What facilitates or hinders the introduction of Adaptive Governance approaches into water quality management on a local level?

A case of Swedish municipalities

Ulrika Lyckman Alnered
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Abstract

Adaptive Governance approaches are being implemented by officials in Swedish municipalities. A close dialogue and cooperation between municipalities, and the acceptance of the uncertainty and unpredictability of climate change are included in the strategic work, and facilitate the introduction of Adaptive Governance approaches.

However, Adaptive Governance approaches are at the same time hindered by the municipal systems, which does not allow for the introduction of new and innovative information. In particular, this study demonstrates that the systems are not structured to include such information from informal sources, such as citizens and farmers.

This comparative study investigates water quality management at the local level, applying the concept of Adaptive Governance in three Swedish municipalities: Kalmar, Västerås and Upplands Väsby. The analysis is based on the theoretical framework of Adaptive Governance that expands on the understanding of adaptive management. The 17 semi-structured interviews conclude that the facilitators for Adaptive Governance are most evident within the areas of collaboration and shared responsibility between municipalities. Barriers to the development of Adaptive Governance are identified as a failure in the systems to include ecological knowledge.

Expanding Adaptive Governance research to a larger number of municipalities within the European Union would shed some more light on what facilitates and what hinders the inclusion of Adaptive Governance approaches at the local level. Such research would have a dual effect: as a contribution to science and as a promotion for the practical implementation of the EU Water Framework Directive according to the Adaptive Governance approaches of the European water quality management.
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1. Introduction

Water can be defined as one of the ecosystem services, provided by nature to support humanity but severely impacted (Pahl-Wostl 2009; Schlüter et al., 2013). Water is included in the newly adopted “Post-2015 agenda” (www.un.org) as part of one of six essential elements aiming at a universal transformation of sustainable development. The UN states the importance of addressing the drivers of climate change and its consequences, and to respect the planetary boundaries. “To foster sustainable management of water resources” is clearly mentioned (The Road to Dignity by 2030). Water quality is on top of the global agenda and the time has come to act. It is time to enhance the governance of water quality management, where adaptation is essential (Plummer 2013).

Adaptive forms of governance is argued as important to cope with slow and fast changes, amongst others, climate change (Folke et al., 2005; Pahl-Wostl et al., 2011). Adaptation in this context of governance of environmental change is “an adjustment in an ecological, social, or economic system in response to observed or expected changes in environmental stimuli and their effects and impacts in order to alleviate adverse impacts of change” (Nelson et al., 2007).

Adaptive Governance could be seen as an approach to reach a sustainable water quality management, thus reaching the target of good water quality, by 2015, according to the EU Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy) hereinafter referred to as WFD. Adaptive Governance could work on a local, regional and global level to assist reaching this goal of having good water quality. The priorities for the Swedish Government for “EU 2015” does not explicitly mention water, but states the need to have a sustainable use of the natural resources within the Union (www.regeringen.se).

This study contributes to the on-going research within the Formas-funded EKOKLIM program at the Stockholm Resilience Center and at Stockholm University and the study on the multi-level governance of water quality on a regional level in the area surrounding Lake Mälaren, in Sweden (Nykvist et al., manuscript; Boyd, Nykvist et al., 2015). This research adds to that ongoing research of analysing Adaptive Governance at the regional level in Sweden, adding another layer of understanding to how Adaptive Governance approaches are being implemented and what drives and hinders such a process. The results in this study may serve as both a basis for further research and also for the development of the water management at the Swedish municipalities.
Water is a commonly shared resource and water quality management could not be carried out without cross-boundary management. This study will contribute to research, by examining if and how the municipalities apply Adaptive Governance-approaches, by e.g. including relevant local participants and building ecological knowledge, to manage water quality at a regional and local level (Bark et al., 2012). The study shed light on concrete actions and thus could serve as a component for policy formulation (Pahl-Wostl et al., 2013).

This study is based on the concept of Social-Ecological Systems (SES). Science has, for many years, stressed the need to look at the management of natural resources, including water, without being limited to only the ecological systems perspective, but also including the combined economic and social systems (Folke 2007; Ostrom 2007). The SES takes into account the synergies and constraints from all three disciplines: people, economics and nature (Berkes et al., 2002). The necessity to address both the social dimension and at the same time understand the dynamics of the ecosystem has been shown vital for research and learning (Huitric 2005).

One way of being adaptive to the on-going and unknown future changes is to introduce a new way of handling crises, to learn, to build the ecological knowledge and to evaluate and follow up the results that are at hand (Armitage et al., 2013). This study investigates contemporary local water quality management through the lens of Adaptive Governance addressing the various components of complex social-ecological systems. Given the changing discourse in water management, moving attention from government to governance, thus changing the way of thinking (Pahl-Wostl et al., 2011), it is important to stress that the line between Adaptive Governance and adaptive management is blurry and the different concepts used are increasingly interchangeable, with adaptive management being part of Adaptive Governance (Armitage et al., 2013; Gunderson et al., 2006).

“Resource management’ refers to the activities of analysing and monitoring, developing and implementing measures to keep the state of the resource within desirable bounds. The notion of ‘resource governance’ takes into account the different actors and networks that help formulate and implement environmental policy and/or policy instruments. Governance embraces the full complexity of regulatory processes and their interaction.”

Pahl-Wostl (2009)
This study aims to include relevant actors for water management, not limited to states or governments, for each municipality and argues that adaptive approaches in management and governance are necessary to cope with changes in SES (Gunderson et al., 2006; Biermann et al., 2010).

The term governance is defined as both public and private interactions to solve societal problems and to create societal opportunities (Armitage et al., 2010).

1.1 The structure of contemporary Swedish water governance

The EU WFD, being a European directive, is to be implemented and put into practice in all 28 EU member states and should have large implications on the European water management. The EU WFD poses challenges on the Member States of the Union and therefore requires change and innovation (Pahl-Wostl et al., 2008).

Water quality management, and its objective to reach good ‘ecological water quality status’, faces challenges due to external perturbations and conservative organizational structures. External drivers - such as climate change, flooding, rising water levels and internal drivers such as the negative impact of environmental degradation, should be considered. Climate change and the fast and slow, dynamic, non-linear and non-predictable changes in the social-ecological system further affect the water quality (Pahl-Wostl 2009). Therefore there is a need to develop a water management structure that is flexible and adaptive and ready to change (Dietz et al., 2003; Folke et al., 2005; Gunderson, et al., 2006; Pahl-Wostl et al., 2011). Furthermore, it has been argued that it is time to move from the demand-and-control management approach to a systematic approach, where uncertainty, learning and collaboration are obvious components of water management (Pahl-Wostl et al., 2011) and where methods of flexible and decentralized management and focus on human behaviour are stressed (Pahl-Wostl 2006). Furthermore, research on risk management has underlined the necessity to include the component of “uncertainty” in the definition of risk (Aven et al., 2009) as well as the need to develop a tradition where uncertainty and failure can be openly discussed (Power 2004).

This study examines water quality management on a local scale in Sweden. The municipalities of Kalmar, Västerås and Upplands Väsby serve as cases for this study, illustrating how the water quality is managed in each respective municipality. The term Adaptive Governance (hereinafter referred to as AG) is defined as the interaction between society and the public (Folke et al., 2005), applicable for all levels, being local, regional or national. The regional collaboration requires financial and human resources to be able to attain a good water quality
status according to EU WFD. This study focuses on the local level and its interaction with stakeholders, transfer of knowledge and readiness for change, since local conditions in governance of the commons is essential (Dietz et al., 2003). The water councils, on the municipal level, serve as an actor platform and a forum for dialogue for citizens, NGOs, civil servants, farmers and businesses. The objectives in the EU WFD are clear and underline the necessity to include stakeholders and the public in the process (Pahl-Wostl et al., 2010). The European Commissioner for the Environment, Janez Potocenik, stated:

“We need to really step up our action a lot in order to get close to the WFD goal. We may be some way from achieving it, but it can be done by working together at all levels.”


All 290 Swedish municipalities must follow directives and regulations formed at the level of the European Union (EU). In Sweden these legal texts are incorporated into Swedish law by the Swedish Environmental Protection Agency and the Swedish Agency for Marine and Water Management at the national level, enforced by the county administrations at the regional level and implemented by the municipalities at the local level. Thus the actual water quality management stays with the Swedish municipalities at the local level. The Swedish system could be characterized as being a multi-level governance system, where decision-making authorities are to be found on various levels, and therefore are particularly complex (Pahl-Wostl 2009). The EU WFD stipulates the need to develop platforms for dialogue, so called “water councils”, which are seen as necessary for the process and underlined by Pahl-Wostl in the NEWATER project.

Since this study focuses on the municipalities, it is important to highlight the autonomous decision-making that exists, based on regional and local conditions, known as ‘local self-government’, which is enshrined in the Swedish constitution. The municipalities are responsible for: drinking water supply, water drainage, sewerage and surveillance of the environment, and to plan the infrastructure of housing and other construction within the municipality. All 290 municipalities in Sweden decide independently on: structures, resources, level of cooperation, level of dialogue with stakeholders, policy documents needed and the vision for the water management.
1.2 Aim of study and research questions

This study aims at identifying if and how the Swedish municipalities have implemented working methods, in line with AG, for their water quality management. This study examines the water quality management of three different Swedish municipalities and their catchments based on the theoretical framework of AG. This study looks for drivers or barriers to AG at the local level. Drivers could be seen as human or natural factors that cause change (Armitage et al., 2009). This study aims to identify whether AG is introduced in the water quality management at these three municipalities and what hinders or facilitates such process.

The study will present results, showing how the municipalities have adopted AG-approaches in their water management. The findings will demonstrate similarities or differences in the way that they govern the water quality management. The study thus delivers a comparative analysis of the drivers and barriers to the development of AG. Given the challenges to the local water quality management and the problems faced to reach good ‘ecological quality water status’ in accordance with the EU WFD, this study addresses and will answer the following research question:

What facilitates or hinders the introduction of Adaptive Governance approaches into water quality management on a local level?

1.3 Thesis outline

The rest of this thesis is organized as follows. In Chapter 2 the Theoretical Framework is further elaborated and discussed by comparing it with important literature covering AG. The case studies and their particulars are described in Chapter 3. The methods for collecting data, in particular the selection of respondents and the interview guide, and secondarily the way in which the grey literature has been selected and used to triangulate the results are found in Chapter 4. The Results are shown for each municipality and for each of the three components, in Chapter 5. The results are discussed in the following Chapter 6. Finally Chapter 7 expresses the conclusions of the study.
2. Theoretical framework

The governance model of AG is an analytical framework that aims to take into account and manage the fast and slow moving, non-linear, dynamic and non-predictable changes in the environment. It has been shown that AG systems are suitable for, and work effectively to govern natural resources, in particular facilitating experimentation, promoting change and learning (Dietz et al., 2003).

It has been stressed that the issue of reaching a sustainable development and good management of the natural resources, lies not only in the understanding of ecological systems, but also in the need to understand the governance and cultural systems in the ecological systems (Pahl-Wostl et al., 2008). The adaptive analytical framework has been criticized for being too ambitious and not practically implemented (Pahl-Wostl et al., 2011). AG is not a governance panacea, nevertheless the concept and theory of AG is relevant for water management (Plummer 2013). The analytical framework used for this study assists in identifying barriers and drivers to AG in the practical implementation of water quality management.

2.1 Adaptive Governance approaches – interacting aspects

Plummer et al. argue for some core environmental governance challenges, such as “accountability and legitimacy” and “evaluation and monitoring” that are important to cope with (Plummer et al., 2013). The components of ‘Actors, Networks, Organisations and Institutions’ illustrate social-ecological processes showing structures and functions that could support a complex problem solving mechanism, and thus may constitute a minimum requirement for AG (Österblom et al., 2013).

Yet another analytical framework used to identify objectives and mechanisms of AG, emphasizes following three components: managing uncertainty, enhancing flexibility and integration (Bark et al., 2012). Similar reasoning is found in the framework for “Earth system governance”, in which the problem of adaptiveness is tackled by questioning adaptiveness: “for whom and who benefits? (…) To what and to which side effects? (…) which governance processes foster adaptiveness” (Biermann et al., 2010).

Huitema (2009) et al. point towards four interrelated aspects in AG; polycentric governance, public participation, experimentation and the bioregional perspective. These are all areas considered to be key in AG and its success, namely: “learning from experiment (…) and a call
for collaboration”, “public participation” is backed up by governance literature. Public participation could contribute to decision-making (Huitema 2009).

Water quality management and climate change
While focusing on water quality management, this study takes into consideration the effects and forthcoming effects of climate change, including the task to adapt the water quality management structures to climate change (Bergkamp et al., 2003). All levels of Swedish society are included in the management of climate change (Simonsson et al., 2011; SOU 2008:24; Prop.2008/09:162) and municipalities have a vital role to play when planning for and adapting to climate change, thus linking scientific results to policy (Moss et al., 2001).

De Loë and Plummer (2010) explore the adaptation process and the impacts of climate change on drinking water supply and one could conclude that modern water management on a local scale should include the adaptation to climate change, present at all scales of water management. The authors demonstrate challenges in water management by making a clear connection between the ongoing and forthcoming climate changes and the need to introduce AG (Folke et al., 2005; Pahl-Wostl 2007; Pahl-Wostl 2002). The study underscores the fact that climate change emerges as a large problem with regard to drinking water treatment and distribution systems. As an example the Great Lakes Basin illustrates impacts on drinking water from climate change, based on predictions on the hydrological cycle (De Loë et al., 2010). There seems to be a global shift in water management and the structures of governance, argued by de Loë and Plummer (2010): “…contemporary water management occurs in an environment where collaboration among a shifting mix of state and nonstate actors has become the norm. In this environment, governance – the ways in which societies make decisions – has shifted away from the traditional top-down, civil servants model of past decades.”

