First test of the portfolio of ideal types in some exemplars

Torsten Krause[a] and Lennart Olsson[a] with input from Anja Liski[b], Núria Marbà[c] and Adeline Bierry[d]

[a] Lund University; [b] University of Edinburgh; [c] Institut Mediterrani d'Estudis Avançats; [d] L'aboratoire d'Ecologie Alpine, CNRS

Ecosystem Science for Policy & Practice

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement number 308393.

Prepared under contract from the European Commission
Project reference: 308393
Collaborative project
FP7 Environment

Project acronym: **OPERAs**
Project full title: **Operational Potential of Ecosystem Research Applications**
Start of the project: 1 December 2012
Duration: 54 months
Project coordinator: The University of Edinburgh
Project website: operas-project.eu

Title: *First test of the portfolio of ideal types in some exemplars*
Milestone number: 3.14
Nature of the deliverable: Report
Work package responsible: WP3
Partner responsible: ULUND
Other partners involved: UEDIN (Anja Helena Liski); IMEDEA (Núria Marbà); L'aboratoire d'Ecologie Alpine – CNRS (Adeline Bierry)

Version	Status	Date	Authors
1.0	Draft	January 2016	Torsten Krause & Lennart Olsson - Lund University Centre for Sustainability Studies

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement number 308393.

Contents

List of Tables

1. Introduction

Three years into the OPERAs project we have strengthened our collaboration with a number of exemplars. Our role within OPERAs is to provide insights into the governance aspects that surround the concept of ecosystem services and its implementation into policies and management strategies on the ground. A particular conceptual approach to understand a complex reality is through the construction of ideal types. In this milestone, a precursor to the Deliverable 3.6, we introduce the concept of ideal types and how we conceive its usefulness and applicability within OPERAs. In section two we explain what ideal types are and how they can be used to inform the governance of ecosystem services. In section three we highlight three exemplars and how we envision ideal types in the specific setting of these exemplars (see table 1 for the list and short description of exemplars). The preliminary results of our collaboration with the three exemplars are used to inform this Milestone, which is a "First test of the portfolio of ideal types in some exemplars". In particular, with this Milestone we intend to provide a basis for continuing collaboration and further refinement of the ideal type concept in the selected exemplar settings during the coming year.

1.1. Aims & Objective

This Milestone is part of the Work Package 'Knowledge' (WP3) in OPERAs and serves as a precursor to the Deliverable 3.6 on "A portfolio of ideal types of (public and private) governance modes for selected ES/NC" due in November 2016. Based on available literature on governance of ecosystem services, we constructed a set of ideal types, which we test in this Milestone. Furthermore, we present preliminary findings from selected exemplars and to what extent ideal types are already, or could be applied in the selected exemplars. We chose three exemplars (Table 1), because they represent a variety of different ecosystem services and types of land-use. Moreover, since the ecosystem services that the exemplars focus on are mostly non-marketed, collective or public goods (Table 2), our analysis becomes more relevant. The three exemplars we selected for this milestone and for future collaboration within OPERAs are the basis for a comprehensive overview of existing and potential governance approaches, particularly in conditions where rights and regulations are blurred. This in turn allows us to apply the set of ideal types of governance modes with the objective to provide more targeted policy guidance.

Exemplar	Short description
1) The Balearic Islands	Assess the co-beneficiary management of seagrass ecosystems for Blue Carbon, assessing magnitude of sinks, socioeconomic values, and management of tradeoffs- exemplar.
2) The Scottish Multi-scalar Exemplar (Focus on the Inner Forth area)	The Scottish exemplar works on four scales, with different spatial and thematic focus: building a science-policy-practice interface (ESCom), a national assessment of ecosystem services and policy, socio-cultural values of green space in peri-urban Edinburgh, and local benefits of coastal wetlands realignment.
3) French Alps	Aims to analyze future land use trajectories and their effects on biodiversity and ecosystem services for the Grenoble urban area.

Table 1 – Three selected OPERAs exemplars and a short description (based on OPERAs exemplar study design document)

2. Ideal types

In its pure form, an ideal type is a simplified but exaggerated conceptual tool that is used to model reality. Ideal types are employed in social science to illustrate a concept. Initially, ideal types originate from Max Weber's argument that no scientific system is ever capable of reproducing all concrete reality, nor can any conceptual apparatus ever do full justice to the infinite diversity of particular phenomena (Weber 1904/1949). Therefore, for an investigator or researcher an ideal type is an analytical construct that serves as a measuring rod to ascertain similarities as well as deviations in concrete cases. Importantly, an ideal type is not meant to refer to moral ideals or a perfect reality, it rather serves an accentuation of typical courses of conduct (for example in collective actions of individuals in society). Moreover, ideal types do not correspond to concrete reality but always move at least one step away from such a reality. Because it is constructed using certain elements of reality that form a logically precise and coherent whole, ideal types cannot be found as such in reality. Yet, they are useful insofar as they can provide a basic method for a comparative study of certain aspects of reality, which share a commonality, for example the concept of ecosystem services.

