DESSIN

DEMONSTRATE ECOSYSTEM SERVICES ENABLING INNOVATION IN THE WATER SECTOR

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D42.4 Recommendations from the open ESS channels:

European platforms, roundtables, conferences and web platform

adelphi, January 2018

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 619039

ROUTE TO MARKET

D42.4: Recommendations from the open ESS channels: European platforms, roundtables, conferencesand web platform

SUMMARY

This strategy paper is part of WP42, the overall objective of which is to maximize the market reach and impact of the water technologies, methodologies and innovative solutions developed in WA1 and WA2 and demonstrated in WA3. The preceding WP41 seeks to achieve market readiness of products and services developed with regards to water quality, water scarcity and ESS assessment.

Due to resource constraints and lacking capacities, SMEs are particularly challenged by this step. Therefore, decision-making support needs to become available to the demand side which demonstrates the long-term superiority of ESS based approaches. To this end, the ESS valuation methodology itself needs to be promoted, establishing a new standard in water management decisions. This step also seeks to create positive innovation dynamics by the supply side, demanding further solutions in the field. In turn, this incentivizes SMEs to innovate.

Based on the content of WP42, this strategy paper covers aspects pertaining to the marketization of the proposed ESS valuation methodology within the European Union (with a particular focus on Germany and the Netherlands).

DELIVERABLE NUMBER	WORK PACKAGE
D42.4	WP42
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PLANNED DELIVERY DATE	**ACTUAL DELIVERY DATE**
31/12/2017	31/01/2018

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1. Background and Objective

This strategy paper is a key outcome of a targeted activity within the DESSIN project (Work Package 42) to maximize the market reach and impact of the water technologies, methodologies and innovative solutions developed and demonstrated within DESSIN. The project seeks to promote market readiness of products and services developed with regards to water quality, water scarcity and ESS assessment.

Due to resource constraints and lacking capacities, SMEs are particularly challenged by this step. Assistance in the area has long been proven to be necessary and effective (e.g., German technology support fund), by promoting an approach of prototyping, testing and verifying solutions in the water technology field, through which SMEs' capacities to develop marketable products and services can be built. DESSIN further seeks to identify entry points to the market and pave the road to market (by addressing and overcoming typical market barriers and proactively promoting the uptake of these solutions among potential clients).

On the other hand, decision-making support needs to become available to the demand side which demonstrates the long-term superiority of ESS based approaches. To this end, the **ESS valuation methodology itself needs to be promoted**, establishing a new standard in water management decisions. This step also seeks to create positive innovation dynamics by the supply side, demanding further solutions in the field. In turn, this incentivizes SMEs to innovate.

Based on the content of WP42, this strategy paper covers aspects pertaining to the marketization of the proposed ESS valuation methodology within the European Union (with a particular focus on Germany and the Netherlands). In this, the document provides guidance on three different levels which facilitate market penetration in the intermediate and long-term future. These include suggestions for:

- Key Stakeholders to be approached for promoting the ESS valuation methodology among demand-side actors (i.e. regulators and site owners) in the EU, Germany and the Netherlands
- Modes of interaction for effective involvement of stakeholders, i.e. tailor-made to the needs and expectations of these groups
- Overall approach and recommendations for a successful marketization of the ESS valuation methodology in the intermediate and long-term future

In section 2, stakeholders influencing the demand for ESS valuation tools will be addressed in more detail. Consecutively, modes of interaction with these stakeholders will be covered in section 3. The paper closes in section 4 by providing some overarching recommendations for the marketization of ESS valuation tools.

2. Key Stakeholders

Successful marketization of ESS valuation methodology is contingent on a complex network of actors, reaching from the local level up to the transnational level. Two groups of demand-side actors are of particular relevance: regulators and site owners. One the one hand, **regulators** exert influence by means of legislations, thus pushing (e.g. through top-down regulations) or pulling (e.g. through tax breaks or other financial incentives) the market towards increased uses of ESS valuation tools; on the other hand, **site owners** represent potential users which offer demand for the application of such tools.