Water quality management and ecological knowledge
The ecological knowledge, stemming from multiple sources, is stressed as important for the environmental governance (Plummer et al., 2013). This component forms the basis of the theory, in other words without knowledge there will be a gap to adaptation and introduction of AG into the water quality management structures. Therefore the level of ecological knowledge will indicate the municipality’s and its civil servants’ maturity and readiness to adapt to and introduce AG in their day-to-day water quality management. Furthermore, the ecological knowledge better equips them to deal with the unpredictable, rapid and slow non-linear changes in the environment and water catchments. Included in the ecological knowledge context is the Social Ecological Systems (SES), which by definition expands on the complexity of the system and covers both rapid and slow changes within the ecosystem. The concept of ‘ecosystem services’, indicating the level of ecological knowledge, is being seen as a bridge between
human and environmental dimensions (Pahl-Wostl et al., 2011). Moreover, it is stressed that ecological knowledge should not be limited to *formal sources of information* (such as knowledge from governmental agencies or the like) but should also embrace knowledge from e.g. farmers, citizens, NGO:s and the like, so called *informal sources* (Folke et al., 2005; Gunderson et al., 2006).

This being said, it is wise to stress the importance of understanding mechanisms behind ecological knowledge, since it is not limited to scientific knowledge but also includes the know-how, traditions and history from people’s practical knowledge of ecological systems and recognizing those values and knowledge (Conde et al., 2005; Bark et al., 2012). The ecological knowledge should therefore be seen in a wider context and it is vital in order for those such as the civil servant and management at the municipality to have “an open mind” to new knowledge. An “open mind or openness” translates into a welcoming attitude towards knowledge no matter if it derives from formal or informal sources. Furthermore, the learning-by-doing mechanism, including all relevant stakeholders building and developing their ecological knowledge, is crucial for the development of well-functioning AG (Galaz 2005). However, research shows that the Swedish local water management does not have a great interest in experimenting or systematically evaluating projects (Galaz 2005).

*Water quality management, feedback mechanism of knowledge and stakeholder inclusion*

The mechanism of knowledge feedback in water management is crucial for the municipality to cope with the dynamics in the ecosystems. The key is the readiness to learn, to share and to spread the knowledge internally within the municipality (Johannessen et al., 2013). It has been pointed out that the adaptive capacity among local water stakeholders is limited and that the learning process, including identifying feedback and driving forces, is slow and at a low level of use (Galaz 2005). Developing the water management, municipalities rely on the feedback of knowledge, and therefore structures should be flexible to counter uncertainty, as well as include platforms to learn from feedback to modify the actions accordingly (Conde et al., 2005; Plummer et al., 2013).

Research claims that there is a shift in water management, where the concept is not any more “demand-and-control” but is defined as “learning to manage by managing to learn” (Bormann et al., 1994). The feedback process is often a weak link in the organisation, where the information or knowledge tends to stay with one person and is not always transferred into the system. This includes collaboration with a set of relevant stakeholders where knowledge is shared and feedback into the system of governance (Keen et al., 2005; Fazey et al., 2007). Nilsson et al. (2012) argue that “soft” governing tools, such as coordinating activities and facilitating learning among actors could be important in the implementation process of
government policies in Sweden. In fact they argue that the coordinating initiatives might be the main policy tool. Furthermore, an extreme event, a crisis, will motivate learning since the actors get a sense of urgency from the crisis, to solve one important problem (Leeuwis 2002).

**Water quality management, flexible institutions and stakeholder participation**

Sharing the water management power and responsibility with all relevant stakeholders is necessary in the AG analytical framework. The former demand-and-control method would not embrace the participation of stakeholders (Pahl-Wostl 2009). Research has underlined that the main components in governance theory, going from “demand-and-control” governance to AG-approach, should include collaborative efforts and participatory initiatives (Duit et al., 2008; Klijn et al., 2007). A careful stakeholder analysis would assist a sustainable and planned adaptation process, while at the same time ensuring that it is flexible (André 2012). Including various stakeholders in the AG-process to secure a good working-method, is therefore as important as being clear on the responsibility and decision-making for the governance process (Hahn 2011; Pahl-Wostl 2009).

Additionally, AG is strongly dependent on the flexible participation of stakeholders as well as giving access to different kind of knowledge for AG where innovative solutions might be found (Pahl-Wostl et al., 2008; Pahl-Wostl 2009). There is an aspect to the participatory AG, reflecting the connection between different stakeholders, in which AG is one way of addressing the participatory aspects in the management of natural resources (Stringer et al., 2006; Klijn et al., 2007). However, research on risk communication and citizen engagement highlights that the public dialogue is complex, in the sense that it gives the stakeholder a possibility to voice their concerns but it might not lead to a real opportunity to influence (Merkelsen 2011).

Swedish water management is dependent on the voluntary action, cooperation and networking to succeed. This implies flexibility on the part of the institutions dealing with water management. “Flexibility is the capacity to avoid maladaptive institutional arrangements that impede periodic changes to water allocation and planning in response to new information” (Bark et al., 2012). However, one must emphasize that AG has to strike a balance between flexibility and the need for the stakeholders and networks to have a mandate to address issues, e.g. drivers for climate change (Galaz et al., 2014).

**Combined interacting aspects of Adaptive Governance**

Folke et al. (2005) described four interacting aspects in AG. The four aspects could briefly be summarized as:
1. “Build knowledge and understanding of resource and ecosystem dynamics, where the knowledge has to be taken into account, translated and used in the social system”.

2. “Feed ecological knowledge and understanding into adaptive management practices”, in an organisation and culture that is open and innovative, where experimentation and evaluation has its given place.

3. “Support flexible institutions and multilevel governance”, where the sharing of management power and responsibility and co-management is the preference leading to “cross-level interactions”.

4. “Deal with external perturbations, uncertainty and surprise”, which means to deal with things such as climate changes and to enhance the adaptive capacity to deal with changes (Folke et al., 2005).

As demonstrated there are various analytical frameworks, approaches and interacting aspects applicable for AG. Taking these diverse theories into account, when discussing the results, the main theory of the study remains the AG theory in line with Folke et al. 2005.

2.2 Adaptive Governance analytical framework – applied for this study

The three first aspects of the framework of Folke et al. (2005) will form the basis for the analytical framework (the fourth being considered an outcome of the first three) in this study. The aim is to determine how the three Swedish municipalities have adopted AG, into their water quality management, by examining if and to what degree the individual municipality has introduced the three aspects (no. 1-3, see 2.1, above), forming the main interacting components in the analytical framework. The fourth aspect “Deal with external perturbations (…)” is focused on the measures to be taken after the “crisis”. This study focuses mainly on how the concept of AG could be applied on water quality management, and that is also why the fourth aspect has been left out. In the subsections of this chapter, it will be demonstrated how these three aspects, hereinafter called the components, should be interpreted, relate to and should be applied to this study.
It is important, throughout this study, to keep in mind that “Build ecological knowledge” should take into account the understanding of ecosystems and resources (read water) and should relate to the SES, meaning that ecological knowledge should relate to, and be translated and used in the social system. Therefore, this component does entail what prioritizations have been done, if climate change is part of the ecological knowledge and if climate change is dealt with through a clear responsibility (the clarity of who is responsible for what at the municipality) and if the concept of ecosystem services is applied and used.

“Feedback of knowledge”, should, throughout this study, be related to ecological knowledge and understanding of the ecosystems and water, with a focus on how this knowledge is transferred into the water quality management, and how the AG-approach for an organisation is open and innovative, where experimentation and evaluation has its given place has been implemented. Openness in this perspective also includes welcoming new information, both from formal and informal sources.

Finally, “Flexible institutions”, throughout this study, should include the support from the municipality to be flexible and to embrace the multilevel governance, where the sharing of management power and responsibility and co-management is the preference leading to “cross-level interactions”. It also translates into the analysis of preference for governance to stem from the municipality (local) or the county (regional), as well as the structure, flexible or not, of working-methods to adapt to cope with crisis due to climate changes, so as to meet the needs of a dynamic, non-predictable social-ecological system. Furthermore, the analysis of flexible institutions reveal which stakeholder is invited.

For further details on how these three components have been analysed, to interpret how the AG-approaches have been used and what facilitates and hinders the same, please see Methods- and Results-sections.

2.4 Gaps in Adaptive Governance research

Research has gaps when it comes to AG and natural resources. There is a need to analyse existing governance systems with respect to today’s non-linear, dynamic and non-predictable environment (Duit et al., 2008). This study contributes to this analysis. There are challenges to sustainable development, such as climate change, and there is a need for further research in the field of climate change adaptation (Nilsson et al., 2012), its institutionalization and the division.
of responsibility and empirical data. This study will add knowledge to AG in an administrative context, at the local level. It aims at contributing to the practical implementation of AG in water quality management. It will give an insight to which barriers and drivers, or facilitators, that exist when implementing AG at local level.
3. Case Study

3.1 Case study selection and description

This case study is part of a larger project and study on the Mälardalen region (Sweden) and the capability of individuals and organisations to adapt to new conditions and to manage water as a resource, taking into account climate change. That project looks at AG at a multilevel regional governance of Lake Mälaren drainage basin. To complement that study on a regional level, this study focuses primarily on actors and their activities regarding water quality management on a local scale. For this purpose the geographical areas of three Swedish municipalities: Kalmar, Västerås and Upplands Väsby, and their catchments were selected.

Reasons for choosing these cases were multifold. First, these municipalities had shown an interactive approach towards using the methods found in AG, based on experiences in EKOKLIM\(^1\). Second, pre-interviews were carried out with the three municipalities, in this study, and the municipalities of Sala and Strängnäs. The pre-interviews supported the conclusion that the three could be a good selection since they all indicated inclusion of AG in their water management. Third the three cases all covered different, vulnerable and interdependent geographical areas, including a sea, a lake and a river (Figure A and C, D and E).

\[\text{FIGURE A: Sweden: Water Framework Directive River Basin Districts} \]

\[\text{Source: http://ec.europa.eu/environment/water/participation/map_mc/countries/sweden_en.htm}\]

Focus for this study is water quality management and the implementation of the WFD in the Swedish municipalities for their prioritized catchments, being the Baltic Sea for Kalmar, Lake Mälaren for Västerås and Oxunda River for Upplands Väsby. The various water quality status grades according to WFD is: high, good, moderate, unsatisfactory and bad. The boundary between good and moderate is important because all bodies of water that are below the limit of moderate require action and measures taken. The WFD is to be implemented in all 28 EU Member States, plus Norway.

FIGURE B: State of play of the implementation of the WFD in the Member States of the European Union, plus Norway. Countries in red (Spain and Greece) have not yet concluded their consultations with stakeholders, nor provided the EU Commission with their River Basin Management plans.

Source: http://ec.europa.eu/environment/water/participation/map_mc/map.htm
The respondents, in this study, represent experts in water quality management, climate strategy, city planning, communication and the employees at the municipal water company plus the water governance body of the city council, dealing with policy. Politicians have not been included as respondents since politicians, in comparison to civil servants, often leave their assignments quite abruptly.

3.2 The municipalities; prioritized water management areas; collaboration

**Municipality of Kalmar**

Kalmar is a coastal municipality with a population of about 63,700. Kalmar has identified the coastal area as the most important water resource. The biggest issues affecting this area are eutrophication and environmental toxins such as mercury. Because of the small sizes of all Kalmar’s neighboring municipalities, and Kalmar being a medium sized Swedish municipality, there is a need and a strong will to collaborate amongst neighboring municipalities in this region. The “Kalmar Bay Comission” was introduced in 2006 and entails a large number of municipalities, collaborating on water management. With regards to the EU WFD, Kalmar has challenges fulfilling the criteria for good water quality status in 2015; therefore the objectives are set for 2021.

**Municipality of Västerås**

Västerås has a population of approximately 149,500, and is the sixth largest municipality in Sweden. The city of Västerås focuses its water management on Lake Mälaren, the third largest Swedish lake, being the fresh water source for the region of Mälaren and Stockholm. The focus on Lake Mälaren and the location of the municipality of Västerås has led to collaboration with other municipalities, adjacent to Lake Mälaren. The collaboration is named “Mälaren en sjö för miljoner”/ “Mälaren, a lake for millions”. The aim of the collaboration, run by the Water Council of Lake Mälaren, is to ensure that Lake Mälaren reaches the ‘ecological water quality status’ good by 2021, in accordance with set objectives at the regional level. All in all, there are 22 municipalities collaborating in the project.

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Municipality of Upplands Väsby

Upplands Väsby, part of the Stockholm county, has a population of about 41,500. The municipality of Upplands Väsby does not share a lake or a sea with other municipalities but one of the most prioritized areas and catchments is the area of Oxunda River where the municipality of Upplands Väsby has a collaboration with neighboring municipalities and the local water management authority. The Collaboration of Oxunda River, “Oxunda Samverkan”, which was started in 1998, aims to improve the water quality in the catchments of that region, which constitute the drinking water reserve for large parts of the region, as well as to preserve a diversity of plant and animal species and their habitats in lakes and streams. Upplands Väsby faces challenges in reaching ‘good ecological water quality status’ by 2015, while the objective of reaching the target of ‘good chemical water quality status’ (mercury excluded) will be reached by 2015.