Ideal types enable the constructions of hypotheses linking them with the conditions that brought the phenomenon or event into prominence, or with consequences that follow from its emergence. As Julien Freund (1968: 69) puts it, "Being unreal, the ideal type has the merit of offering us a conceptual device with which we can measure real development and clarify the most important elements of empirical reality." Ideal types should be seen as thought experiments based on empirical observations that help us create logically coherent and objectively feasible configurations of social relations, and thereby guide policy making and governance (Jessop 2002).

There have been a few attempts to construct ideal types for the governance of ecosystem services. For instance, Arnouts et al. (2012) present a framework, based on Kooiman's (2003) governance conception, of four ideal type governance modes that are operationalized into four ideal-type governance arrangements. They apply their framework to a case study of the rise of Dutch Nature policy. The ideal-type governance arrangements are a continuum from government-centered governance (i.e., hierarchical to closed co-governance) to non-state governance (open co-governance to self governance).

2.1. Why ideal types for the governance of Ecosystem Services and Natural Capital

Ecosystems perform functions independent of people, but anthropogenic activities have strong impacts on how ecosystems function. A wide range of ecosystem functions (for example nutrient or carbon cycling) is particularly useful for people, because it provides the foundation to produce food and other agricultural commodities, for flood regulation, carbon storage in biomass and soil or water purification for human consumption. Yet, despite the numerous services and benefits that people and ultimately society derives on a daily basis from ecosystems, their governance is often complex and challenging. Governance of ecosystems is characterized by processes of negotiation between different groups of stakeholders, for example farmers, governmental institutions and authorities, who have diverging and at time conflicting interests and different levels of power.

Dietz et al. (2003) stated that environmental governance depends on good and trustworthy information about stocks, flows, and processes within the resource systems being governed, as well as

about the human-environment interactions affecting those systems. However, when scales are highly aggregated, information may ignore or average out local information that is important in identifying future problems and developing solutions. Therefore, effective governance requires not only factual information about the state of the environment and human actions, but also information about uncertainty and values (Dietz et al. 2003). In addition, Wilson (2002) stated that the scientific understanding of coupled human-biophysical systems is always uncertain, because of inherent unpredictability in the systems and because science is never complete. Wilson (2002) further claims that against general perceptions, science does not fully understand ecological complexities, trade-offs and feedback loops, nor can we grasp the full spectrum of social factors that influence human preferences, decision-making, values and behavior, which bear on the governance of natural resources and ecosystem services. Thus, we suggest that by using the notion of ideal types, we can construct and model the complexity of reality in order to provide better ways to govern ecosystem services.

It is worth noting that the term governance emerged as reaction to a previously quite narrow focus on government as the prime actor in shaping society. Governance implies the recognition that many more actors and structures are at play and that they interact in myriad ways. There is no universally accepted definition of governance, but there is wide agreement that governance today goes beyond regulation, public management and traditional hierarchical state activity. In addition to these traditional forms of political steering, governance emphasizes the use of novel instruments (such as voluntary and market-based approaches) and cooperative structures between state and non-state actors from various sectors of society (including the private sector, businesses and civil society). Most often governance implies certain degrees and forms of self-regulation and cooperation among different types of actors and coalitions (see Rhodes 1997 and Biermann 2007). Governance in its essence can be understood as the extent to which governmental and/or non-governmental actors (both private sector and civil society-related actors) are involved in governing. Moreover, governance equates to the totality of theoretical conceptions regarding governing (Kooiman 2003, Arnouts et al. 2012).

In conclusion, ideal types are simplified conceptual tools that can be used to better describe and understand certain phenomena and thus approach these from a scientific lens. Therefore, ideal types are useful in reflecting about appropriate governance tools for ecosystem services and natural capital. Nonetheless, ideal types should by no means be understood or seen as representing an 'ideal' or 'perfect' solution, since they are, as previously stated, simplified and do not capture the entire complexity of reality. The main premise of the construction of ideal types is to come up and provide concrete and policy relevant guidance on how to govern ES.

2.2. Examples of ideal types for selected Ecosystem Services

In Milestone 3.6 (submitted 2013), we postulated a set of generic questions that we sent out to exemplars. These questions served as a starting point for the enquiry and the construction of the ideal types for selected ecosystem services (Table 3) and the subsequent application to the three exemplars chosen in this Milestones (Table 4). In this section, we present a short typology of ecosystem services in Table 2, where we presents an economic categorization of ecosystem goods and services according to their level of rivalry and whether or not laws are in place that regulate access.