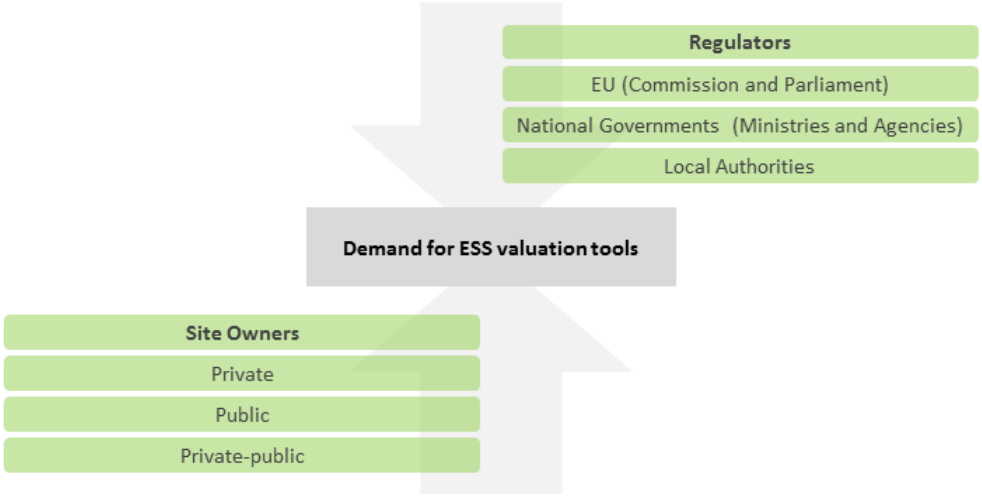

Figure 1: Types of demand-side stakeholders

2.1 Regulators

With respect to regulators, main stakeholders comprise the European Union as well as national governments and national authorities with interests in preserving and enhancing the quality of (trans-)national waterbodies. They issue regulations and enforce legal and technical standards, thereby influencing the marketization of ESS valuation tools to a great extent. Depending on the national context, they pay subsidies and issue guidelines for maintaining water management facilities. In order to create conducive market conditions for the ESS valuation methodology, legislative actors need to be addressed by tailor-made lobbying activities. In fact, it appears that without such support from the public sphere, the future uptake and dissemination of ESS valuation tools across European countries will remain limited.

Against the baseline assessments of national water bodies from 2004, national policies often address major issues compromising water quality, such as:

- use-related deterioration of water bodies, e.g. through waterways freight, generation of hydro-electric power or use-related morphological changes to the waterbody
- non-point nutrient inputs, e.g. from agricultural activities;
- input of pollutants and contaminants, e.g. through precipitation, runoff or municipal and industrial waste water treatment plants.

Despite actions taken on the ground, contamination of waterbodies through (for instance) industrial processes is still a major issue across many European countries; hence, technical treatment and purification of effluents is necessary. Taking these aspects into account when promoting ESS valuation across public authorities is paramount and lobbying activities should focus on highlighting the benefit of ESS valuation for achieving objectives within these areas.

Water-related legislations consist of a wide range of instruments, such as top-down regulations, tax laws, substance laws and liability rules. For each of these constituents, introduction of ESS-based thinking is principally possible: top-down regulations could prescribe the valuation of ESS prior to granting permission for using national water bodies; in tax law, financial incentives to water facility operators could be given where ESS valuation tools have been applied; with regards to substance law, exemptions from legal prescriptions may be provided if a dose-response relationship was evaluated through an ESS valuation framework and impacts on eco-systems were found to stay below stipulated thresholds; and lastly, liability rules may ascertain negligence in case ESS valuation was not conducted with due diligence.

2.2 European Policy Landscape

On the European level, central regulating actors are the European Commission and the European Parliament. By passing the landmark Water Framework Directive (2000/60/EC) and its daughter

directives, the Commission has introduced an overarching legislative framework for protection of surface water and groundwater. The Directive applies to all member countries and needs to be transposed into national law. When promoting the ESS methodology on the European level, highlighting its added-value in the context of the WFD and other water-related legislations is crucial; it will require long-term lobbying efforts to ensure political decision makers recognize the benefits of ESS valuation and integrate the rationale of such methodologies into economic calculations, e.g. by accounting for opportunity costs of endangered ESS.