(For further details on the municipalities, please see Appendix V.)
4. Methods

This study uses a multiple case study design to gain empirical results (Yin 2009). This structure will help the researcher to analyse what facilitates or hinders the implementation of adaptive quality water management including the components of AG (Yin 2009). The case study in turn applies two methods: in depth interview and document analysis. The study adopts qualitative case methodology that uses semi-structured open-ended interviews and document analysis, and combines these in a model for assessing AG on a local level in the Swedish municipalities. This interview model has been recommended by Plummer et al. (2014) to understand the motivations, activities and involvement of the individuals.

4.1 Semi-structured interviews

To scrutinize the perspective and understanding of water quality management in their respective municipalities, 17 interviews were carried out with municipal civil servants between November 2013 and January 2014. The interviews aim to show the full nature of governance approaches and would identify drivers and barriers for change (Pahl-Wostl 2009) as well as identify if the municipalities are more or less supportive of AG (Ebbesson 2009).

The interviews were conducted using a semi-structured template (Kvale 1996). Most of the interviews were carried out by telephone with one informant at a time. The exception was the municipality of Kalmar in which one of the interviews was carried out with three respondents at the same time, similar to a focus group, and two of the interviews took place in Kalmar at the municipal offices.

To analyse how the local municipalities have adopted the AG approach the components have been broken down into nine variables (A-I), to help interpret the findings (Yin 2009). The qualitative assessment of each variable is supported by the questions and answers in a semi-structured interview guide (Appendix I).

4.2 Analytical framework; Adaptive Governance

A template for coding the interviews is found below (Table 2). It relates its three components with cross-reference to the interview guide (Appendix I).
The key empirical observations are shown, by breaking down the results in two different ways:

- One presents the results, a summary of the answers given by the respondents, broken down for each one of the three municipalities (Appendixes II-IV). Each municipality has its Appendix (II-IV) indicating the drivers and barriers to AG-approaches per component, in accordance with the interview guide (Appendix I).

- The other presents the results broken down for the respective municipality and is giving a qualitative analysis of each variable, indicating the individual level of drivers and barriers to AG-approaches for each municipality, in “5.1 Presentation of the interviews”.

**Presentation of the analytical procedure; template for coding**

The results of the study show what facilitates and hinders AG in relation to the working methods at the municipalities – from policy to practice. This section describes the analytical process used for the analytical framework to identify AG-approaches in water quality management at the three municipalities. The aim was to make a comparison between the three components in the model and between the three municipalities, to identify barriers or drivers to AG-approaches.

Following steps have been taken, in chronological order, in order to present the results (see 5.2) in this study. The three AG-components were broken down and are reflected by correlating questions in the interview guide (Appendix I). The interviews were recorded and notes were taken. The fieldwork and the empirical evidence was translated and summarized (Appendixes II-IV). Each of the components was broken down into variables (9 variables in total, named with the letters A-I) in order to facilitate an in-depth analysis. Each variable was qualitatively analysed, in accordance with the empirical evidence.

To illustrate how the analytical framework is constructed, table 2 presents the three AG components, with the appropriate question (Interview guide, Appendix I) attached to the component.
Table 2: AG-components with the subject explored (Column 1-2, Appendix II-IV) alongside with the questions used in the interview guide (Column 3, Appendix I). The questions in table 2, column 3, have been translated from Swedish into English.

<table>
<thead>
<tr>
<th>AG components, according to the analytical framework</th>
<th>Name of municipality</th>
<th>Questions (translated into English) to support or oppose the component</th>
</tr>
</thead>
</table>
| **Build ecological knowledge (AG 1:1a)** | “X” | **Explores:** How is knowledge built, which stakeholder has contributed and to what degree is the water management institutionalized.  
 | | **What issues with regards to water have been prioritized and why?**  
 | | **What actors have been participating in the prioritization of the same, external and internal stakeholders?**  
 | | **If all stakeholders left their position, how would the water management continue to work?** |
| **Build ecological knowledge (AG 1:1b)** | | **Explores:** Who is responsible, how do you work with and how is knowledge transferred regarding climate changes within the organisation.  
 | | **How do you cope with unpredictable and fast moving changes, in particular adaptation to climate changes?**  
 | | **How have your working methods changed?**  
 | | **Who is responsible for the issue of climate changes and how is it coordinated?**  
 | | **What policies or documents are there to support the work with climate changes?** |
| **Build ecological knowledge (AG 1:2)** | | **Explores:** Is the concept of ecosystem services a part of the knowledge and understanding of ecosystem dynamics?  
 | | **If so, how is knowledge built through communication to other stakeholders in the municipality?**  
 | | **How do you work with the concept of ecosystem services;**  
 | | **• how do you communicate this, and if so,**  
 | | **• what target groups, both externally and internally, do you have?** |
| **Feedback of knowledge (AG 2:1)** | | **Explores:** What barriers are there, that could hinder the feed in of knowledge into the adaptive governance practice  
 | | **How do you get input and handle knowledge from the catchments?**  
 | | **How is this knowledge transferred?**  
 | | **What are the factors that make you use some knowledge and not other?** |
| **Feedback of knowledge (AG 2:2)** | | **Explores:** If new knowledge, or a new result is found,  
<p>| | <strong>Are there continuously follow-ups to activities or projects, e.g. measurements?</strong> |</p>
<table>
<thead>
<tr>
<th>Flexible institutions (AG 3:1)</th>
<th>Explores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is your organisation flexible in structure and in the systems that handles incidents of climate change?</td>
<td></td>
</tr>
<tr>
<td>What changes have been made in the system and/or organisation, e.g. integrally, the coordination to support the flexible institution and multilevel (locally), the governance system?</td>
<td></td>
</tr>
</tbody>
</table>

| What unpredictable incidents, e.g. climate changes, have occurred? |
| How will you, or did you manage those? |
| Are you prepared? |

<table>
<thead>
<tr>
<th>Flexible institutions (AG 3:2)</th>
<th>Explores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the organisation an open body, welcoming new input, actively taking measures for inviting those actors and how are the sources judged as being trustworthy or not.</td>
<td></td>
</tr>
<tr>
<td>How is the local water management best run, through regional governance (law and instructions) or locally through collaboration?</td>
<td></td>
</tr>
</tbody>
</table>

| What collaboration with other stakeholders is most important, why and what do you collaborate on? |
| What about actors outside your network, how do you get their input? |
| What is your preference; regional governance or non-mandatory interaction locally? |

The analytical framework in Table 2 was used to summarize the results from the interviews, as a first step. The results were then scrutinized in another layer, with the assistance of the nine variables (A-I). The empirical evidence is obviously the same as for table 2, but the information has been divided even more in detail to identify the barriers and drivers. The themes in table 2 (presented as empirical evidence in appendixes II-IV) were divided into variables so as to demonstrate and identify underlying causes to the barriers or drivers to AG-approaches. The definition of the nine variables is illustrated below.

**AG 1: Build Ecological Knowledge**

A. Explored: *Openness to include stakeholders to prioritize issues in the water management process* (Interview guide AG 1.1.a)

B. Explored: *Institutionalized working methods, prevent large gaps in the water management process* (Interview guide AG 1.1.a)
C. Explored: *Acceptance of, and clear responsibility for, climate changes and adaptive working methods to cope with those changes* (Interview guide AG 1.1.b)

D. Explored: *Good ecological knowledge and strategic communication of "ecosystem services" used both internally and externally* (Interview guide AG 1.2)

**AG 2: Feedback of knowledge**

E. Explored: *Employees and organisation are open to feedback and have low barriers to feed in ecological knowledge, with regard to both internal and external stakeholders* (Interview guide AG 2.1)

F. Explored: *Continuous measurements in water management projects, evaluations, follow-ups of the results that increase the feed of knowledge into the system.* (Interview guide AG 2.2)

**AG 3: Flexible institutions**

G. Explored: *Readiness and ability to cope with crisis due to climate changes through flexible working methods. Meet the needs of a dynamic, non-predictable social-ecological system* (Interview guide AG 3.1)

H. Explored: *Willingness to include actors outside the “normal” network and formal institutions.* (Interview guide AG 3.2)

I. Explored: *Interest of regional cooperation indicates a more multi-level approach* (Interview guide AG 3.2)

The reader will notice that the content in the interview guide for each component, such as the formulation of the questions, is sometimes overlapping between the different components and variables. This is done deliberately, aiming to capture the most important information for each component in an open-ended interview method. The questions are formulated to expand on the perspective of the original theoretical framework of Folke et al. 2005. Therefore, although the variables may seem similar, they are attached to different components, and as such, should
identify the underlying causes that could hinder or drive the development of AG-approaches. For instance, variables for both component 1 and 3 include “learning, openness and collaboration”, since they are important for both components. Likewise, component 1 and 2 both discuss “ecological knowledge” since this is vital for both components.

4.3 Document analysis

To triangulate the empirical evidence from the interviews, respondents were also asked to highlight important documentation that assists them in their practical implementation of the water quality management. Documents, such as ‘water and drainage plan’, ‘water plan’, ‘communication plan’, ‘climate change adaptability plan’ and ‘climate strategic plan’, were identified as crucial by the respondents. The documents were provided to the researcher and structured in accordance to the Table in Appendix VI. Each policy document was identified with the ‘date of decision/date of enter into force’, ‘owner of the document (division at the municipality)’ and the ‘type of document (guideline or program)’.

These policy papers (Appendix VI) were scrutinized by the researcher, to find out if they explicitly mentioned “water quality management”, and if so, in what way/how water quality management was documented. For further details, please see Appendix VI, column “Content relating to water quality management”. Results are presented in 5.2, stemming from the document analysis presented in the column mentioned above.

4.4 Ethical considerations

Parts of the interviews were recorded; parts of the interviews were transcribed from listening. When respondents were recorded, they were asked for permission. Data was treated with confidentiality. Therefore, recorded interviews and transcribed interviews, where the respondents name or voice may be identified, will not be exposed to anyone but the researcher. Data has been transferred into the study in an anonymous way, only indicating which municipality represents a certain citation or view.
5. Results

The results presented in this section demonstrate how AG-approaches have been adopted and what facilitates and hinders that process.

The status of the water quality in the three Swedish municipalities of Kalmar, Västerås and Upplands Väsby is shown in Appendix VI, where the mapping and data from the county administration is found. There are challenges for the municipalities, in particular when it comes to eutrophication, flooding and rising sea/lake levels and climate change. Kalmar, being a coastal municipality by the Baltic Sea has severe issues to deal with in order to reach the ‘good ecological’ and ‘chemical status’ in the coastal area. Västerås and Upplands Väsby both face challenges with reaching the objective of ‘good ecological status’ of the water quality in Lake Mälaren and Oxunda River.

In light of the AG analytical framework, the plans and strategies of the municipalities are lagging behind. Facilitators and drivers for the adaptive water quality management are found, where people are committed to cooperate, both internally and externally, to reach the objective of ‘good water quality statuses (for both chemical and ecological water quality). In contrast a low level of willingness to welcome new and innovative ecological knowledge, to share it and to incorporate it into the systems for water management, hinders the introduction of AG.

5.1 Presentation of the interviews

The results are presented for each component, showing the level of achievement for each variable (A-I), to demonstrate the municipalities approach to AG. Given the results, two of the components, namely ‘Build ecological knowledge’ and having ‘Flexible institutions’ are indicating a high level of AG-approaches in the working methods in all three municipalities. On the other hand there is also an overall barrier for ‘Feedback of knowledge’ into the systems and water management at the local level, which also indicates barriers to the full implementation of the EU WFD. The results for each variable and each municipality plus a summary of the overall level of achievement of the AG-approach for all three municipalities for each variable are shown below.
**Variable A explored: Openness to include stakeholders to prioritize issues in the water management process**

There is a high degree of openness, defined as providing for broad participation of stakeholders in local decision-making (Ebbesson 2009) in the water quality management process. Formalized cooperation between municipalities in the region and "water councils" is the most common channel of communication.

There is a platform for dialogue with external stakeholders, but at the same time there is a barrier including those stakeholders in the process of decision-making, since municipal employees make decisions on water quality. As an example, Upplands Väsby has decided to include all officials at an early stage in water quality management and has implemented the quality standard (ISO 14001), but it is still limited only to the municipality’s employees.

Huitema (2009) underscores: “However, there is ample empirical evidence that public participation can contribute to decision-making and can result in more creative and new solutions, can improve relations between those involved, and can prevent legal challenges during later stages of the decision process”,

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperation, coordination and shared knowledge are key components: inclusion of all municipalities in the prioritized area, water councils active, projects on citizens' level through associations/&quot;samfällighet&quot;. Low participation of external stakeholders in decision-making when prioritizations are made, water councils function merely as knowledge</td>
<td>Strong will to include all stakeholders. Water councils are well functioning, but obstacles with farming, since that is an area outside of the jurisdiction of the municipality. Shared responsibility within the water management, leading to a spread in knowledge (internally and externally).</td>
<td>Involvement of all employees at an early stage in the process. Working on projects with many employees, engagement from employees and emphasis on communication (internally and externally) are key factors to success. Awareness of the need to involve citizens to a higher degree in the</td>
<td>Overall high degree of openness to include stakeholders. However not particularly open when decisions on what to prioritize are taken.</td>
</tr>
</tbody>
</table>

Table 3: Variable A (Interview guide AG 1.1.a)
| sharing hubs. | water management. Priorities are made through ISO 14001, a system that helps to institutionalize water management. However, the values of "understanding" and "collaboration" are not stated in any working method, but it is the working culture that is another key factor for success in water management. |

Variable B explored: Institutionalized working methods, prevent large gaps in the water management process

The mandatory requirements such as the environmental norms, set by law and overseen by the county administration, are met. However, non-mandatory initiatives to measure the water quality are less evident and require both human and financial resources, which are also less prioritized. Given these facts, an increased level of exchange and sharing of knowledge as well as coordination initiatives between municipalities are needed (Simonsson, et al. 2011).