Currently, there are three main approaches that are used in the governance of ecosystem services. The first group can be characterized as marketization/commercialization. The basic idea behind marketization or commercialization is to let demand steer management practices that result in desired outcomes, i.e., the production and delivery of certain ecosystem services. For example, in table 2, those ecosystem goods and services for which laws are in place that prohibit access can be governed by using market approaches. This is primarily the case for already marketed goods (agricultural products) and to some extent also for collective goods. For those ecosystem services that fall into Box 2, which are few, market approaches need to be devised artificially (artificial scarcity to steer demand) for example by governments through private-social or public- private partnerships. Very often, for those ecosystem services that fall into Box 1, markets do already exist or could potentially be created, for instance in the form of some direct payments from users to owners of the ecosystem service (i.e., private fishing lakes, hunting licenses) or as Payments for Ecosystem Services (PES) schemes.

		Does use by one person physically preclude use by others?	
		Yes – Rival	**No – non-rival**
Do laws prohibit access to these services?	**Yes – excludable**	**BOX 1** **Market goods** – agricultural products (Cultivated crops, reared animals, in-situ aquaculture) **Non marketed goods** – wild plants and animals, fisheries in Marine Protected areas and trawling fisheries in the entire ecosystem	**BOX 2** **Collective goods / club goods** – (Artificial scarcity to steer demand); access to community owned forest or park for recreation for instance restricted access of visitors to enjoy national parks (Cabrera Archipelago NP in Mallorca)
	No – non-excludable	**BOX 3** **Common property resource** – wild fish stocks, timber from unprotected forests, aquifers, fisheries other than trawling outside Marine Protected Areas	**BOX 4** **Pure public goods** – climate regulation, pollination and seed dispersal (by wild populations), many CES (aesthetic, spiritual), carbon sequestration, sand production, nutrient removal

Table 2 – A typology of ecosystem goods and services

A second group of ecosystem services is left largely unregulated, it is those for which currently no laws are in place that prohibit access, but which are rival and whose use by someone limits or even prevents someone else from using them (Box 3 in table 2). In theory, it is also possible to create access rules or rules over who can use these services and how. In practice, however, this might not always be feasible, or might lead to undesired consequences and inequities over who gets to decide and who gets to benefit from these ecosystem services in the future.

The third group of ecosystem goods and services falls into the category for which neither laws are in place that restrict access nor is the use by one person preclusive for the use by others (non-rival, Box 4 in table 2). For this group, most feasible and equitable form of governance is through democratization, characterized through dialogues and jointly set targets by all concerned and potentially affected stakeholders or citizens (Weber's notion of value or emotional rationality). Nonetheless,

environmental governance attempts to regulate currently unregulated ecosystem service. The most prominent example is carbon sequestration and storage from anthropogenic greenhouse gas sources. For carbon markets are being artificially created, but they depend to a large extend on political factors and state interests, as well as negotiations between private sector interests and states in their inception and functioning (Vatn 2014).

In table 3, we list the key questions and the way we envision governance modes for selected ecosystem services. It is important to note here that the key questions are only intended to provide a basis to better understand and analyze the current state of ecosystem service governance. By no means do we infer that there property or user rights are always needed nor do we suggest that establishing these should be a goal. Moreover, property rights are not easily created as they usually emerge through social processes. Rather, instead of property rights, the notion of entitlements can be more appropriate (Sen 1981). Entitlements are a different conceptualization of ownership relations based in certain rules of legitimacy. Sen further develops four entitlement relations that are accepted in a private ownership market economy such as (1) trade-based, (2) production-based, (3) own-labor and (4) inheritance and transfer entitlements (see Sen 1981).

Key questions	Example of Ecosystem services			
	Pollination and seed dispersal	**Flood protection (in river catchments and watersheds)**	**Water purification by ecosystems**	**Global Climate Regulation (Forest Carbon Sequestration and Storage)**
Are the property rights arrangements clear?	Unclear	Clear	Clear	Above ground: clear Below ground: unclear
Are the user rights arrangements clear?	Unclear	Clear	Clear	Clear
Do we understand the science?	Low	Very high	High	Medium
Are the boundaries of the systems defined / definable?	Fuzzy boundaries – species dependent ranges, highly mobile and numerous overlaps	Clear boundaries (catchment / watershed)	Surface: clear; Sub-surface: unclear	Clear boundaries (but leakage is a risk)
Are there temporal inertia and lags?	Yes	No	Yes	Yes (permanence issue), multi-generations
Can the stakeholders be defined?	Partly – Low definability	Yes – high definability	Yes – high definability	Partly - Low definability (multi-generations)
Are power relations among the stakeholders clear?	Unclear (Polarization)	Clear (Consensus)	Unclear (Polarization)	Unclear (Polarization)
Production / distribution rules	No distribution rules – public good	Marketed good / non-marketed good - Market-distribution	No distribution rules - Non-marketed good	No distribution rules - Collective good / common property resource
Ideal typical mode of governance (based on Arnouts et al. 2012)	Open co-governance	Closed co-governance	Hierarchical / Closed co-governance	Self-governance (?)
Examples for ideal typical mode of governance?	Precautionary principle	Payment for Ecosystem Services Schemes	Protected areas	Land-use rules