In order to analyze the conditions of European water bodies on a broader scale, the WFD required EU member countries to conduct baseline assessments of national water bodies by 2004. Against these baselines, countries would need to develop River Basin Management Plans (RBMPs) which stipulate specific actions that preserve or enhance the quality water bodies by the end of the first management cycle in 2009. With the second cycle currently being implemented, points of intervention for the introduction of ESS valuation frameworks are limited; with due lobbying efforts however, elements of ESS valuation may be introduced for the third management cycle starting 2021. In this case, national RBMPs could stipulate meeting specific ESS-based objectives, thus contributing to the fulfillment of the WFD within national contexts.

The Groundwater Directive (2006/118/EC) is linked to the WFD through Art. 17.1. It stipulates underground water quality standards and introduces measures to prevent or reduce groundwater pollution. In accordance with the WFD, it entails a number of quality criteria which take into account local preconditions and are linked to the chemical status of groundwater bodies. In particular, the Groundwater Directive required pollution trend studies to be carried out and groundwater quality standards to be established by the end of 2008. In addition, pollution trends needed to be reversed through specific measures in order to achieve the environmental objectives of the WFD by 2015. Technical provisions of the Groundwater Directive needed to be first reviewed in 2013 and every six years thereafter. In addition to these two core legislations, a number of other Directives directly or indirectly relate to the WFD and the Groundwater Directive. These are presented and outlined in Table 1 below.

Table 1: European directives related to the WFD and the Groundwater Directive

Directive	Rationale
Directive on Environmental Quality Standards (2008/105/EC)	Prescribes environmental quality standards for the substances in surface waters and confirms their designation as priority or priority hazardous substances; stipulates specific limits on concentrations of 33 priority substances and 8 other pollutants in surface waters.
Nitrates Directive (96/676/EEC)	Seeks to reduce and prevent water pollution from agricultural sources (especially nitrates); obliges Member States to identify and appoint “vulnerable zones” where (ground) waters are prone to be affected by nitrate pollution (concentration higher than 50 mg/l).
Urban Wastewater Treatment Directive (91/271/EEC)	Aims to protect the environment from discharges of urban waste water and certain industrial sectors; covers “sensitive areas” which relate to: 1) freshwater, estuaries or coastal waters which are affected by eutrophication; 2) lakes and streams reaching lakes/reservoirs with

	poor water exchange; and 3) surface freshwater intended to be potable containing more than 50 mg/l nitrates.
Plant Protection Products Directive (91/414/EEC)	Deals with the authorization, marketization, use and control of commercial products for plant protection within the EU; authorization is only granted if plant protection products have no harmful effect on human health or groundwater; in addition, products must have no undesirable effects on the environment and/or contribute to the contamination of ground- or drinking water.
Biocides Directive (98/8/EC)	Concerns the authorization and marketization of biocidal products (including pesticides, herbicides and fungicides); authorization may only be granted if products have no adverse effect on human health and/or groundwater; moreover, products must have no undesirable effects on the environment and/or contribute to the contamination of ground- or drinking water.
Integrated Pollution Prevention and Control Directive (96/61/EC) Directive on Industrial Emissions 2010/75/EU	Directive 96/61/EC was replaced by the Directive 2010/75/EU as of 7 January 2014; defines measures to prevent or reduce pollution of air, water or soil; applies to a large number of industries with high pollution; entails provisions for granting of permits for existing and new installations, including requirements to ensure the protection of soil and groundwater and set emission limits for pollutants.
Landfill Directive (99/31/EC)	Aims to prevent or reduce environmental impacts (including groundwater) of landfill waste; entails provisions for granting of permits for existing and new installations through, inter alia, impact assessment studies; at each landfill site, hydrogeological conditions must be identified and sites must be designed in such way that they prevent contamination of groundwater; contaminated water and leachate needs to be collected and treated; establishes criteria for waste testing, considering the protection of the surrounding environment, including groundwater.