“The system is part of our planning and will keep on running even if people leave their assignments. There are no written procedures for the working methods, which could easily be handed over, that address ‘understanding’, ‘collaboration’ and the culture at work. This could be done to secure the process. There is a necessity to secure the plans and the actions at the political level, if not, they [the plans] do not exist and cannot be implemented.”

(Respondent at Upplands Väsby).

The results indicate an interest from the municipalities to work towards an institutionalization of the water quality management, including plans and water councils. To institutionalize working methods is seen as a method to prevent large gaps both in ecological knowledge and in the process of developing the water quality management. The approaches differ but the
vulnerable non-mandatory water quality management is still not institutionalized, or institutionalized to a lesser degree, than the mandatory requirements.

Table 4: Variable B (Interview guide AG 1.1.a)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveillance is institutionalized because it is mandatory. Non-mandatory water management needs engagement and funding for both human and financial resources, which are key components. <strong>Vulnerable non-mandatory water management</strong> is dependent on the political will.</td>
<td>The positions (number of employees) specifically for water management have increased and are determined on the management level. Therefore the water management is institutionalized, to some degree. However, the ambitions with the water quality management are not clearly stated.</td>
<td>ISO 14001 prevents some of the gaps in water management. There are still gaps in the area of “who is responsible for what”. There is an awareness that an increased focus should be put on the exchange of experiences and knowledge to make the best prioritizations.</td>
<td>Overall average level of institutionalizing working methods in water management.</td>
</tr>
</tbody>
</table>

**Variable C explored: Acceptance of, and clear responsibility for, climate changes and adaptive working methods to cope with those changes**

**Climate change** is well accepted as a phenomenon by all three municipalities, the ‘**responsibility**’ is clearly defined and working methods are developed in the ‘climate change adaptation plan,’ where an increased awareness to work in a long-term perspective is evident (Upplands Väsby). This result shows a clear development towards AG and, compared to earlier research, demonstrates that the ”wait-and-see” strategy to climate change is less evident now, in comparison to some years ago (Galaz 2005).
Table 5: Variable C (Interview guide AG 1.1.b)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is an acceptance of climate changes. The responsibility is also clearly expressed and the issue is highly prioritized. <em>Strategy for climate change adaption</em> is being produced, but is not implemented.</td>
<td>A clear acceptance of climate changes exists. A plan for climate change is produced, focusing on preparation and long term planning. The responsibility is clearly appointed to the management level. (&quot;Kommunledning&quot;) but also shared with others in the municipality.</td>
<td>Awareness of the need to work with climate change in the long-term perspective exists. A plan for climate change adaptation is being produced.</td>
<td>Generally there is an acceptance of and clear responsibility for climate change and to adapt to the same.</td>
</tr>
</tbody>
</table>

**Variable D explored:** Good ecological knowledge and strategic communication of “ecosystem services” used both internally and externally

‘Ecosystem services’ is simply not used as an expression, yet all three municipalities are elaborating the concept. There is a growing interest for developing the concept ‘ecosystem services’ as a tool, both for internal and external communication.

Table 6: Variable D (Interview guide AG 1.2)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low knowledge of ‘ecosystem services’, no strategic communication of the same. There is a will to develop the concept of ‘ecosystem services’.</td>
<td>The concept “ecosystem services” is not used often, nor communicated. Instead the municipality uses “balanced community construction” (balanserad samhällsbyggnad),</td>
<td>Increased knowledge of the concept during the last two years. Still low knowledge and the concept is not used in communication. Awareness of the possibility of using the “concept for future</td>
<td>Low knowledge of and low usage of the concept of ecosystem services.</td>
</tr>
</tbody>
</table>
where there is a tool for compensation for things such as green spaces. communication. Today “sustainable development” is used.

Feedback of knowledge (Variables E-F)

Variable E explored: Employees and organisation are open for feedback and have low barriers to feed in ecological knowledge, with regard to both internal and external stakeholders

Municipal structures, which enable an active search for and inclusion of new ecological knowledge into the system are weak, in particular when sources are seen as informal, such as e.g. citizens and farmers. Therefore, officials working practically with water quality management rely and depend on formal sources. Some civil servants have indicated that they would like to include new information, stemming from informal sources, but challenges are evident, such as the validation of the sources and information (Upplands Väsby). The selection of what information to include into the municipal system for water quality management is done subjectively and with a personal preference (Kalmar, Västerås). This leads to the exclusion of some ecological knowledge and is identified as a barrier to AG adaptation in water management. Formal sources are seen as the official channels while informal sources are seen as those sharing social och cultural norms (Pahl-Wostl 2009).

“If the information gathered is applicable for services within the municipality, and if the information/measurement to be taken is cost effective, the information would be considered to be included in the system of communication and knowledge regarding water quality management. There is a need for the municipality to be clearer to the respondent on the purpose of gathering information. For example it needs to be made clear whether or not the respondent truly has the potential to influence the decision-making process. There is also a need to clarify the concept of ‘collaboration’ and to specify who should be invited for the ‘hearing’ or meeting, as well as a need to produce a communication plan. The key to success still is the buy-in from the politicians.”

(Respondent at Upplands Väsby)
Table 7: Variable E (Interview guide AG 2.1)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input comes mainly from formal sources. There are barriers to welcoming knowledge from other sources, due to lack of a system to manage information, time constraints where new information is seen as time-consuming and lack of knowledge amongst citizens of what they could report or share to the municipality. Awareness of existence of barriers to feed knowledge into practice.</td>
<td>Water councils merely function as a forum for dialogue. Lack of formalized system to feed in local knowledge from informal sources into the water quality management system. Formal sources are frequently used. Tendency to only use trustworthy source to influence other actors. &quot;Västeråsbarometern&quot; is a transparent tool for citizens, where formal data is being published</td>
<td>Networking is key. Lack of system to gather the information from external sources. There is an awareness of the importance to feed local knowledge into the system and being clear on what is asked for. Still, there is a barrier from not knowing how to validate the information. Today the criteria for the validation of information could be &quot;if the information is applicable and relevant for the municipality and if it is cost effective, it is introduced&quot;. There is a need to produce a communication plan alongside the water plan, to state what decision is possible to influence and who should be invited, and how to define collaboration. Internally well functioning through system where all employees participate at an early stage in the process. Key to success is the buy-in from politicians.</td>
<td>Variation between the municipalities in the levels of having barriers to feed in ecological knowledge and thus to welcome and to include informal and new informants or stakeholders.</td>
</tr>
</tbody>
</table>
Variable F explored: Continuous measurements in water management projects, evaluations, follow-up of the results that increases the feed of knowledge into the system

There is an overall strong will and good skills to control and meet the environmental norms, while the awareness to analyse slow processes of ecosystems and following up on lessons learned, is low (Pahl-Wostl 2006). When the environmental damage on water is less concrete and less visible, it is also more difficult to convince politicians and to influence policy (Kalmar, Upplands Väsby).

Table 8: Variable F (Interview guide AG 2.2)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurements of a small portion of the catchments. Lack of follow-up after implementation of projects. There is an awareness of the need to have evaluations and follow-up.</td>
<td>Good understanding of the slow processes in the ecological system and the challenges with measurements taken today. Demand for information on quality norms is low, but there is an increased interest in the ecological system from politicians.</td>
<td>ISO 14001 with environmental certification is connected to the plans of action and the scorecard for the municipality. There is an awareness of and lack of (except for ISO 14001) the need to follow up, evaluate and register in database. Awareness of (and lack of) the need to reflect, define lessons learned and identify improvements for the future.</td>
<td>Variation between the municipalities, in the capacity of evaluating, following-up on results of water management projects. However overall there is a need to reflect, define lessons learned and identify improvements for future water management projects.</td>
</tr>
</tbody>
</table>
Flexible institutions (Variables G-I)

Variable G explored: Readiness and ability to cope with crisis due to climate changes through flexible working methods, which meet the needs of a dynamic, non-predictable social-ecological system

The municipalities have systems in place to cope with manageable and known changes such as flooding and droughts but there is still a lack of insight and action plan to cope with the unpredictable. However, they all have started producing plans for adaptation to climate change that will be in place within the next few years. Västerås and Upplands Väsby show an awareness of the need to include long term planning and to train employees in the area of climate change. Västerås emphasizes the importance of strengthening the internal communication regarding climate change.

Table 9: Variable G (Interview guide AG 3.1)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The water councils focus on flooding and droughts. Long term changes due to slow climate changes are not fully covered, partly because of the problem to get the approval from the politicians. Plan for climate change adaptation (2015) will make the issue more visible.</td>
<td>Climate change is on the agenda, including a long-term plan. Crises have increased the knowledge at the municipality, as well as fostered a better distribution of responsibility.</td>
<td>Awareness of the need to think differently, to manage climate changes and crises, and to accept fast and slow changes in the climate change debate. Key factors to success are reliable systems of communication and training the employees to manage crises.</td>
<td>Good preparedness to cope with crises due to climate change and to plan with a long-term perspective.</td>
</tr>
</tbody>
</table>

Variable H explored: Willingness to include actors outside the “normal” network and formal institutions

The multi-stakeholder approach is evident amongst all, but the approach is limited to the formal actors and the well-known networks, like the water councils. The strongest links with external stakeholders are found with their neighboring municipalities and are formalized collaborations. The weakest part of the multi-stakeholder approach is the low willingness to include actors outside the formal networks. Despite that, there is still an understanding of the
need to reach out to a larger audience, such as citizens and farmers. Upplands Väsby pointed out that participating stakeholders must be informed as to how and in what manner they would be able to influence the municipality; for example, there is a need for clarity in the external communication.

“There is one formal organisation, according to the organogram, but there is also an informal organisation, where civil servants are working on projects, no matter which department the civil servant belongs to. One crucial component is how this informal organisation is structured. In one example, the ‘water group’ in Västerås, employees can bring issues to next level, the decision-making group of directors. This informal structure is extremely powerful.”

(Respondent in Västerås)

Table 10: Variable H (Interview guide AG 3.2)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary source is the formal network and its actors; secondary source would be more informal as water councils, business, NGOs, farmers and citizens. All stakeholders are invited to participate. Awareness of the fact that due to citizens’ lack of knowledge of ecosystem dynamics and water quality management, emphasis is put on issues with less impact on the ecosystems.</td>
<td>Multi-stakeholder approach on the formal level. Key is the collaboration with other municipalities.</td>
<td>Input from formal sources of information. Through &quot;Oxunda-collaboration&quot; there is a willingness to include stakeholders outside the established network.</td>
<td>Average level of multi-stakeholder approach. High level of use of formal networks, low level of participants outside the formal and established networks.</td>
</tr>
</tbody>
</table>
Variable I explored: Interest of regional cooperation, which indicates a more multi-level approach
In AG, the sharing of management and responsibility lead to *multi-level governance*, which is preferred and helps create the cross-level interactions. The municipalities in this study all emphasized the importance of both regional governance and guidance from the county administration, and also equally the importance of a non-mandatory collaboration on the local level between municipalities (self-governance). Upplands Väsby clearly pointed out that strong local governance is the key to good water quality management, and is preferred over the regional governance. Kalmar and Västerås put more emphasis on the strength in having well-functioning regional governance that might lead to better local water quality management. Kalmar stressed the need for national guidelines regarding recipient controls, to facilitate the streamlining of working methods among the municipalities.

Table 11: Variable I (Interview guide AG 3.2)

<table>
<thead>
<tr>
<th>Kalmar</th>
<th>Västerås</th>
<th>Upplands Väsby</th>
<th>Overall level of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional governance is crucial to get financial support and could serve to put pressure on the prioritization process so that focus would be on water quality management at a local level. Local non-mandatory cooperation is likewise important and is a key to success for the water quality management.</td>
<td>Regional governance must be there to support the local collaboration. There is a need to formalize working methods that meet the demand in the WFD. At a local level, within the municipality, there is an informal structure (“water group”) and working methods that are seen as key for the water quality management in the municipality.</td>
<td>Non-mandatory collaboration is overall preferred, even if the regional governance is important too. If regional governance, there is risk to miss important local knowledge. There is an awareness of the need to evaluate the structure of the water councils, to avoid increased administrative burden but to have a well functioning cooperation.</td>
<td>Some variations between the municipalities in their preference for either regional governance or local non-mandatory collaboration. Overall, they all underscore the importance of having both, while some prefer the regional governance and some the local collaboration.</td>
</tr>
</tbody>
</table>
5.2 Document analysis

Having in mind that the Swedish municipalities decide independently on policy documents needed, there are some official documents, such as ‘water and drainage plans’, ‘water plans’, ‘communication plans’, ‘climate strategy’ and ‘climate adaptability strategy’, to some degree, which support the inclusion of AG into municipalities’ water quality management. However, the ‘climate strategies’ in all three municipalities are based on energy consumption, and water quality management is seldom, if at all, mentioned in the climate strategy. The ‘water and drainage plans’ focus on the infrastructure for water, while the ‘water plans’ have a strong aspect of water quality and therefore could be seen as supporting the AG-approach in some way.