Table 3 - Ideal types and selected ecosystem services

We use the key questions posed in table 3 to construct the ideal types. They are meant to indicate the challenges that continue to exist when contemplating which governance approaches are the most appropriate given the current conditions. Therefore, the concept of ideal types is useful as it allows

disregarding some specificity, but focuses on a simple yet comparable form of understanding ecosystem services situated in specific social and institutional settings. For instance, policies for ecosystem service management and regulation need formal institutions and regimes to provide clear frameworks. These frameworks then determine, for instance, where the power to make decisions is found and how responsibilities and accountability are distributed as well as what compliance mechanisms are put in place. Therefore, governance of ecosystem services benefits from a functioning legal framework that provides concrete and mandatory guidance on the management of ecosystem services. Nevertheless, governance should not be equated to government, since it is based on a much broader approach to governing, with more inclusion of relevant stakeholders and more deliberation.

Greiber and Schiele (2011) for example define governance of ecosystem services as the interaction of laws and other norms, institutions, and processes through which a society exercises powers and responsibilities to make and implement decisions affecting ecosystem services. Thus, governance of ecosystem services is the result of interplays of governmental, inter-governmental, and nongovernmental institutions, the private sector, and civil society based on rules established by statutory and customary law (Greiber and Schiele 2011).

Here, governance structures can be defined as the following:

- **The type of actors involved** – characterized by their goals and motivations, capacities, rights and liabilities – for example whether these are private or public actors or partnerships between private and public actors, landowners with legal titles or land users who only have use rights

- **The form of political steering** – characterized by the mode of governance (top-down, bottom-up, hybrid forms) and the policy instruments applied (regulatory, economic/market-based, communicative/informational, organizational)

- **The institutional structures** that facilitate (or hinder) the interaction between the actors involved or integrate or exclude certain actors, respectively, and favour or discriminate against the application of certain policy instruments

However, considering governance practices in various relevant policy areas, it becomes apparent that ecosystem boundaries and political structures often do not match (Young 2002). Ecosystems and their functions and services often span over geographical areas that fall into different political and administrative boundaries and jurisdictions. Moreover, although several policy areas might be integrated to various degrees, the outcome leads to increasingly complex vertical and horizontal interactions across levels of biophysical, socio-economic and political structures (Young 2013).

Public actors such as states or local bodies have a pronounced role in setting rules for the management and use of ecosystem services, as most ecosystem services and types of natural capital are characterized as public goods. This is important to bear in mind, because any actions that attempts to ensure protection or a more sustainable use of these lead to a benefit not only for those actors that protect, but also others who gain from their protection (Vatn et al. 2014). Moreover, because of the public good characteristic (see table 2), governance of ecosystem services requires to look across scales that include many different social interests. These different social interests and the unequal distribution of power among the different interest groups is problematic since it risks to undermining the long term protection of ecosystems for and with relevant stakeholders, thus questioning the overall sustainability of these policies (see for example Paavola et al. 2009, Paavola and Hubacek 2013).

The OPERAs projects and most of its exemplars are situated in a European context. This has implications for governance approaches for ecosystem services. In times of increasing Europeanization, countries within the European Union cede parts of regulatory processes to the EU. In terms of environmental regulations and legislation, this manifests through a number of directives, such as the Birds and Habitat directive, which have to be directly implemented by member states. EU directives have a greater importance than national regulations, the latter having to be adjusted to EU directives. The unique situation with the EU has implications on the governance of natural capital and ecosystem services in the EU member states, which are implicated by EU regulations and national regulations that ideally complement, but at times also contradict each other. Here again, the ideal type concept can be used to overcome this issue, by focusing on the most important elements, which we have identified as the key questions.

An additional way of approaching the governance of ecosystem services comes from examples of transnational governance. Here, regulatory standard setting is a process that goes beyond the state as the entity responsible for setting standards of production (Abbott and Snidal 2009). For marketed agricultural products, fisheries and forest products, but also for industrial processes that require natural resources inputs, certification represents an approach that is increasingly used in order to set and promote standards beyond those that are legally demanded. Actors involved in setting standards and participating in their oversight include different groups from private sector institutions and firms, public entities and states, and NGOs. According to Abbott and Snidal (2009) states are not obsolete as a regulator, but their role as agenda setting actors has changed substantially and increasingly moves away from direct regulation towards the support of regulatory standard setting schemes.