On a national level, environmental ministries act as regulating institutions and, amongst others, have the responsibility of transposing the European WFD into national law. In this, they are supported by environmental agencies, municipalities and other authorities which assist in developing and enforcing legislations within their statutory mandates. These authorities often operate in very different legislative national contexts. In order to identify intervention points for ESS-based legislations, promotional efforts should not only take into account European legislations but need to be tailor-made to the specific contexts of the target countries.

2.3 German Policy Landscape

In Germany, key regulating authorities are the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as well as the German Environment Agency (UBA). On the national level, the European Water Framework Directive has been transposed into national law through the Water Resources Act (Wasserhaushaltsgesetz). The Groundwater Directive has been implemented through the German Groundwater Ordinance (Grundwasserverordnung). While these two legislations constitute the major instruments for water management on a national level, German federal states are able to grant exceptions and issue complementary regulations. In the Emscher case for instance, the State Water Act (Landeswassergesetz) of the state North Rhine-

Westphalia complements national legislations by addressing the protection, use, supply and disposal of water. Despite this dual distribution of legislative competencies, responsibility for enforcement lies at the state level.

Three core legislations need to be taken into account when promoting ESS valuation within the German policy context. The Waste Water Ordinance (Abwasserverordnung) prescribes minimum requirements for granting permits to discharge effluents into German water bodies and contains provisions for analytical methods and threshold limits for discharge from, inter alia, chemical industries and households. The Surface Water Ordinance (Oberflächengewässerverordnung) transposes Directive on Environmental Quality Standards (2008/105/EC) into national law and regulates 45 priority substances. In addition, it stipulates detailed aspects for the protection of surface waters and contains provisions for the categorization and classification of national surface water bodies in accordance with certain quality criteria. Lastly, the Waste Water Levy Act (Abwasserabgabengesetz) provides incentives for reducing the pollution level of wastewater discharge to national water bodies by imposing levies in accordance with the polluter pays principle. The magnitude of levies is based on the level and harmfulness of pollutants, e.g. by taking into account chemical oxygen demand and relative toxicity to aquatic ecosystems.

Any company or organisation which seeks to discharge effluents into German waterbodies needs to acquire a water permit. Permits are granted by the lower water authority if the planned process complies with the codes of practice ("Regeln der Technik") as per definitions by the German Waste Water Ordinance. Guidelines on these codes of practice are published by the Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V. (DWA). Specific DWA guidelines which are important for the Emscher case include those for construction of CSOs (DWA-A 128), construction of rainwater holding tanks (DWA-A 166 (DWA (2013)), for sewerage control (DWA-M 180) or integrated discharge control (DWA-AG ES2.4).

Complementing these legal provisions, the German Water Partnership (GWP) was launched in 2008. The Partnership is a joint initiative from the private and public sector, including commercial enterprises, government and non-government organisations, scientific institutions and water-related associations. The network consists of some 350 members and is supported by five federal ministries. The initiative promotes German engineering, know-how and experience in the international water sector by collecting and coordinating information about innovations, activities and services of its members. Additional work is carried out via seven working groups and fifteen regional sections, the latter of which aim to cultivate contacts with partners and decision makers in designated focus countries. The network (co-)hosts a number of events which can be used as venues for promoting ESS valuation across a broader audience. Some examples are presented in Table 4 in Annex I.

2.4 Dutch Policy Landscape

In the Netherlands, responsibilities for policies on water management are distributed among various authorities, ranging from the central government (through the Ministry of Infrastructure

and the Environment), water boards, provinces down to municipalities. The current National Water Plan (NWP) 2016-2021 outlines the country's water policy which aims to protect the Netherlands' low-lying land against flooding and ensure sufficient availability of clean (drinking) water. Through the Administrative Agreement on Water 2011, standard-setting is assigned to one governmental body. While flood risk management and water quality control lies within the responsibilities of the central governmental, issues pertaining to pluvial flooding and regional water quality are administered by provinces (i.e. Dutch federal states).