The most interesting supporting document might be the “Climate adaptability plan/strategy” which these municipalities are working with, and will produce and implement in the near future. The respondents gave some insights as to what these strategies should look like and seem to acknowledge the importance of including the notion of climate adaptability and a non-predictable, dynamic and non-linear development of the environment. In addition, they are aware of the necessity to “look around the corner”, having a long-term perspective, introducing experimentation and following up on the results. These plans and strategies take into account values not necessarily seen elsewhere, for example, recreational value and other ‘ecosystem services’.

The document analysis shows if and how the ‘content, relating to water quality’ (see Section Methods) is reflected in the policy documents. There are variations in the motivation of water quality management in the policy documents:

Kalmar, in general, has a clear understanding of ecological knowledge and an awareness of its importance, for example, in the ‘water and drainage plan’, where climate change is clearly stated and will be further elaborated in the ‘climate change adaptability plan’.

Västerås has its ‘VA-policy’, where both WFD and planning for climate change are emphasized. Furthermore, Västerås has produced a pre-study for its ‘climate change adaptability plan’, in which a long-term thinking and a “look-around-the-corner”-approach is highlighted. It also aims at analysing the shared responsibility, ways of communication and how the ‘follow-up’ should be carried out.
Upplands Väsby’s ‘climate change adaptability plan’ reflects water vulnerability. Moreover, Upplands Väsby has an ‘ecological development plan’, where both green and blue values are covered.

5.3 Collaboration with other municipalities in the region

Water management is a shared responsibility between local authorities. This study has identified that one of the strongest linkages, for the cases at hand, to AG is the mechanism and the willingness to collaborate with neighbouring municipalities. The local collaboration is crucial and so is the collaboration between the municipality and the county administration.

Regional collaboration, Kalmar
The municipalities want to bring expertise together and share both the knowledge and the responsibility for regional water governance. That is why the Commission of Kalmar Bay (Kalmarsundskommissionen) was launched in 2006. The starting point was an action plan for measurements to be taken, and the Commission was to support local initiatives, as well as municipal actions, and research for better water quality. Examples of on-going activities include the establishment of wetlands and nitrogen traps, enhancement of private sewers, rainwater runoff, improved management in agriculture, reed cutting and throughput measures, sewage dump stations for boats and boat wash stations that can reduce the use of toxic antifouling paints (www.kalmarsundskommissionen.se). Part of the catchment is demonstrated in Figure C.

http://www.kalmarsundskommissionen.se/omkalmarsundskom
Regional collaboration, Västerås

The project “Mälaren, a lake for millions” aims to increase the pace of action to achieve environmental quality standards for water in Lake Mälaren, including its catchment area. The project runs from 2013-2015. The activities will focus on seminars and meetings, networking
Project development is focused both on supporting internal projects of the local governments and seeking funding for larger projects where more municipalities can participate. Some of the results that the project wants to attain are: “all participating municipalities should have a policy for their work on environmental quality standards for water” and “the organisation for the project will help ensure that actions to take measures have been initiated by all constituent municipalities”. Figure D shows part of the lake called "Oxfjärden" where the municipalities of Enköping, Västerås and Strängnäs share the responsibility for this specific area.

Figure D : Part of Lake Mälaren ; Oxfjärden

Source: http://www.viss.lansstyrelsen.se/Waters.aspx?waterEUID=SE660124-156481&userProfileID=3

*Regional collaboration, Upplands Väsby*

The Oxunda Collaboration has produced a large number of studies and reports covering the region, in regard to water quality and the environmental norms that have to be fulfilled. Furthermore, the Collaboration works in accordance with a yearly action plan covering various topics for the region. One issue that has been identified in that action plan is the need to produce water plans, and water and sewage plans, for all the participating municipalities. Figure E shows part of the catchment where the responsibility is shared by the municipality of Sollentuna and Upplands Väsby.
Friction between local and regional levels

Respondents in this study on local water management highlighted the importance of coordination, both within the municipality, with other municipalities and with other external stakeholders.
There is friction between the county administration and the municipalities. The friction translates in hidden values and perceptions that might hinder the development of AG and is a barrier to building trust amongst stakeholders on the regional and local levels. Many respondents say they use the information from the county administration for gathering knowledge about social-ecological systems, implemented in the water quality management system on the local level. However, there seems to be a gap between the regional and local level, because the municipalities see themselves as “doers” and the county administration as an informative body. This way of separating the two governance bodies, in some cases, leads to friction in the collaboration.

This is not a clear-cut issue, contrary it has many layers, since the municipalities crave support from the regional body and at the same time state their independency. One respondent (Kalmar) explicitly expressed the need for regional governance and clear and harmonized working methods among the municipalities in order to “get things done in time”. Another respondent (Västerås) clearly stated the need for regional governance as a must, since the local collaboration was not sufficient. Yet another respondent (Upplands Väsby) claimed that the non-mandatory local collaboration is more important than the regional governance, since the latter could hinder the development of “creative ideas” through the “bottom-up perspective”.

The ‘water councils’ are meant to form the bridge between community stakeholders and the municipality. However, the councils’ work are not aligned with each other, and seem to be more of a forum for discussion, for exchange of views, where sanctions are taken only to improve certain technical issues in the area. The ‘water councils’ have less success being a referral body, representing citizens, NGOs, farmers, businesses and the municipality, one of the reasons being the wide variation of interests and opinions of the councils. One respondent stated that the collaboration in the ‘water councils’ had been institutionalized, which was not necessary, because according to the respondent: “Having other effective forms of collaboration was just as good as establishing ‘water councils’ ”. 
6. Discussion

The results show that the municipalities are advanced in their thinking when it comes to progressively increasing the knowledge of ecosystem dynamics, even if the use of the term ‘ecosystem services’ is almost non-existent, but it still serves as a good basis for developing the understanding of water quality management as part of a complex system (Moss et al., 2001). However, welcoming new knowledge into the municipalities’ water quality management system and practices, is more problematic and a barrier to systematically introducing new information, particularly from informal sources. Perhaps this is caused by an already set agenda that is difficult to influence. Therefore, timing is crucial to succeed with AG (Folke et al., 2005). The feedback mechanisms in place could also actually work for retaining core elements of status quo (Gunderson et al., 2006). It should therefore be emphasized that the interaction with the same stakeholders, such as in the water councils, may not always be meaningful (Biermann et al., 2010). However, the full stakeholder analysis is not covered in the analytical framework used for this study. Results show that it is crucial to invite relevant stakeholders to participate in the dialogue, while it has to be clear how, where and what the stakeholder may influence regarding the policy and water quality management (Merkelsen 2011).

The results show that there is a tendency to welcome the multi-level governance system for water quality management, where there is strong support for the cooperation with neighboring municipalities, and where the support and guidance from the regional authority and the county administration, is seen as an asset and help. The exception might be Upplands Väsby where there is a large interest for local independence over the regional mandatory governance.

The AG component: “Build knowledge and understanding of resource and ecosystem dynamics, where the knowledge has to be taken into account, translated and used in the social system” (Folke et al., 2005), could be clearly identified and supported in all municipalities, thus indicating a high degree of participation when looking into the participatory approach (Stringer et al., 2006; Simonsson et al., 2011). However, the municipal decision-making process in itself is somewhat less participation-friendly. Therefore, including external stakeholders and their ecological knowledge becomes critical, even if the sources are of informal character. The organisational structure, working methods and supporting documents addressed issues of climate change adaptation and in that respect, a change of people’s mindset (Simonsson et al., 2011). ‘Climate change adaptation plans’ facilitates the work of the municipalities in making uncertainties available for policy-makers (Pahl-Wostl 2002).
Since this study focuses on people working in water management, and one key issue is education, it would have been interesting to include an analysis of the kind of learning the municipalities are applying, which could facilitate the introduction of AG (Pahl-Wostl 2009). Knowledge and feedback of knowledge is covered by this study, but learning as such is not analysed in depth.

The AG component: “Feed ecological knowledge and understanding into adaptive governance practices, in an organisation and culture that is open and innovative, where experimentation and evaluation has its given place” (Folke et al., 2005), was not shown to be obvious with any of the municipalities. The municipalities want to integrate ecological knowledge, but it seems to remain a goal rather than a reality (Bark et al., 2012).

This indicates that the local authorities implementing the water quality management, still use working methods and systems for introducing information that are quite traditional and inflexible. The barriers to a full scale AG-working method seems to be an inability to welcome, introduce and implement ecological knowledge from informal sources, such as farmers or citizens, as well as a low interest and priority to evaluate, to experiment and to follow up results from projects which are closely connected to water quality management. With regards to the experimentation, Huitema (2009) stresses; “The choice of measures to study and the interpretation and presentation of the results always depend on the values and influence of the persons and values involved.”

Barriers exist with regard to the feedback mechanisms for building ecological knowledge and are difficult to address, especially when there could be a lack of critical self-reflection in the day-to-day work (Pahl-Wostl 2009). This is a key finding and relates to people’s mindset when considering water management (Plummer et al., 2013; Pahl-Wostl 2010). It shows that the structures and the social-ecological process miss out on the possibility of including new and important ecological knowledge to enable complex problem solving (Österblom et al., 2013). This finding might have been further analysed using the analytical framework focusing on the inclusion of marginalised stakeholders, their knowledge and perspectives (Bark et al., 2012), but is not fully covered by the AG-framework used for this study. Furthermore this study focuses on governance and not on technological problems, since water crises often have been recognised as being crises of governance (Bucknall 2006).

The importance of introducing ‘ecological knowledge’ to policymakers and in doing so, assisting in shaping the future policies, is necessary for AG to work effectively (Stringer et al., 2006). However, the results indicate a lesser degree of inclusion of new and innovative knowledge (e.g. Berkes and Folke, 2002). Hence there are large incentives for enhancing this
component in Swedish municipalities. A mechanism to gather different stakeholders (e.g. water councils) could still push the iterative learning process (Bark et al., 2012).

The third component: “Support flexible institutions and multi-level governance”, where the sharing of management power and responsibility and co-management lead to “cross-level interactions” is supported and implemented more strongly by two of the municipalities. One of them indicates that the multi-level governance is not always the best solution, and stresses that the non-mandatory local collaboration and the self-governance of the municipalities are two governing methods that are equally important for the municipality. Huitema (2009) addressed the challenge with “polycentric governance” and underscored: “(…) coordination problems, transactions costs, and problem of democratic legitimacy”.

Keeping the self-governance structure was underlined as important, and working with neighbouring municipalities seems to be preferred over close cooperation-option with the county administration. In fact there is a friction, caused by different roles and perception between local authorities and the regional governing bodies. However, the horizontal municipal collaboration is seen as the “key for success” for good and effective water quality management.

What is the best option: regional governance or local non-mandatory interaction? The truth lies, as this study indicates, somewhere in between. Clear regional governance and rules sometimes serve well for the harmonization of working methods and for a uniform water management, in particular for the EU WFD. On the other hand, as expressed by a respondent in Upplands Väsby: “(…) too strong regional influence leads to a “mechanical” water management, with an increased risk that the creative and flexible working environment existing today is lost”.

The results show that networking, between municipalities, path the way both to an increase of ecological knowledge, to a better feedback of knowledge and to a stronger collaboration with actors with divergent beliefs but with a common objective. This is key for the introduction of novelty and innovations, which is a crucial component of AG (Österblom et al., 2013).

In summary, the strongest facilitator, in this study, is the component of building knowledge, collaborating and sharing between municipalities (Conde et al., 2005; André 2012; Simonsson et al., 2011). This is part of the structure in the systems of the municipalities and has shown to be an important part of an effective water quality management (Pahl-Wostl et al., 2008). This way of sharing ecological knowledge could be translated into: ”learning to manage by managing to learn” (Pahl-Wostl 2007).

No further analysis has been made on the societal network that ties together the AG system. This study touches upon the roles of individuals, e.g. building trust and vision, but it does not
carry out any deeper analysis of these aspects, important to AG (Dietz et al., 2003; Folke et al., 2005). The analytical framework used for this study, based on Folke et al. 2005, does not fully reflect the division in and analysis of further four important components in AG; ‘Actors, Networks, Organisations and Institutions’ (Österblom et al., 2013).

The analytical framework used in this study covers “managing uncertainty” through the analysis of how the municipalities have tackled climate change, both from a human resources perspective and from the priorities that the municipalities have done with regards to the elaboration of the climate adaptability plans. However, the framework for this study does not scrutinize the aspect of ‘managing uncertainty’ in detail (Bark et al., 2012). The same logic is applicable for ‘enhancing flexibility’, where the analytical framework for this study analyse whether or not the municipalities have adopted flexible working methods and how they are reflected in relation to the water quality management. The aim of this study has not been to ‘question adaptiveness’ (Biermann et al., 2010), why the reasoning from the study of Biermann (2010) is not scrutinized, except for the stakeholder engagement covered in the theoretical framework for this study and reflected in the results.

One may argue that the analytical framework based on Folke et al. 2005, also misses out the in depth analysis on two major components for AG, namely the ‘accountability and legitimacy’ and the ‘evaluation and monitoring’ (Biermann et al., 2010; Plummer et al., 2013; Ebbesson 2009). These components have an impact on decision-making and AG in the municipalities, and the results for this study show that the ‘water councils’ are mainly arenas for discussion, whereas experimentations and projects are merely implemented, evaluated and monitored. These have been designated as areas for further research (Plummer et al., 2013). Leadership is another important component for driving change and adapting the organisation and its water management (Ebbesson 2009), not covered specifically in the analytical framework used for this study, even though the results, from the interviews in this study, indicate a need for strong leadership in the ‘water councils’.

