locals	Municipality (EPA) consulted with locals	Municipality (EPA) consulted with Research
Information provision	Municipality provided information to locals	Municipality provided information to locals	Municipality (EPA) and locals	Municipality (EPA) and locals	
	Co-assessment	Co-design	Co-implementation	Co-operation and co-maintenance	Co-evaluation and co-monitoring

Table 4.31 Involvement of stakeholders at different stages of the decision-making process, Var Éco-Vallée

The aim of getting members of the Demonstrator site to fill out the Stakeholder Matrix and Stakeholder Involvement Table was to be able to provide feedback which links the matrix to the table as well as the theory. As a result, we can assess whether the stakeholders that could be involved in the decision-making process, in order to avoid a strengthening of vulnerabilities, conflict and delays, are in fact intended to being the decision-making process.

4.10.3 Feedback/ lessons learnt

Figure 4.62 provides a suggestion for which stakeholders should be involved in co-deciding, consultation and information provision.



Legend

Red: co-deciding

Orange: consultation

Green: information provision

Figure 4.62 Stakeholder matrix with recommendations for level of engagement, Var Éco-Vallée

Based on the results of the stakeholder mapping exercise, we can see that the positioning of the stakeholders in the matrix and the engagement of the stakeholders at each stage of the decision-making process is in line with the suggestion of how to engage stakeholders in order to avoid conflict and delays.

5 Next steps

This document provides the basis for the demand and supply analysis (please refer to deliverable D2.2). Based on the information presented here, we are able to identify the knowledge gaps and expertise that demonstrators have in regards to stakeholder engagement in NBS processes. In a next step, these results will be analysed and commonalities in interests and knowledge gaps, as well as expertise will be identified not just for stakeholder engagement and governance issues but also for each stage of the NBS process (see D2.4. and D2.5.). Together with demonstrators, approaches to collaboration, knowledge sharing and upscaling will be identified in order to ensure that demonstrators are able to learn from each other and draw from state-of-the-art scientific knowledge about how to assess, design, implement, maintain, monitor and evaluate the NBS in a co-creative way.

References

- Arbter, K., Handler, M., Purker, E., Tappeiner, G., Trattnigg, R. (2007): The Public Participation Manual: Shaping the Future Together. Vienna: Austrian Ministry of Environment & ÖGUT.9.
- Arnstein, Sherry R. 1969. "A Ladder Of Citizen Participation." *Journal of the American Institute of Planners* 35 (4): 216–24. <https://doi.org/10.1080/01944366908977225>.
- Basco-Carrera, Laura, Andrew Warren, Eelco van Beek, Andreja Jonoski, and Alessio Giardino. 2017. "Collaborative Modelling or Participatory Modelling? A Framework for Water Resources Management." *Environmental Modelling & Software* 91 (May): 95–110. <https://doi.org/10.1016/j.envsoft.2017.01.014>.
- Begg, C. (2018) Power, responsibility and justice: a review of local stakeholder participation in European flood risk management. *Local Environment* 23, 383-397.
- Begg, C., Luther, J., Kuhlicke, C., & Steinführer, A. (2011). 3rd CapHaz-Net Regional Hazard Workshop: Social Capacity Building for River Floods, WP9, CapHaz-Net, Leipzig: Helmholtz Centre for Environmental Research.
- Birkmann, Jörn, and Ben Wisner. 2006. *Measuring the Un-Measurable: The Challenge of Vulnerability ; Report of the Second Meeting of the UNU-EHS Expert Working Group on Measuring Vulnerability, 12 - 14 October 2005, Bonn, Germany*. Studies of the University: Research, Counsel, Education, No. 5. Bonn: UNU-EHS.
- Brikké, F. 2000. "Operation and Maintenance of Rural Water Supply and Sanitation Systems. A Training Package for Managers and Planners." Malta: IRC International Water and Sanitation Centre and World Health Organisation.
- Burgers, P., and A. Farida. 2015. "Community Management for Agro-Reforestation Under a Voluntary Carbon Market Scheme in West Sumatra." In *Co-Investment in Ecosystem Services: Global Lessons from Payment and Incentive Schemes*. World Agroforestry Centre.
- Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016). *Nature-based Solutions to address global societal challenges*. Gland, Switzerland: IUCN. xiii + 97pp.
- Forrester, John, Åsa Gerger Swartling, and Kate Lonsdale. 2008. "Stakeholder Engagement and the Work of SEI: An Empirical Study." SEI Working Paper. Stockholm: SEI. https://mediamanager.sei.org/documents/Publications/Policy-institutions/stakeholder_engagement_workof_sei.pdf.
- Kenyon, W, Hanley, N., Nevin, C. (2001): Citizens' juries: an aid to environmental valuation? *Environment and Planning C* 19, 557-566.
- Malcolm, J. 2015. "Criteria of Meaningful Stakeholder Inclusion in Internet Governance." *Internet Policy Review* 4 (4). <https://policyreview.info/articles/analysis/criteria-meaningful-stakeholder-inclusion-internet-governance>.