Legal provisions were, until recently, stipulated by eight water management statutes. As of 2009, these have been integrated and repealed by the Water Act. The Act defines standards for primary flood defense structures but does not regulate water management in every detail. Instead, it is complemented by a number of other legislations, including the Water Decree and the Water Regulation. Under the Water Act, governmental authorities are obliged to meet specific water quality requirements in the form of chemical and ecological quality standards. For this, the Act refers to a list of substances and threshold limits laid out in the Environmental Protection Act and the Groundwater Directive.

In addition to these legislations, the Dutch government launched the Delta Program in 2011 in order to proactively manage impacts from climate change and rising sea levels. The Program is revised and published on an annual basis. As of today, it entails a Delta Plan on Flood Risk Management and a Delta Plan on Freshwater Supply. By 2018, it will further entail a Delta Plan on Spatial Planning. The legal agreements of the Delta Program are laid out in the Delta Act from 2012.

To accelerate innovation in the water sector, the government launched the Netherlands Water Partnership (NWP). Similar to its German counterpart, the initiative consist of a wide spectrum of stakeholders, including companies, civil society organizations, scientific Institutes and governmental authorities. As of today, it counts 200 members and aggregates information on water expertise, policy developments and market trends. The NWP regularly organizes events which can be used as venues for ESS valuation, some of which are presented in Table 4 in Annex I.

2.5 Site Owners

Within the scope of this paper, site owners refer to municipalities, private or public entities, water boards and water companies that manage water facilities. Within their defined mandate for water management, it is their interest to maintain and enhance the quality of water bodies without compromising economic viability of their operations. Hence, they represent potential users for ESS valuation tools. A list of selected site owners and water companies in Germany and the Netherlands which may be approached for the promotion of ESS valuation are presented in Table 5 in Annex II.

Against this baseline assumption, ESS valuation can help increase site owners' understanding of goods and services that water-based ecosystems naturally provide. In case site owners seek to implement one among many different technologies, ESS valuation can provide decision support by quantifying tacit natural capital flows prior to implementation. By taking these into account, the net-capital impact of each technology can be compared, thus enabling site owners to internalize

external environmental costs. In fact, marketing technologies which maintain or enhance ESS can provide competitive advantages. This in turn may spur greater innovation efforts among competitors to develop technologies which positively affect ESS.

However, it should be highlighted that these impacts on the innovation potential of companies remains – at least for now – hypothetical. Hence, marketization efforts for ESS valuation tools should emphasize adapting the application of ESS valuation to local conditions. In other words: the corresponding benefits need to be communicated as clearly as possible and should be presented within the specific geo-physical context of the site. Otherwise, ESS valuation risks to be neglected when compared to Unique Selling Propositions (USPs) of innovative water technologies which do not entail ESS-based value-added elements.

3. Modes of Interaction

For an effective promotion of ESS valuation tools among regulators and site owners, modes of interaction need to be chosen carefully. Factors for choosing specific interactions include the **type of stakeholder addressed**, the **level of trust** required, **point in time**, **resource requirements** as well as **potential risks and drawbacks**. By taking these factors into account, preparing discussions in due time and choosing the right modes of interaction, proponents of ESS valuation can maximize influence exerted on stakeholders and hence, contribute to a successful marketization of ESS valuation in the intermediate or long-term future.

The following section distinguishes between five different modes of interactions, namely one-on-one discussions, round tables, conferences, market place events and workshops. It explains the role of different formats in promoting the ESS valuation methodology. Each mode of interaction will be reviewed against the above mentioned factors, resulting in tangible suggestions for the suitability of interactions in addressing different stakeholders.

The analysis presented below is illustrated in Figure 2 and is summarized in two assessment tables at the end of section 3. While Table 2 offers recommendations on interactions with regulators, Table 3 provides suggestions on interactions with site owners.