Moreover, the analytical framework used for this study does not thoroughly analyse the political dimension, such as the ruling political party and the political will of local water quality management, although politics governs changes and approaches within municipalities and the institutionalization of the same (Olsson et al., 2010), and the results from this study clearly show that politics could hinder a full scale AG-approach and underline the importance of connecting science to politics (Pahl-Wostl et al., 2013).

Finally, it is of interest to underline that the choice of AG-theory was done before choosing the case study design, which has been found important for the result of the thesis (Yin 2009). The
results have been triangulated and compared to the document analysis made by policy documents applicable for the local water quality management in the municipalities.
AG reflects and is driven by the way that people choose to work, the atmosphere in the working place, openness based on values such as respect and understanding, and the curiosity among the civil servants at the municipalities. Barriers have been identified and do give an indication on where to put the effort and the focus for the development of AG. Furthermore, one major issue lies in the collaborative process where information is shared, but not recognised as a legitimate source, when stemming from the bottom-up approach.

Based on the empirical evidence and theoretical research in AG, this study speaks to the need for science to bridge knowledge and concrete actions, and as such, influencing policy in water governance. The strengths in AG revealed by this study, could serve as an example for other Swedish municipalities of how AG could be practically applied. These are results at the local level in Sweden, but other Member States in the European Union could be facing similar challenges to reach the targets and levels for what is a ‘good water quality status’ in the EU WFD. AG could pave the way to a more effective, innovative and fast-moving method of working, needed to cope with forthcoming challenges.

This study argues that the key to a strong adaptive water quality management is hidden in the mindset and traditions of people and organisations, and thus could be seen as a challenge. Still the study affirms that there is a clear movement towards AG in water quality management in Sweden, at municipal level. Therefore, the combination of AG and behavioural science is an area for further research, particularly as it relates to “accountability and legitimacy” For the latter, one could choose to concentrate on expanding the scope of the Swedish case study, including a larger number of municipalities, or to focus on a comparison of water quality management on a regional level, by comparing similar Member States of the EU.

Results based on either a full-scale national or a regional level, could lead to future changes in the development of policies for water quality management within the EU, be it within amendments to the WFD or elsewhere. Results could thus lead to a higher level of use of AG, thus introducing a modern way of addressing future challenges within water quality management.
8. References


Nykvist et al. manuscript; Boyd, Nykvist et al.


Non-published papers:

The Road to Dignity by 2030: Ending Poverty, Transforming All lives and Protecting the Planet, Synthesis Report of the Secretary-General On the Post-2015 Agenda, New York, December 2014


Websites:


Other grey literature:

APPENDIX I: Interview guide, questions in Swedish

*Adapted Interview guide (EKOKLIM) by Ulrika*

*Organisation: __________*  
*Respondent: __________________________*  
*Interviewer: Ulrika Lyckman-Alnered*

<table>
<thead>
<tr>
<th>Theme/Question</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Adaptive governance theme 1</strong></td>
<td>“Build ecological knowledge”</td>
</tr>
</tbody>
</table>


1.1.a Vatten är en av kommunens arbetsområde, vilka frågor är på agendan?
Vad gör att dessa vattenfrågor har prioriterats av kommunen?
(Några specifika avrinningsområden? Om detta inte redan har nämnts av respondent)

Vilka aktörer, externt såväl som internt, deltar i framtagande av dessa prioriterade frågor?

Om alla ansvariga för vattenförvaltning nu slutade på kommunen hur skulle det fortsätta fungera med vattenförvaltningen?

1.1.b På vilket sätt arbetar ni med plötsliga och oförutsedda förändringar och särskilt anpassning till klimatförändringar?

Hur har ni utvecklat ert arbetssätt inom kommunen för att möta förändringarna, låt säga under de senaste två åren?

Hur ser ansvarsfördelningen för frågan om klimatförändernar ut inom kommunen?
(Hur koordineras frågan om klimatförändringar inom kommunen? Om detta inte framkommit i frågan ovan.)

Vilka policydokument finns som behandlar klimatförändringar och som styr kommunens arbete med desamma?

1.2 Hur arbetar ni med begreppet ekosystemtjänster?

Hur ser kommunens kommunikation av ekosystemtjänster ut?

Vilka styrdokument, strategier, finns för kommunikationen?
| Vilka målgrupper finns för denna kommunikation, internt såväl som externt |  
|---|---|

2) "Feedback of knowledge"

2.1 Hur hämtar ni in/tar ni om hand kunskap kring avrinningsområden? 
Hur förs den vidare? 
Vad är det som gör att viss kunskap används, medan annan inte? (Vilka barriärer finns?)

2.2 Finns det kontinuerliga uppföljningar av "aktiviteter"? (t.ex mätningar som görs regelbundet eller program för uppföljning av projekt som genomförts) 
Hur arbetar ni med dessa resultat?

3) "Flexible institutions"

3.1 Kan du ge något exempel på oförutsägbara händelser, tex Klimatförändringar, och hur ni hanterade eller kommer att hantera det? 
Är ni förberedda? 
Hur har ni utvecklat ert arbetssätt/förvaltning av vatten för att möta dessa oförutsägbara händelser?
3.2 Fortsättning, samarbeten och samverkan, institutionellt överblick

- Vilka **samarbeten men andra aktörer** är viktigast? (fyll i tabell nedan)
- Varför?
- Vad samverkar ni om?
- De som ligger lite utanför era nätverk – har ni system för att fånga in den kunskapen/de synpunktspunkterna? (frågan ställs när tabellen är ifylld)

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<th>Något/Ibland</th>
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- Vad fungerar bäst, styrning från regional nivå, eller frivillig samverkan lokalt?

**Frågor på slutet**

Är det något du/ni tycker att jag missat som du/ni vill ta upp?

Är det några andra som ni tycker att jag borde prata med?

Är det något material som jag borde ta del av?
### APPENDIX II: Municipality of Kalmar; summary of the answers given by the respondents

<table>
<thead>
<tr>
<th>AG components, according to model</th>
<th>Kalmar</th>
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| Build ecological knowledge (AG 1:1a) | Explores: How is knowledge built, which stakeholder has contributed and to what degree is the water management institutionalized.  
Prioritized areas are the coastal area, storm water, water and drainage, *the sea as a resource* and climate adaptation strategy  
*Stakeholders engagement:* Water councils, Water group (internal in the municipality), coordinated environmental surveillance and control of recipients ("miljösamverkan Sydost", all municipalities in the region, plus the county of Gotland), HAV and project for the associations (samfälligheter).  
*Knowledge distribution:* Through the water councils information is spread, exchange of knowledge shared and support to the landlords given, which enables them to take concrete measures, e.g. to prevent the leakage of phosphor. The original idea of having the water councils, as a referral body did not work, since the members have such diverse interests. It is important that the council is actively working and there is a need to have both financial and personal resources.  
According to the civil servants the *key for success for Kalmar* is the start of “Kalmarsundskommissionen” in 2007, where coordination and cooperation and looking into each municipality and there competences, which is shared between the municipalities in an effective way. This leads to an increase in trust. What is needed, is the human resources to take action, this should be the priority for companies and municipalities. This cooperation makes it possible to speak with one voice, as in “Östersjöinitiativet” where the sea is consider a resource (a service “biogas”) that has a price/a cost. One challenge is that it is easier for politicians to take decisions when it the environmental problem is obvious and visible (algae blooming), but more difficult when it is about long-term risks, not visible today, e.g. the high risk of constructions close to the sea.  
*Internally* there is a water group, with planners, project managers, strategists and Kalmar Vatten AB; i.e. all relevant actors within water management.  
*Externally* we have a close cooperation with the county administration, with Kalmar county, the regional council and the federation for Swedish farmers. The cooperation with the regional council lead to the setting up of three water councils and to an international cooperation with other countries that got inspired to set up their own |
Institutionalization: If people quit, we would loose competence and slow down the processes. However, the water councils need strong people, leading the councils, even if the political will exists. Activities within the budget would continue to function, there is a plan for the coastal environment with its budget. The management (kommunledningskontoret) would continue to lead the work, the Environmental office (miljökontoret) would continue to control and the management for services (Serviceförvaltningen) would continue to implement. What would be better is if the Environmental office would encourage more than they punish the users today (better communication).

| Build ecological knowledge (AG 1:1b) | Explores: Who is responsible, how do you work with and how is knowledge transferred regarding climate changes within the organisation. Are there any supporting documents for this work?  
Climate change is just a small part in the governance of Kalmar Vatten AB, but the company would like to see an increase from 2.5 to 3.0 m, when constructing close to the sea. However, a strategy for climate change adaptation is being produced within the municipality, which should be adopted and started to be implemented 2015. The knowledge of climate change is there and now there is time to act on it. The overall responsibility lies at the management level in the municipality (kommunledningskontoret). |
| Build ecological knowledge (AG 1:2) | Explores: Is the concept of ecosystem services a part of the knowledge and understanding of ecosystem dynamics. If so, how is knowledge built through communication to other stakeholders in the municipality.  
There is low knowledge on the concept of eco system services. The communication division did not know it’s meaning, while others described how Kalmar is working with the Sea as a resource. There needs to be concrete project, e.g. mussel culture that could be used to illustrate the concept for politicians, who now understands the system with emission rights (utsläppsrättigheter). Why not introducing a new model from national level, to pay for ecosystem services? Kalmar airport and the municipality have been innovative in that the company has to “pay” or give back for the land that it has taken for the airport expansion. Kalmar understands the communicative values of having good eco system services, as a sales argument. |
| Feedback of knowledge (AG 2:1) | Explores: What barriers are there, that could hinder the feed in of knowledge into the adaptive governance practice |
Formal sources: HAV (national authority), county administration (länsstyrelsen), VISS, SMHI.
Informal sources: own analysis, consultants, Water Councils (vattenråd) and small talk at the coffee and the Water group at the municipality.

Barriers: Challenge to take care of and share the information/knowledge received and to make water management available for the citizen (in particular from the water councils). The crucial factor that makes us take in new information is the experiences, judgements (this judgement is subjective and related to the person) and knowledge from employees. This system might not be optimal and surely things could be missed out. Time is a barrier and the fact that other colleagues might not be that interested of new information (lack of receiver). Barrier could be if the question is interesting for the management and the politicians. The system of “error notification” (felanmälan) to the municipality, steer the resources to what citizens find is most relevant, this could be a barrier since some of the negative environmental developments are not visible to the eye, and therefore is not notified to the municipality.

<table>
<thead>
<tr>
<th>Feedback of knowledge (AG 2:2)</th>
<th>Explores: If new knowledge, new result is found, through experimentation, or through measurements – how do you feed that new knowledge back into the system?</th>
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<td>Coordinated control of the recipients exists through the collaboration of municipalities (Miljösamverkan Sydost), however a small part of the catchments are being checked and measured. Some experiments are being used to test new methods (seabed sediment). There is a lack of follow-ups after the implementation of the project and there is a need to calculate for these follow-ups and evaluations. Through measurements and evaluation, Kalmar Vatten has improved the purification of water (humus in water is a challenge in southern Sweden).</td>
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<tr>
<th>Flexible institutions (AG 3:1)</th>
<th>Explores: Is your organisation flexible in structure and in the systems that handles incidents of climate change? What changes have been made in the system and/or organisation, e.g. integrally coordination to support the flexible institution and multilevel (locally) governance system?</th>
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<td>Water management is an issue that is discussed at the office and not in the field, where the water councils (vattenråd) work. Flooding and drought is discussed at the</td>
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water councils, but for larger activities there is a need for financial support. There is a need for Water councils to be developed so their message is taken as trustworthy. Training in crisis and risk have been carried out, vulnerable areas have been identified.

Challenges: long term changes, due to slow climate changes, difficult to get on board politicians. One step is to produce the plan for climate change adaptation.

Flexible institutions (AG 3:2)

Explores: Is the organisation an open body, welcoming new input, actively taking measures for inviting those actors and how are the sources judged as being trustworthy or not. How is the local water management best run, through regional governance (law and instructions) or locally through collaboration?

Knowledge and exchange of views are collected primarily from university, the county administration, employees at the municipality, national authorities (HAV), consultants and other municipalities (e.g. Kalmarkommissionen) secondary from water councils (vattenråd), sectorial associations, business (industrial), NGOs,

Schools are being informed. Kalmar Vatten AB is collaborating with similar businesses in the region.

Water councils are a forum for discussion (do not function as a referral body). Dialogue with citizens and farmers are crucial.

Actors outside the network: Through the “catchment walks” (vattenvandringar) we reach all stakeholders. Through consultations all stakeholders are invited to participate. Through communication/information via website, seminars, and through complaints from citizens (nb. Complaints often reflect smaller issues, e.g. littering, why resources are taken away from larger and more crucial issues. Need to increase the general level of education “folkbildning” amongst citizens.)

Water group at the municipality includes all relevant employees at the municipality, including Kalmar Vatten AB. Aim of the group is seen as somewhat blur.