Nowadays, increasing attention is drawn to standard setting and a variety of other economic instruments, which comprise both market and non-market types. Economic instruments, either market or non-market, still have a certain command element, because rights need to be defined. Trade characterized through market types represents a particular set of governance structures that already exist or that are on the way of being implemented to manage and govern ecosystem services. Payments for ecosystem services (PES) are one prominent example for this form of trade-based governance, although they often operate in the grey zone between market and non-market types (Vatn 2014). On the other hand there are a variety of non-market based structures, such as laws and regulations at different administrative and political levels. In the European Union the aforementioned Biodiversity Strategy to 2020 and the Birds and Habitats Directive are examples of regulatory frameworks established at a supra-national level. Furthermore, non-market-based approaches include for example subsidy reform, land use activities and different policy instruments, certification and labeling initiatives. Within the EU, there are attempts to implement biodiversity-offset markets, which are supposed to function like a complete market with intermediaries. Herein, public bodies are involved as regulators who define goals, control trades and performances (Vatn 2014).

3. Applying ideal types to the three exemplars

The information we provide is based on written sources, publications and other data provided to us by the OPERAs exemplars. In Table 4 we present an overview of the exemplars, each exemplar's study focus, the level at which ecosystem services are being addressed and investigated, the methods used and the current policy documents that are directly impacting ecosystem service governance.

	The Balearic Islands	**The Scottish Multi-scalar Exemplar (Focus on the Inner Forth area)**	**French Alps**
Ecosystems studied	Marine - seagrass meadows	Tidal ecosystems, estuary, floodplains	Urban lands, rural agricultural & forest lands, alpine ecosystems
Ecosystem service(s) in focus	Carbon sequestration, nutrient removal, fisheries	Flood prevention, habitat, CES (use and non-use)	3 ES Bundles: 1. Peri-urban area (12 ES) 2. Rural area (12 ES) 3. Forest area (13 ES)
Scale (approximate size of area under investigation)	Regional (5,000 km^2)	Regional (300 km^2)	Regional (global study area: 4,450km^2) Depending on ES
Property rights organization	Open access / public good	Private property (agricultural lands) & 4 out of 12 potential sites are public lands (council lands – Falkirk, Stirling and Clackmannanshire)	Mix of private and public / common
Existing regulations / laws for use of ES?	Partly –, fishery laws, Habitat Directive (EU), Regional and National habitat laws	Partly – RAMSAR convention and Habitat Directive (EU), Legal responsibility for farmers to maintain flood defenses, no legal responsibility to adapt to rising sea levels	Yes - planning documents, national and regional legislation, EU regulation
Are the property rights arrangements clear?	State and regional jurisdiction as entirely marine based.	Clear for land under agriculture	Partly – depending on the ES bundle and ES in question property rights arrangements differ substantially
Are the user rights arrangements clear?	Unclear	Clear	Clear
Do we understand the science?	High ecosystem dynamics, ecosystem threats and Carbon sequestration ES. Medium for the other ES.	High	High – depending on particular ES considered; medium for bundles of ES and interactions between the different ES in space and over time

Are the boundaries of the systems defined / definable?	Yes – but land based agriculture and sewage disposal are key drivers of ecosystem decline	Clear boundaries – defined by sea levels and flood maps	Depending on the ES; clear from a planning / administrative perspective
Are there temporal inertia and lags?	Yes – but not well understood	Yes	Yes – varies depending on ES
Can the stakeholders be defined?	Yes	Yes	Yes
Are power relations among the stakeholders clear?	Yes	Yes	Yes
Actors	Mainly regional and state government actors such as departments for Biodiversity, Climate Change, Fisheries, Tourism and Water; Ports Authority, Coasts department, Municipalities & other government agencies	Selected mix of actors - Landowners (farmers), Municipalities Government agency regulate and monitors protected areas; Charities (RSPB) manage some coastal areas; private actors propose fracking near and inside tidal areas	Large mixed group of actors – private landowners and farmers, forest owners, territorial development and resources management: mainly from government, local authorities (including municipalities, regional government etc.), NGOs, Regional Natural Parks
Power	Government, but tourism lobby is strong	Pooled – landowners and government	Multi-level / intersectorial interactions – planning document (SCoT) as overarching tool to specify land use
Rules	Government coercion (seldom applied)	Restricted cooperation	Flexible collaboration
Ideal typical governance types	Hierarchical governance / co-governance	Closed co-governance	Open co-governance

Table 4 - Three selected exemplars and ideal types for the governance of ecosystem services, Adapted from Arnouts et al. 2012; Olsson et al. 2013.

3.1. The Balearic Islands

Seagrass meadows are an important habitat for many marine species and act as fish nurseries (Beck et al. 2001). Moreover, they are an important natural carbon sink (Fourqurean et al. 2012) that is in decline globally. Within the OPERAs exemplars, the Balearic Seagrass meadows represent a unique case, since it is the only marine ecosystem. The exemplar's main goal is to assess the co-beneficiary management of seagrass ecosystems for Blue Carbon, assessing magnitude of sinks, socioeconomic values, and management of tradeoffs- exemplar.