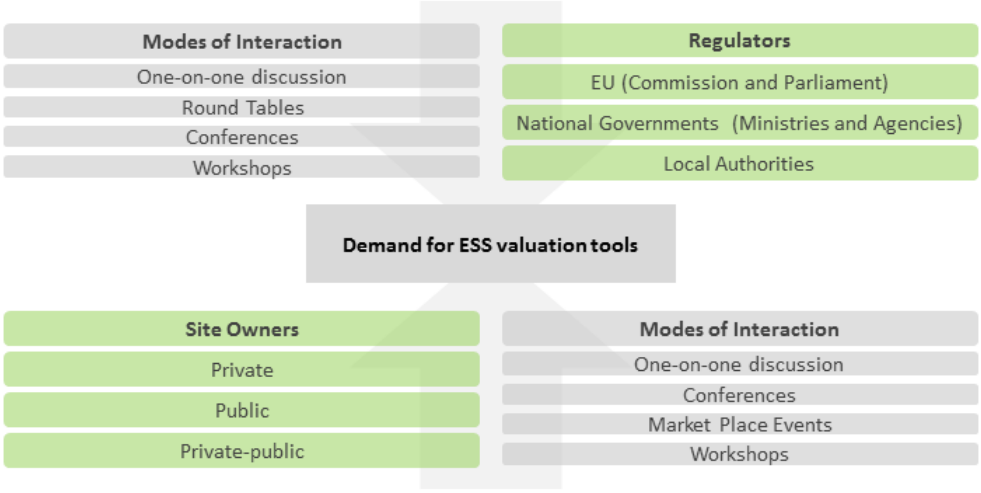

Figure 2: Summary of stakeholders and suitable modes of interaction

3.1 One-on-one Discussions

One-on-one discussions can take various forms and may be conducted in face-to-face situation or at distance (i.e. through phone calls). They are **suitable for engaging with both regulators and site owners alike**. Promoting ESS valuation among **regulating agencies or other public authorities** appears most fruitful if the stakeholder is willing to cooperate and if a certain level of trust had

been established beforehand. Nevertheless, discussions should be conducted as early as possible because legislations create favorable conditions for ESS valuation and thus, form the basis for the future dissemination of such methods. Further, face-to-face discussions are likely to be more effective than at-a-distance conversations. This is mostly because direct personal contact allows for more intense, reciprocal interactions and delivers a more holistic picture of the participants, thereby contributing to experts' credibility.

Since lobby talks with stakeholders from the political sphere often take place in private, adherence to ethical standards (e.g. refraining from bribery) is absolutely paramount and needs to be followed at all times. Although the rationale of ESS valuation clearly seeks to contribute to a sustainable development and can be expected to receive support on a larger scale, the general public remains skeptical about lobbyism, even if conducted in an ethical and responsible manner. Thus, the rationale and content of such interactions should be communicated as transparently as possible; otherwise, a lack of transparency may risk the overall success of promoting ESS valuation due to the fear of losing voters among policy makers.

One-on-one discussions with **site owners** can be expected to differ from conversations with policy makers but also share some important similarities. For instance, they are likely to be successful if the stakeholder's willingness to cooperate is high and if the expert is perceived as trustworthy. While some discussions may start out at distance without prior contact, personal interaction with the client is vital and will increase the potential for success by a large degree. Yet, sometimes reaching out by mail or phone without prior contact presents the only way of touching base in the first place. In such cases, identifying the key decision makers (preferably by name), maintaining contact as frequently as possible and referring to previous interactions or messages will be crucial to the successful promotion of ESS valuation. One-on-one discussions with site owners should be held as early as possible and need to be intensified once more favorable policy conditions are implemented.

With regards to risks and drawbacks, one-on-one discussions may lead to decreased credibility and often fail to convince if conducted improperly. Hence, thorough preparation is absolutely vital; the expert or salesman needs to have enough expertise in ESS valuation to clearly explain the benefits of the solution to the client and should be able to communicate the Unique Selling Proposition (USP) in a concise and well-structured manner. Due to the complexity of the ESS valuation in general, this is a challenging task because innovative water technologies often contribute to better environmental performance and do not need to demonstrate positive impacts on ESS to create a USP. Hence, pointing out the benefits of ESS valuation within the specific geo-physical and socio-economic conditions of the site will be decisive for effective promotion.