Governance: regional governance makes things happen and might add financial resources, but local collaboration is good too. Would need national guidelines when it comes to recipient controls, to streamline the working methods among municipalities. A combination of the two is best, maybe it could be considered as a ladder: first step is non-mandatory – second step is a support (financial, e.g. LOVA) – third step is a Law (If a proposal of law, this drives the work in the municipality, so that initiatives are taken to move things forward).
## APPENDIX III: Municipality of Västerås; summary of the answers given by the respondents

<table>
<thead>
<tr>
<th>AG components, according to model</th>
<th>Västerås</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build ecological knowledge (AG 1:1a)</td>
<td>Explores: How is knowledge built, which stakeholder has contributed and to what degree is the water management institutionalized. Knowledge and capacity is built around lake Mälaren, according to the vision of an increased ecological status of the same. There is an obstacle in the governance, since there are <em>limits to the municipality’s responsibility and possibility to govern</em> (rådighet), e.g. in the area of farming. There is a strong will to <em>invite all relevant stakeholders into the process</em>, the water councils (vattenråd) consist of all actors (business, farmers and non governmental organisations). Furthermore there is a <em>shared responsibility</em> in the municipality, leading to a spread in knowledge (input and output). The question of <em>institutionalization</em> is somewhat complex, since the positions/jobs are <em>set in the organisation, independently of who</em> has that position, but at the same time loss would be seen in the <em>ambition</em> of reaching the objectives and the overall picture of reaching the norms set for the environmental quality.</td>
</tr>
<tr>
<td>Build ecological knowledge (AG 1:1b)</td>
<td>Explores: Who is responsible, how do you work with and how is knowledge transferred regarding climate changes within the organisation. Are there any supporting documents for this work? There is an <em>action plan for climate changes</em>, which is proactive, where the focus is on <em>what could not obviously be seen and where changes are a part of reality</em>. The action plan takes into account costs and consequences that lead to a prioritization and coordination. The work has developed from a question of crisis to a question of water and there is a new thinking of “<em>preparation and long term planning</em>”. There has been the “possibility” to practice through crisis and the necessity of looking into the matter in a broader perspective. The <em>overall responsibility and coordination</em> is run from and by the head office (<em>Stadsledningskontoret</em>), ordered and governed by the political management, but all offices “<em>förvaltningar</em>” at the same time share the responsibility.</td>
</tr>
</tbody>
</table>
| Build ecological knowledge (AG 1:2) | Explores: Is the concept of ecosystem services a part of the knowledge and understanding of ecosystem dynamics. If so, how is knowledge built through communication to other stakeholders in the municipality. Use “ecosystem services” to *explain*, but do not practically work with “ecosystem
services”, in a knowledge capacity building phase. The municipality works with another set of measurement: Balanced construction and society (balanserad samhällsbyggnad), which functions as a control mechanism, when the municipality has used e.g. green spaces, the municipality has to compensate or balance this loss of “services” through an action. Little or no communication, neither externally nor internally of it.

<table>
<thead>
<tr>
<th>Feedback of knowledge (AG 2:1)</th>
<th>Explores: What barriers are there, that could hinder the feed in of knowledge into the adaptive governance practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water councils (vattenråd) for exchange of views, no formalized system to take in the local perspective. Trustworthy sources of information, e.g. SMHI, otherwise if information hooks in to an on-going project, depending on your personal interest. Trustworthy information is needed if you are to influence others. “Västeråsbarometern”, transparent source of information, where results are being evaluated. One has to check if the information is relevant and trustworthy, if it is needed for you than you could transfer it to others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feedback of knowledge (AG 2:2)</th>
<th>Explores: If new knowledge, new result is found, through experimentation, or through measurements – how do you feed that new knowledge back into the system?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recipient control, but ecological system is slow and not until 2014 do we know if we meet the objectives. The demand for information on the environmental quality norms is low, evaluated each sixth year, but the interest from the politicians is quite large (different views from respondents). There is a system for follow up and evaluation of the environmental quality norms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexible institutions (AG 3:1)</th>
<th>Explores: Is your organisation flexible in structure and in the systems that handles incidents of climate change? What changes have been made in the system and/or organisation, e.g. integrally coordination to support the flexible institution and multilevel (locally) governance system?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From only risk to long term planning, pinpointed sensitive issues, calculate risks and costs, issue of climate change is now on the agenda. “Västeråsbarometern” indicates the status of the environment, could be used even more. We have learnt from experiences with flooding, to distribute responsibility and to make roles clear in a situation of crisis. There are structures in place, but there might still be a need to communicate internally even more.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexible institutions</th>
<th>Explores: Is the organisation an open body, welcoming new input,</th>
</tr>
</thead>
</table>
actively taking measures for inviting those actors and how are the sources judged as being trustworthy or not. How is the local water management best run, through regional governance (law and instructions) or locally through collaboration?

**Stakeholders:** Traditionally interested and interesting bodies are welcomed and are engaged: national authorities, municipally own energy company, consultants, other municipalities and water councils (vattenråd). *Exchange* with other municipalities is vital and very fruitful.

**Governance:** Different views: local management through collaboration, *regional governance is a must*, since the local collaboration is not sufficient. Crucial to *formalize working methods* that meet the demands from the Water Framework Directive. To govern regionally there is *a need for financial resources and political will*, since this is often lacking, local collaboration could work better.

There is one formal organisation, according to the organogram, but there is also an *informal organisation*, where civil servants are working in projects, no matter which department the civil servant belongs to. One *crucial component is how this informal organisation is structured*, e.g. the "water group" in Västerås, where employees work, and could take issues to next level of decision making (chefsgruppen). This *informal structure is extremely powerful.*
APPENDIX IV: Municipality of Upplands Väsby; summary of the answers given by the respondents

<table>
<thead>
<tr>
<th>AG components, according to model</th>
<th>Upplands Väsby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build ecological knowledge (AG 1:1a)</td>
<td>Explores: How is knowledge built, which stakeholder has contributed and to what degree is the water management institutionalized.</td>
</tr>
<tr>
<td></td>
<td><strong>Prioritized issues:</strong> Storm water, ground water supply, drinking water, drainage.</td>
</tr>
<tr>
<td></td>
<td>There is a database production, with product specific information of lakes and catchments, which will be used in urban planning. This new plan will be developed as an ecological plan, including blue and green values and will be spread to all relevant parties in the municipality. Part from the plan there is a need for ad hoc action, as developing a &quot;biological square&quot;, making space for innovation.</td>
</tr>
<tr>
<td></td>
<td><strong>Internally:</strong> Through ISO 14001, each division will make the prioritization, if the issue is relevant or not. Engagement from all relevant employees at an early stage in the process of prioritization, working in projects with as many relevant employees as possible is a key factor of success. Communication is another key issue, where one person should be responsible and carry the message internally and to the public. All issues are political issues.</td>
</tr>
<tr>
<td></td>
<td><strong>Externally:</strong> Suppliers of drinking water, receivers of drainage water, land owners, Oxunda water collaboration (Oxunda vattensamverkan). There is a need to increase the awareness of the issue amongst the citizens. The municipality should take the responsibility to communicate issues of water and environment, where there are experts in the area. There is a challenge with responsibility within Oxunda water collaboration, who will take on the issue and actually take the measure?</td>
</tr>
<tr>
<td></td>
<td><strong>Institutionalized:</strong> If people quit, consultants will be hired, what will be missing is experience and knowledge. Furthermore it is the engagement from employees as well as from the leader that is the key. By introducing ISO 14001 (water is one of 8 environmental strategical aspects) as environmental certification of system the risk of individual dependency is reduced. The system is part of our planning and will keep on running even if people leave their assignment. There are no procedures for the working methods written down, that could be easily handed over, and that treats &quot;understanding&quot;, &quot;collaboration&quot;, that treats the culture at work. This should have to be done to secure the process. There is a necessity to secure the plans and the actions at the political level, if not they do not exist and cannot be implemented.</td>
</tr>
<tr>
<td>Build ecological knowledge</td>
<td>Explores: Who is responsible, how do you work with and how is</td>
</tr>
</tbody>
</table>
| Knowledge (AG 1:1b) | Knowledge transferred regarding climate changes within the organisation. Are there any supporting documents for this work?  
Responsibility: All relevant personal is involved at an early stage in the planning, when the municipality takes decision. There is one coordinator of ecology and environment. There are still gaps in who is responsible for what in the municipality. Focus should be on exchange of experiences and knowledge with other municipalities, so that correct prioritizations can be done.  
Governance documents: There are plans for storm water and “spillvatten”, but they might only be supporting documents (?). Analysis has been carried out about the lack of measurements and needs for the municipality when it comes to crisis and climate vulnerability. There is one plan for climate change adaptation that is being produced and there will be a sectorial plan in the general plan for the budget 2015. A challenge is that the municipality do not govern (rådighet) roads and railways. “Översvämningsdirektiv” is central. |
| Build ecological knowledge (AG 1:2) | Explores: Is the concept of ecosystem services a part of the knowledge and understanding of ecosystem dynamics. If so, how is knowledge built through communication to other stakeholders in the municipality.  
Awareness of the concept is low. Some means that the awareness is increased among employees, last 2 years, but that the knowledge of the concept amongst politicians is low (50%?). General idea is that “sustainable development” shall be governing all planning in the municipality. The concept could be used more, in communication and in a broader aspect, including the urban and social-economical aspects. The concept could be used more to influence the politics, and the concept has to be explained. |
| Feedback of knowledge (AG 2:1) | Explores: What barriers are there, that could hinder the feed in of knowledge into the adaptive governance practice  
Channels to feed in knowledge: Networking. Collaboration between municipalities: Oxunda(!). Challenge to gather information in a systematic way. However there is the structure where all relevant actors are in the process from the very beginning. Other sources of information are lawyers, consultants, and research from the municipality. Through water councils (vattenråd) and water walks (vattenvandringar) employees get input from land owners (where history and development of the area |
could be given). Important to feed in *local knowledge* into the process, at the same time as it is a challenge to act on it and to prove to the informants that their input has been valid and lead to results.

*Barriers:* If the information is *applicable* on the municipality (being an environmental municipality), if the information/measurement to be taken is *cost effective*. Some says they take in all information, and are not conscious of leaving other information out. When asking for input, the *municipality* has to be *clear* in its purpose with getting that information, when decisions are possible to influence and when they are not and clear on when collaboration is to happen, therefore there should be a communication plan along side the action plan. Crucial issue to answer is what is the *definition of collaboration* (samverkan), which should be invited. The *key to success still is the buy-in from the politicians.*

<table>
<thead>
<tr>
<th>Feedback of knowledge (AG 2:2)</th>
<th>Explores: If new knowledge, new result is found, through experimentation, or through measurements – how do you feed that new knowledge back into the system?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Measurements:</em> Measurements are being carried out on phosphor and “kväve”, but the variables should be increased in numbers, followed up and evaluated. Data should be input in the database. Follow-ups, evaluation and documentation are lacking. A need for reflection and “lessons learnt”, identify improvements.</td>
</tr>
<tr>
<td></td>
<td><em>The system</em> for environmental certification that is connected to the plans of action and the scorecard for the municipalities. The system as such is evaluated and variables are followed up.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexible institutions (AG 3:1)</th>
<th>Explores: Is your organisation flexible in structure and in the systems that handles incidents of climate change? What changes have been made in the system and/or organisation, e.g. integrally coordination to support the flexible institution and multilevel (locally) governance system?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Flexible:</em> Need to think differently. Knowledge of climate change and there are tools, structures and routines to handle crisis. Most important to have a reliable system of communication, where employees have to be innovative and pragmatical. Through experience the municipality has been able to train the organisation and identified the gaps.</td>
</tr>
<tr>
<td></td>
<td><em>Changes:</em> Knowledge on how fast issues on water happen. Working methods are changed and broaden. Preparation is good. Looking into the slow changes in climate</td>
</tr>
</tbody>
</table>
(10-15 years ahead) and what we should be focusing on and put emphasis on.

| Flexible institutions (AG 3:2) | Explores: Is the organisation an open body, welcoming new input, actively taking measures for inviting those actors and how are the sources judged as being trustworthy or not. How is the local water management best run, through regional governance (law and instructions) or locally through collaboration?

*Take in new information:* County administration, national authorities, municipalities, municipal companies (water and construction), consultants, regional planners, Swedish municipalities & the Swedish Association of Local Authorities and Regions (SKL), land owners, local media, local NGOs, Oxunda collaboration (Oxundasamverkan)

*Regional governance or local collaboration:* Different views, but non-mandatory collaboration is preferred, but both working methods are important. The structure of water councils (vattenråd) have to be evaluated: in Northern Sweden the councils have been institutionalized but e.g. in the municipality of Södertälje it is more of a forum for discussion. If there is a well functioning collaboration, a water council is not necessary, but it could instead lead to an increase in the administrative burden. If regional governance there is a risk to lose information from the “bottom”.

APPENDIX V: Status of water quality and the regional cooperation for Kalmar, Västerås and Upplands Väsby

The municipality of Kalmar

The database "VISS" run by the county administration indicates the quality of the water. For the area of "N v s Kalmarsunds kustvatten" [http://www.viss.lansstyrelsen.se/Waters.aspx?waterEUID=SE563100-161500](http://www.viss.lansstyrelsen.se/Waters.aspx?waterEUID=SE563100-161500) the ‘ecological water quality status’ is moderate and the ‘chemical water quality’ is found to be does not fulfil the criteria for "good". It is also noted that the quality status of the water will not be able to reach good at 2015, but the goal is instead set for 2021, when the water quality status should be good.

Figure I shows the exposure for the municipality of Kalmar and its strong dependence on the Baltic Sea. This first picture also illustrates the importance of the coast and the quality of the water in the Baltic Sea for the city of Kalmar. Figure I illustrates one part of that coastline and is part of Mörbylånga, Torsås and Kalmar municipalities (N v s Kalmarsunds kustvatten).