- Mostert, Erik. 2003. "The Challenge of Public Participation." *Water Policy* 5 (2): 179–97. <https://doi.org/10.2166/wp.2003.0011>.
- Nesshöver, Carsten, Timo Assmuth, Katherine N. Irvine, Graciela M. Rusch, Kerry A. Waylen, Ben Delbaere, Dagmar Haase, et al. 2017. "The Science, Policy and Practice of Nature-Based Solutions: An Interdisciplinary Perspective." *Science of The Total Environment* 579 (February): 1215–27. <https://doi.org/10.1016/j.scitotenv.2016.11.106>.
- Olsen, Nathalie, and Joshua Bishop. 2009. *The Financial Costs of REDD: Evidence from Brazil and Indonesia*. Gland: IUCN. <https://portals.iucn.org/library/sites/library/files/documents/2009-047.pdf>.
- Pahl-Wostl, C., Becker, G., Knieper, C., & Sendzimir, J. (2013). How multilevel societal learning processes facilitate transformative change: A comparative case study analysis on flood management. *Ecology and Society*, 18(4), 58.
- Pelling, Mark. 2011. *Adaptation to Climate Change: From Resilience to Transformation*. Oxon & New York: Routledge.
- PKRR (Planologische Kernbeslissing Ruimte voor de Rivier). (2006). *Spatial planning key decision: Room for the River. Explanatory memorandum*. Retrieved from <http://www.ruimtevoorderivier.nl/media/21966/pkb%204%20nota%20totaal%20eng-22.pdf>
- Quarantelli, E. L., ed. 1998. *What Is a Disaster? Perspectives on the Question*. London : New York: Routledge.
- Segnestam, Lisa. 2015. "Interactions in Hazard Management Policies: The Case of Drought in Nicaragua, 1976–2010." *Disasters* 39 (4): 715–37. <https://doi.org/10.1111/disa.12121>.
- Seidl, R., Stauffacher, M. (2013) Evaluation of river restoration by local residents. *WATER RESOURCES RESEARCH* 49, 7077-7087.
- UNISDR (United Nations Office for Disaster Risk Reduction). 2017. *Terminology*. Retrived from <https://www.unisdr.org/we/inform/terminology#letter-v>
- van der Nat, A, P. Vellinga, R. Leemans, and E. van Slobbe. 2016. "Ranking Coastal Flood Protection Designs from Engineered to Nature-Based." *Ecological Engineering* 87 (February): 80–90. <https://doi.org/10.1016/j.ecoleng.2015.11.007>.
- Zingraff-Hamed, A., Hüesker, F., Lupp, G., Begg, C., Huang, J., Oen, A., Vojinovic, Z., Kuhlicke, C., Pauleit, S. (2020) Stakeholder Mapping to Co-Create Nature-Based Solutions: Who Is on Board? *Sustainability* 12, 8625. <https://www.mdpi.com/2071-1040/12/20/8625>