Being a marine ecosystem has several important implications. **First**, the suite of EU policies and directives that apply is different compared to the land-based ecosystems. **Second**, ownership structures are distinct, seagrass meadows cannot be owned by private entities, but are entirely owned by the government. **Third**, with regards to the ecosystem services these seagrass meadows provide, locals and visitors differently appreciate a direct benefit / use. Whereas the local stakeholders

recognize a direct benefit of seagrasses, most people who visit the Balearic Islands aren't aware of it because they will not see the meadows with the own eyes, nor will they be able to establish a personal link with the ecosystem and its services (Kurani 2015).

The seagrass meadows around the island of Mallorca, which consist largely of the endemic Mediterranean species *Posidonia oceanica*, can be found down to a depth of approximately 45 meters. These underwater meadows "cross the border" between internal and external territorial waters. Therefore, both regional (internal waters) and national (external waters and nature reserve park) jurisdictions apply. Compared to terrestrial ecosystems and lands, the case of the marine environment is completely different as the sea or its resources cannot be owned by private entities. The Spanish Constitution declares that the coasts, beaches, territorial sea, internal waters and natural resources of the Exclusive Economic Zone (EEZ) and the continental shelf are of public domain. Therefore, everyone is entitled to make use and enjoy the coast. Certain activities are, nevertheless, regulated and require the permission of local authorities to carry out these activities (e.g., commercial fishing). The seagrass meadows are included in national and EU level regulations. The EU Habitat Directive (92/43/EEC) recognizes *Posidonia oceanica* as a priority habitat for conservation. At the Spanish national level various laws protect *Posidonia oceanica* (National law 4/1989 on the Conservation of Natural Areas, Flora and Wildlife; Royal Decree of December 7, 1995 (BOE 310, 28/12/1995)) and establish necessary measures for their conservation. The Royal Decree 139/2011, 4th of February, includes *Posidonia oceanica* in the List of Wildlife and Flora with special protection status. Moreover, because of the detrimental effects of fishing by bottom trawling, the Council Regulation (EC) No. 1626/94 specifies that bottom trawling be expressly forbidden on seagrass meadows. In addition, In the Balearic Islands regional law prohibits any type of trawling above 50 meters depth (BOE 169, 16/07/1962).

3.2. The Scottish Multi-scalar Exemplar

The Scottish exemplar works on four scales, with different spatial and thematic focus: (1) building a science-policy-practice interface (ESCom), (2) a national assessment of ecosystem services and policy, (3) socio-cultural values of green space in peri-urban Edinburgh, (4) and local benefits of coastal wetlands realignment in the Inner Forth as well as social and cultural meanings of salt-marsh and mudflat restoration for local communities.

In our collaboration with the Scottish Exemplar, we focus on the Inner Forth area of Scotland, west of the City of Edinburgh where the River Forth opens out into the North Sea. The Inner Forth area is an old industrial and agricultural landscape with marine influences. A substantial part of the currently used industrial and agricultural land in the Inner Forth has been claimed from North Sea in the past 400 years. This has resulted in the loss of over half of the tidal marsh and mudflat habitats, which still remain an internationally important breeding and wintering ground for wild fowl and waders. The industry, farmland, urban areas and tidal ecosystems are becoming increasingly vulnerable as changes in climate and sea-levels are expected to increase the frequency and severity of coastal flooding and erosion, particularly during extreme weather events.

In the past 30 years, plans for managed realignment have been put forward by NGOs and government agencies to mediate potential flood risks and restore tidal habitats. These plans delineate potential areas where managed realignment (the planned and stepwise take down of sea walls and dikes to give land back to the sea) can be carried out. Managed realignment has several advantages, first it is an option to buffer against rising sea levels by giving more room to expanding seas, particularly in areas that are low-lying, and by reducing coastal erosion through renaturalizing sediment dynamics. Second,

it increases the area of habitat for a variety of estuarine species, as well as many species of wading birds that feed on these. In the Inner Forth, birds in particular are an important aspect for the restoration of tidal lands, as they receive large attention and the Royal Society for the Protection of Birds (RSPB) is one of the most active NGO's in the area.

The cost of implementing a single managed realignment scheme is high, posing a notable barrier to a landscape-scale uptake of nature-based solutions for flood management in the Inner Forth. Furthermore, there is an immediate trade-off with agricultural production as giving up agricultural land is not a preferred option by the owners of land. High-cost investments and compensation in the form of payments (either buying the land, or perpetual payment when land becomes flooded – for instance the multifunctional farming approach used in the Netherlands) are probably needed to support nature-based adaptations to rising sea levels and other climatic changes (i.e., more severe and unpredictable storms with associated flooding events).

There are a number of towns that would benefit from managed realignment projects in the Inner Forth. A series of surveys and workshops have been completed in four towns around the Inner Forth in order to create a shared community-driven vision for coastal management in the area. The methodological approach involves a combination of a choice experiment for coastal land use and management, deliberative mapping of the current landscape and potential future uses, and conceptual mapping of future drivers of change that residents are concerned about. The purpose of the survey and workshop activities is to understand the cultural and social values of the coastal marsh, and the preferences the residents hold for coastal management.