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4 [www.viss.lansstyrelsen.se](http://www.viss.lansstyrelsen.se)
Figure I

Source: http://www.viss.lansstyrelsen.se/Waters.aspx?waterEUID=SE563100-161500
The municipality of Västerås

Figure II shows part of the lake and is called “Västeråsfjärden”. According to VISS (www.viss.lansstyrelsen.se) the water quality for ”Västeråsfjärden” reaches a moderate status for the ‘ecological water quality’, whereas the ‘chemical water quality status’ does not fulfil the criteria for ”good”. There is also an indication that neither the ecological nor the chemical water quality status will fulfil the criteria for ”good” by 2021.

Source: http://www.viss.lansstyrelsen.se/Waters.aspx?waterEUID=SE660320-154469

The municipality of Upplands Väsby

Oxunda River (Figure III) runs through various municipalities in the region, amongst others the municipality of Sollentuna. Oxunda River has the ‘ecological water quality status’ of moderate and the ‘chemical water quality’ (including quicksilver) of does not fulfil the criteria for”good” while the status for chemical water quality and excluding quicksilver is good.
The aim is to have good ecological water quality status by 2015, but the challenge of reaching that objective is highlighted by the County Administration. For the chemical water quality (quicksilver excluded) good status will be reached by 2015, and there is no risk attached to reaching that result\(^5\).

## APPENDIX VI: Document analysis of policy papers

### Municipality of Kalmar

<table>
<thead>
<tr>
<th>Name of document</th>
<th>Date (decision taken/enter into force)</th>
<th>Type of doc. &amp; Owner of doc.</th>
<th>Structure of the document</th>
<th>Content, relating to Water Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water &amp; Drainage Plan (VA-plan)</strong></td>
<td>Planned for late 2013. Decision will be taken late 2014.</td>
<td>Guideline for the coordination and an overview of other plans activities. City Council Management owns the document.</td>
<td>Strives to give a complete coverage of water- and drainage issues in Kalmar, provide guidelines and information. There are three levels of the plan “General overview”, “Policy with strategical guidelines” and “Execution and implementing”. Reference is made to the Vision “Kalmar 2020”, political decision, where Kalmar should be an attractive and clean municipality, with no dependency on fossil fuel by 2030. Kalmar wants to create an ecological, socially and economically sustainable society and strives to have water of good quality. This plan is a thematical appendix to the “General Plan” (Översikts-planen) and should be tried for its relevance at least once, each period of mandate. Activities in the plan should be planned for in the budgets for each Division.</td>
<td>The plan informs why the plan is important and states that the provision of drinking water has to be long term and sustainable. This plan should contribute to drinking water of good quality and the responsibility within Kalmar and its divisions should be clearly stated. Climate change is underlined (will be further elaborated in the “climate adaptation plan”) as important as well as further studies on future water provision and ecosystem.</td>
</tr>
<tr>
<td><strong>Water plan</strong></td>
<td>N/A (?)</td>
<td>Guideline</td>
<td>One out of six “profile areas” in the plan, for the marketing activities, is “environment” as being deemed necessary for the “good quality of life”. Internal communication with employees “on all activities (in the plan) taken place” is highlighted as crucial. “Having an open dialogue with citizens” is underlined as “most important”</td>
<td>Focus is on how to attract and to market the municipality. Kalmar should also be in the front seat on social and environmental responsibility</td>
</tr>
<tr>
<td><strong>Communication plan</strong></td>
<td>March 2011. Decision taken by Management</td>
<td>The plan is a Guideline. Head of Communication owns the document.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| Climate Change | Planned for 2015 | Is being produced, not | No draft available. | No draft available. |</p>
<table>
<thead>
<tr>
<th>Adaptability Plan</th>
<th>decided upon by management.</th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| Climate Strategy Plan | December 2013. Decision taken by Management | The plan is a Programme. Manage-ment owns the document. | Based on the politically accepted documents:  
1. "Vision 2020",  
2. Yearly budget  
3. General Plan (översiktsplan). | Explicitly focus on the energy saving and minimizing the use of fossil fuels. Generally states the necessity to meet the challenges with climate changes and to minimize the negative impact on the environment. Water management is not mentioned in particular, but cleaning of water is mentioned. |
### Water & Drainage Plan (VA-plan)
- **Water & Drainage Plan (VA-plan)**
- **VA-policy**
  - April 2013, Decision taken by City Council
  - **Action plan for the development of drainage for households/City Council**
  - Responsibility is shared between City Council and Mälarenergi.
  - Water quality norms, WFD and reduction of Phosphor and reduction of Oxygen central.
  - Planning for climate change is underlined, as well as continuously evaluation and communication to citizens.
- **Water plan**
  - October 2012, decision taken by City Council
  - **Guidelines for water quality, Owned by City Council**
  - Based on WFD.
  - Objectives and actions
  - Objectives and actions for: Fishing, climate change, storm water, drinking water, toxic substances, eutrophication.

### Climate Change Adaptability Plan
- **Climate Change Adaptability Plan**
  - Produced June 2013, by Consultants: WSP together with the City of Västerås
  - **Prestudy/ City Council**
  - Prestudy: to identify actions needed, form the basis for a climate change adaptability plan.
  - Proposal for Action: 1. "Västerås Water group" should work with and adapt to the climate change adaptation plan.
  - Working method for the pre-study is the template recommended (for the plan) by the County Administration.
  - Identification of issues: high sea levels, flooding, increased rains and cloudbursts.
  - Factors to take into consideration for future scenarios: rain, flooding, ice, wind, snow, increase in temperature of lake (effects on water quality, responsibility "Mälarenergi" municipal company), changes in discharge pattern etc.
  - The facto of long term thinking when it comes to climate change, in comparison to calculated short-term crisis, is highlighted.
  - Generally it is proposed to analyse e.g.: Västerås shared responsibility, ways of
<table>
<thead>
<tr>
<th><strong>Climate Strategy Plan</strong></th>
<th>Adopted June 2012, City Council</th>
<th>Program/ Board of City Council</th>
<th>Climate Program (Energy Plan is included). Based on Vision 2026 and the Environment Program, where Objectives for Climate are found.</th>
<th>General objective, reduction of greenhouse gases (compared to 1990 and 2009). Sectors covered: Energy, Transport and Agriculture. Revision of Objectives in 2015.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action Plan to Strategy Plan</strong></td>
<td>Adopted November 2012, City Council</td>
<td>Action Plan to Program/ City Council</td>
<td>Action Plan to Climate Program (See above)</td>
<td>Focus not on water. Noted training/advising within the area of climate and the prioritized sectors.</td>
</tr>
<tr>
<td><strong>Compensation/adjustments – negative impact</strong></td>
<td>Date? / City Council of Västerås</td>
<td>Guidelines</td>
<td>Guidelines on how to compensate and why. &quot;Principles of Balance&quot;</td>
<td>General compensation/action/adjustment that cancels out another action, one that has a bad or destructive effect on the environment. Through the three steps of Avoid, Reduce, Remedy In the Checklist- &quot;value of water&quot; is mentioned.</td>
</tr>
<tr>
<td>Name of document</td>
<td>Date (decision taken/enter into force)</td>
<td>Type of doc. &amp; Owner of doc.</td>
<td>Structure</td>
<td>Content, relating to Water Quality</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>Water &amp; Drainage Plan (VA-plan)</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water plan</td>
<td>Water plan from 2007 public on the website. New water plan with measurements to be taken in database (new) not open to the public</td>
<td>Based on the General Plan (översiktsplan) and Vision 2040</td>
<td>The new water plan and the list with measurements that are to be implemented is a tool for planning for the municipality, not for the public. Thus not open for this study. Structure of decisions to be taken is seen below: The collaboration with other 6 municipalities on the river of &quot;Oxunda&quot; (replaces the water councils &quot;vattenråd&quot;) has its primary goal to reach a &quot;good quality of the water&quot; in rivers, lakes and in lake Mälaren. There is a yearly budget for surveillance of the environment.</td>
<td></td>
</tr>
<tr>
<td>Communication plan</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate Change Adaptability Plan</td>
<td>Date for Pre-study, unknown. (Climate Change Adaptability Plan to be produced Spring 2014)</td>
<td>Pre-study carried out</td>
<td>Project (October 2013- December 2014), which entails an analysis on the vulnerability and climate change. Risk analysis, with regards to risks and vulnerability is continuously carried out. The analysis on vulnerability and climate change will lead to an action plan on how to make Upplands Väsby more adapted to climate change. (Document to be produced).</td>
<td></td>
</tr>
<tr>
<td>Climate Strategy Plan</td>
<td>Decision taken September 2011, City Council Latest update November 2013</td>
<td></td>
<td>Detailed activities to reduced use of energy.</td>
<td>Focus only on energy efficiency.</td>
</tr>
<tr>
<td><strong>Ecological Development Plan</strong></td>
<td>Under consideration. Pre-study on-going, to be finalized Spring 2014.</td>
<td>Ecological Development Plan, that includes both green and blue (water) values.</td>
<td>The pre-study should: map the situation, put forward proposals and working methods.</td>
<td>The pre-study should include (for both green and blue values): e.g. ecosystem services, biodiversity, parks, water environment and wetlands.</td>
</tr>
</tbody>
</table>
APPENDIX VII: Organizational structure and names of respondents

Kalmar

At the municipality of Kalmar the researcher interviewed persons, which had the following titles and were located in the structure according to the division or department (in Swedish) in the organogram:

- Ecological Strategist in the area of Sustainable Development (Kommunledningskontoret),
- Communication Strategist (Kommunledningskontoret),
- Environmental Inspector (Samhällsbyggnadskontoret),
- Project Manager, Coastal Environment (Serviceförvaltningen)
- Coordinator for the Water Councils, "Vattenråd" (Serviceförvaltningen)
- Director, Water Division at Kalmar Vatten AB (municipally owned company)

Following respondents were interviewed:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title, Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renate Foks</td>
<td>Vattensamordnare, Serviceförvaltningen</td>
</tr>
<tr>
<td>Harald Persson</td>
<td>Avdelningschef, Kalmar Vatten AB</td>
</tr>
<tr>
<td>Christine Bergkvist-Björklund</td>
<td>Kommunikationsstrateg, Kommunledningens kommunikationsenhet</td>
</tr>
<tr>
<td>Karin Nilsdotter</td>
<td>Ekologisk hållbarhetstrateg, Kommunledningen</td>
</tr>
<tr>
<td>Susanna Minnhagen</td>
<td>Projektledare Kustmiljö, Serviceförvaltningen</td>
</tr>
<tr>
<td>Anna Carnelius</td>
<td>Miljöskyddsinspektör, Samhällsbyggnadskontorets miljöavdelning</td>
</tr>
</tbody>
</table>
Västerås

In the city of Västerås the respondents had the following titles and were located in the structure according to the division or department (in Swedish) in the organogram:

- Communication officer (Miljö- och hälsoskyddsförvaltningen),
- Water Manager & Coordinator Water Councils "Vattenråd" (Tekniska nämndes stab, Stadsledningskontoret),
- Director City Planning (Stadsledningskontoret),
- Director Water Production at "Mälarenergi" (municipally owned company),
- Climate Strategist (Stadsledningskontoret)

Following respondents were interviewed:

<table>
<thead>
<tr>
<th>Västerås</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna Jungmarker</td>
<td>Klimatstrateg, Stadsledningskontoret</td>
</tr>
<tr>
<td>Carina Tunner</td>
<td>Kommunikatör (Miljö och Hälsa), Stadsledningskontoret</td>
</tr>
<tr>
<td>David Liderfeldt</td>
<td>Projektleader för Västerås stads vattenplan, Stadsledningskontoret</td>
</tr>
<tr>
<td>Karin Ols</td>
<td>Affärsområdeschef vatten, Mälarenergi AB</td>
</tr>
<tr>
<td>Per Johansson</td>
<td>Miljö- och samhällsbyggnadsdirektör, Stadsledningskontoret</td>
</tr>
</tbody>
</table>
Upplands Väsby

At the municipality of Upplands Väsby the following persons and roles were interviewed, located in the department or division (in Swedish) in the organogram:

*NB: the office of planning of society (Kontoret för Samhällsbyggnad/KSB) is a newly taken initiative to merge questions related to sustainable development and sustainable society and is shared by the offices of "Teknik och Fastighet" and "Stadsbyggnadskontoret". Therefore KSB is not seen in the organogram.*


- Director Technical Office (Teknik och Fastighet),
- Environmental Planner (Kontoret för Samhällsbyggnad (KSB)),
- Director City Planning (KSB),
- Environmental Strategist (KSB),
- Director Security (Kommunledningskontoret),
- Norrvatten AB (Supplier of drinking water to the Municipality of Upplands Väsby, not owned by the municipality)

Following respondents were interviewed:

<table>
<thead>
<tr>
<th>Upplands Väsby</th>
<th>Miljöplanerare, Kontoret för Samhällsbyggnad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna Åhr-Evertson</td>
<td>Anita Ackeberg, Kommunledningskontoret</td>
</tr>
<tr>
<td>Anita Ackeberg</td>
<td>Bertil Johansson, Chef för produktion och distribution, Norrvatten AB</td>
</tr>
<tr>
<td>Bertil Johansson</td>
<td>Carl Bachman, Teknisk chef, Teknik och Fastighet</td>
</tr>
<tr>
<td>Carl Bachman</td>
<td>Eva Berg, Miljöstrateg, Kontoret för Samhällsbyggnad</td>
</tr>
<tr>
<td>Eva Berg</td>
<td>Fredrik Drotte, Stadsutvecklingschef, Kontoret för Samhällsbyggnad</td>
</tr>
</tbody>
</table>

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