3.2 Round Tables

Round tables present a common way of interacting in larger groups. They are particularly suitable for engaging with **policy makers and other representatives of public authorities**. A major benefit of round tables is that they can directly engage targeted stakeholders and offer equal opportunities to

have a say, thereby increasing their trust and willingness to cooperate. As opposed to one-on-one discussions, this mode of interaction appears particularly valuable when engaging a number of stakeholders at a time. It can involve experts from the scientific community or the realm of business which may further strengthen the case for ESS valuation. However, for effectively promoting ESS valuation, it is most crucial that such interactions are facilitated in a professional and well-structured manner, giving equal parts of speech to every participant.

Round table discussions typically do not require large amounts of resources. However, due to the large number of people involved, arranging a round table discussion can be somewhat challenging as some participants may not be able to afford the time to attend. As for the point in time for arranging such interactions, round tables appear to be more appropriate once all attendees have gained a well-founded understanding of ESS valuation and are sufficiently familiar with the concept. While some room may be dedicated to creating a level state of knowledge about ESS valuation among participants, the center of discussions should ideally revolve around the implementation of favorable policy conditions for ESS valuation in water-based ecosystems.

Given that round tables function as open platforms for discussions and knowledge exchange, they appear **less suitable for promoting ESS valuation among site owners**. However, this does not imply that site owners should not participate in round tables at all; in fact, they can contribute valuable insights and may serve as best practice examples which illustrate the valuation of ESS to a wider audience.

3.3 Conferences

Conferences are suitable for bringing together a wide range of stakeholders from different backgrounds and different levels of knowledge regarding the subject. They can provide deeper insights into ESS valuation through panel discussions, bi- and multilateral conversations and offer valuable networking opportunities to all attendees. Hence, they are **suitable for promoting ESS valuation among regulators and site owners alike**, yet within a slightly different framing.

Regulators are most likely to attend conferences that focus on emerging trends and developments which are relevant for future legislations. Often times, networking aspects (e.g. to explore business opportunities) receive less attention from high-level regulators, unless people attending are key representatives from other governmental, academic or business institutions. In order to appeal to policy makers, conferences should be well-planned and well-structured with a clear focus on recent developments of ESS valuation and its benefits within the European policy context.

Conferences can be understood as knowledge sharing platforms and are typically attended by a large number of people. They can contribute to deepening participants' understanding of ESS valuation methodologies and rely on little existing pre-knowledge, that is, participants merely need to be familiar with the concept as such; hence, they can be used for early promotion of ESS valuation among policy makers. Moreover, due to the non-binding nature of conferences, regulators are not required to expose a high willingness to cooperate. Yet, in order to be attractive, venue, date and content of a conference need to be selected carefully. While some theoretical

inputs on ESS valuation may be provided, it appears fruitful to further present tangible best-practice examples which, for instance, have shown to improve the innovation capacity of companies in the water sector. Given the complexity of the subject, demonstrating the impacts of ESS valuation through best practice examples and hands-on case studies is vital and can help participants to recognize the benefits of such methodologies.

Due to the larger focus on business opportunities and networking aspects, conferences appear somewhat **more suitable for promoting ESS valuation among site owners**. Since they provide platforms for knowledge exchange, conferences should avoid revolving around one particular ESS valuation tools alone. Instead, a specific emphasis should be put on explaining the rationale of ESS valuation, providing additional insights into applications and presenting the financial and environmental benefits to site owners. Again, working with best practices and case studies can assist in making the benefits more tangible and shaping a selling proposition.

Overall, the advantages of conferences for interacting with site owners are largely congruent with those for regulators: first, attending a conference requires little (if any) existing pre-knowledge about the subject; second, they present a low threshold opportunity for face-to-face interaction; and lastly, they create a public venue for promoting ESS valuation among a large number of stakeholders. However, depending on the venue and number of people involved, hosting a conference may become costly and can consume large quantities of resources. While some of the costs can be offset through ticket sales, high pricing may deter potential attendees and thus, compromise the overall effectiveness of the event.

As of today, specific conferences which revolve around ESS valuation are scarce, even more so when looking at the particular application of ESS thinking to the water sector specifically. However, other conferences can be used as a venue for individual sessions and workshops which highlight the utility of ESS-based thinking and introduce the concept to a wider audience. Table 4 Annex I presents a number of suitable events which will take place over course of 2017 and 2018 during which sessions on ESS valuation may be offered.