The preliminary surveys suggest that residents in the area have a low level of awareness about the current flood risk, expected changes in climate and sea levels, and the flood regulating benefits of tidal marsh and mudflats. A high proportion of the workshop participants report their preferences for coastal land use and management to have changed after learning about the role that tidal marsh play in coastal flood and erosion regulation. Overall, concerns over coastal wildlife and environmental health were generally seen as strong motivations for the restoration and enhancement of coastal marsh in the area. A notable group of residents are opposed to providing further access to the coastal nature areas due to the disturbance this might cause to tidal wildlife. Residents prefer future visions where conversion of land to marsh and improved access occur across the landscape rather than concentrated in a particular area.

Currently, we are investigating what people who live around the Inner Forth think about the governance of the proposed land-use changes. This concerns not just questions about how to finance managed realignment and restoration, but also concerns historic and future responsibilities. Many workshop participants and citizens seems to hold local industries and government responsible for environmental degradation, and many respondents suggested that it is the industry's duty to pay for ecological improvements in the area. However, there are increasingly strong concerns over further degradation and environmental impacts because of proposals for fracking in the area, which has mobilized many residents to voice their concerns about potential environmental degradation as a result. A preliminary analysis of the workshops that were held shows that the views on who should fund changes in coastal land use are very heterogeneous and quite unconstructive, i.e. lots of pointing fingers rather than careful thoughts on how to go about solving the issue. Overall, government and the private sector are often mentioned as being responsible, but there is no consensus among the workshop participants on who in particular should be responsible for addressing environmental degradation and vulnerability in the Inner Forth.

Yet, there are two things that most people seem to agree on:

1) A lot needs to be done (or should be done) in the coastal area, highlighting that people are concerned and want to see a shift away from the business as usual, and
2) Others (people and politicians) do not care enough, or are not able to contribute financially (at least that is the general excuse) - so there seems to be a negative social (community-level) barrier to instigate bottom-up changes and movements for restoration and realignment, i.e. a feeling of not being able to make a difference as a community.

Quite a large share of the lands that are identified as suitable for managed realignment and restoration of salt marshes is currently owned by private landowners who mostly use it for agriculture. In the upcoming months, we plan to approach these actors in order to understand what their perceptions regarding the proposed land-use changes are and what they propose to change current land-use practices, or even give up parts of currently used lands.

3.3. The French Alps

The French Alps exemplar aims to analyze future land use trajectories and their effects on biodiversity and bundles of ecosystem services for the Grenoble urban area in order to support future choices regarding land use planning and urban development.

It aims to improve a cross-sectorial approach in land use planning and management decisions that considers the overall relationship (trade-offs and synergies) between biodiversity, ES and territorial management. This affects mostly rural and peri-urban areas, forestry, and agricultural, forestry, agricultural and water management.

Grenoble is the center of one of the very active and dynamic French metropolitan areas. With an extent of 4450 km^2, the study site includes the entire extent of the Grenoble urban area. All significant landscape units in an Alpine region are represented (plains, plateaus, mountains). In addition, the exemplar area also presents a large variety of physical and natural characteristics, resulting in contrasted heterogeneous landscapes. The region is structured by three mountain ranges: Vercors, Chartreuse and Belledonne. The valleys of the Drac and Isère rivers are favorable for urban development, but also at risk from flooding events. The mountain areas benefit from a wide range of protection measures through the existence of two Natural Parks (a third is in the process of being established) and several conservation areas.

The study area includes 311 municipalities. Most (277) are part of the Grenoble SCoT area (*Schéma de Cohérence Territorial* – Coherent Territorial Planning Schemes). As one of the most relevant documents and regulatory tools, the SCoT is a French planning document that determines common objectives for urban planning and territorial development: environment, housing, trade, services, economy, agriculture, commuting. Since the French law of 13 December 2000 on solidarity and urban renewal, SCoTs have become the reference strategic planning documents for urban planning and development in large residential zones or urban areas. The SCoTs constitute project territories that go beyond the municipal, intermunicipal or departmental administrative boundaries. They conform to the logic of an integrated development approach, ensuring the coherence of sector-specific policies: urban planning, housing, transport, digital communication, commercial facilities, development of the economy, tourism and culture, protection of spaces, landscapes and the environment, including the

preservation and restoration of ecological connectivity, climate change mitigation and risk prevention (Ministry of Housing, 2013).

One on the major environmental issues identified by the SCoT is reduction of space consumption, especially agricultural spaces. Indeed, artificialization contributes to the weakening of agriculture and biodiversity, and fragments ecosystems driving the decrease in ecological connectivity. Although the SCoT does not use the term "ecosystem services", the dependence of human activities on the presence and abundance of functional ecosystems is a key topic in the SCoT. In particular, the key role of agricultural ecosystems in providing multiple ecosystem services (production: crops, forages; regulatory: flood etc.) is considered as priority at the territory level.

Furthermore, within the exemplar area, there are two Natural Regional Parks (*Parc Natural Regional* - PNR) of Vercors and Chartreuse that are also involved in managing the territory. Their main objective lies in the preservation and valorization of natural, cultural and human patrimony, land use planning and the management of territorial development activities, such as agriculture, forestry and tourism within the parks.

In the French Alps exemplar, four regional scenarios are developed and subsequently translated as changes in the different types of land use and in agricultural and forest management. Moreover, spatially explicit modeling is used to project land-cover changes by 2040. Based on these land use and management projections changes the 13 Ecosystem Services are jointly modeled in the French Alps exemplar. A multi-criteria decision analysis on stakeholders' priority in each scenario is intended to provide information on how the model of the ecosystem services can support the integration of the complexity of ecological functioning into debates on territorial planning and management.

4. Summary and conclusion

This Milestone provides a recap of various approaches in the governance of ecosystem services. In order to better understand and disentangle the complexity of governance, we use the notion of ideal types, a concept first coined by Max Weber many decades ago. We then apply ideal types to three OPERAs exemplars, where various ecosystem services are being studied in different geographic and institutional contexts. By employing the ideal types, we are able to better understand as well as bring forward the different factors that are at play in the three exemplar contexts. We facilitate the construction of ideal types by posing a set of generic questions to understand the ES studied in the exemplars. These questions are intended to shed light on the state of knowledge about the ES in question, the institutional complexity surrounding their management, the power structures at work and the different stakeholders that are involved. The preliminary results highlight that ideal typical governance for ecosystem services is closely related to the natural properties of the ES in question and the current social structures and institutions that are linked in the management of ES. As stated, the results are preliminary and the upcoming months and continuous collaboration with the exemplars will shed further light on the governance of ES in each particular setting as well as provide further data in order to inform our analysis, culminating into the Deliverable 3.6, due in November 2016.

5. References

Abbott, K. W., and D. Snidal. 2009. The Governance Triangle - Regulatory Standards Institutions and the Shadow of the State. Pages 44-88 The Politics of Global Regulation. Princeton University Press.

Arnouts, R., M. van der Zouwen, and B. Arts. 2012. Analysing governance modes and shifts - Governance arrangements in Dutch nature policy. Forest Policy and Economics 16:43-50.

Beck, M. W., K. L. Heck, K. W. Able, D. L. Childers, D. B. Eggleston, B. M. Gillanders, B. Halpern, C. G. Hays, K. Hoshino, T. J. Minello, R. J. Orth, P. F. Sheridan, and M. P. Weinstein. 2001. The Identification, Conservation, and Management of Estuarine and Marine Nurseries for Fish and Invertebrates: A better understanding of the habitats that serve as nurseries for marine species and the factors that create site-specific variability in nursery quality will improve conservation and management of these areas. Bioscience 51:633-641.

Dietz, T., E. Ostrom, and S. P.C. 2003. The Struggle to Govern the Commons. Science 302:1907-1912.

Fourqurean, J. W., C. M. Duarte, H. Kennedy, N. Marba, M. Holmer, M. A. Mateo, E. T. Apostolaki, G. A. Kendrick, D. Krause-Jensen, K. J. McGlathery, and O. Serrano. 2012. Seagrass ecosystems as a globally significant carbon stock. Nature Geosci 5:505-509.

Freund, J. 1968. The Sociology of Max Weber. Pantheon.

Jessop, B. 2002. Liberalism, Neo-Liberalism and Urban Governance: A State Theoretical Perspective. Antipode 34:452-472.

Kooiman, J. 2003. Governing as Governance. Sage.

Kurani, S. 2015. Forget!about carbon – let's go on holiday. Using tourist values to conserve seagrass meadows. Lund University Master Thesis in Environmental Studies and Sustainability Science.

Ministry of Housing. 2014. Coherent Territorial Planning Schemes (SCoT). Ministère du Logement, de l'Égalité des Territoires et de la Ruralité. http://www.territoires.gouv.fr/IMG/pdf/les_schemas_de_coherence_territoriale_scot_-_version_anglaise.pdf

Olsson, L., Krause, T., Hirschi, C. and M. Kettunen. 2013. Set of generic questions sent to selected exemplars regarding salient characteristics of ES/NC and stakeholders. OPERAS Milestone 3.6.

Sen, A. 1981. Poverty and Famines - An Essay on Entitlement and Depreviation. Oxford University Press, Oxford.

Vatn, A. 2014. Markets in environmental governance — From theory to practice. Ecological Economics 105:97-105.

Weber, M. 1904/1949. "Objectivity in Social Science and Social Policy" in *The Methodology of the Social Sciences*, E. A. Shils and H. A. Finch (ed. and trans.), New York: Free Press.

Wilson, J.A. 2002. in The Drama of the Commons, Committee on the Human Dimensions of Global Change, National Research Council, E. Ostrom et al., Eds. (National Academy Press, Washington, DC, 2002), pp. 327–360.