3.4 Market Place Events

Market place events are usually frequented by stakeholders from the private sphere; hence, they appear **less suitable for interacting with regulators** and public authorities but **well-suited for addressing site owners** of water facilities.

Given that such events are commonly attended by business representatives who are interested in receiving information on state-of-the-art technologies and current R&D activities, ESS valuation tools may be presented in conjunction with technical equipment. Choosing such approach illustrates the impact of technologies on ESS, thereby making such tools more tangible. The implementation of innovative water technologies and their impact on ESS across the DESSIN demo sites may be used as case-studies. Choosing such approach would have several benefits: first, it would demonstrate the successful valuation of ESS across various pilot sites; second, it would

illustrate ESS in a more tangible and practical manner; and third, it would highlight the context-specific financial and environmental benefits across various sites.

Since participants of market place events are often specifically looking for novelties, this way of interacting with site owners is useful at an early point in time and does not require the attendees to possess extensive pre-knowledge about ESS. Promoting ESS valuation at market place events provides valuable opportunities for engaging with a large number of stakeholders while devoting comparatively little resources. However, we can assume that the attentions span of attendees is limited; thus, the effectiveness of interactions at market place events is inherently limited and more detailed information about ESS valuation should be provided in follow-up sessions (e.g. one-on-one discussions) after the event. Table 4 in Annex I presents a number of suitable events taking place in 2017 and 2018 during which ESS valuation may be promoted.

3.5 Workshop

Workshops are class- or seminar-like interactions and typically involve a number of people at a time. They often comprise both theoretical and practical elements. While theoretical elements include short lectures, presentations or other forms of knowledge-driven inputs, practical aspects often refer to break-out sessions, group works and brainstorming activities which provide a more hands-on experience. In principle, workshops are **suitable for engaging with both regulators and site owners alike**. As outlined above, individual workshops may be arranged as part of existing conferences in order to reach a wider audience.

Naturally, the specific structure and objective of the workshop is highly dependent on the type of stakeholder and should be clearly defined prior to interaction. When conducting a workshop with **regulators** or representatives from public authorities, objectives can be manifold; e.g. designing a policy framework for ESS valuation in the water sector or the creation of benefits through ESS valuation on public health and societal costs. When involving **site owners**, the focus may shift towards more practical elements, such as the application of ESS valuation within a specific context or among one of the DESSIN demo sites. In any case, theoretical and practical elements should be tailored to the needs of the stakeholder and clearly communicate the contextual benefits of ESS valuation.

For stakeholders to join a workshop, a certain level of trust needs to be established beforehand. Similar to round tables, workshops are not suitable for engaging people with limited pre-knowledge about ESS valuation. Hence, they should be applied in the intermediate future when ESS valuation has been sufficiently promoted across regulators and site owners. The prime resource for conducting workshops is time; this applies to both the workshop leader and the participants. While it does not demand extensive financial resources, successful implementation requires thorough preparation. Due to the condensed content and intense working atmosphere, workshops should be conducted by appointed facilitators which guide the participants through the agenda in an efficient and well-structured manner. Otherwise, interactions with stakeholders may backfire and result in

frustration for not reaching the proposed objectives, thereby resulting in negative promotion for ESS valuation.

Table 2: Assessment table for modes of interactions with regulators

	Overall Suitability	Level of Trust Required	Point in Time	Resources Requirements	Risks and Drawbacks
One-on-one Discussions	High; face-to-face interactions to be preferred over at-a-distance (phone) conversations	Low to medium; less suitable for establishing first contact	Continuously; suitable for early and follow-up interactions	Low if any	Medium; transparency and adherence to ethical standards is paramount
Round Tables	High; well-suited for discussing in groups with sufficient pre-knowledge	Medium; certain level of trust needs to be attained beforehand	Intermediate future; only suitable once stakeholders have gained sufficient understanding of ESS valuation	Low to medium; mainly time and coordination efforts needed	Little if any
Conferences	Medium; networking opportunities more attractive to business representatives	Low; non-binding nature of conferences requires little trust to be built beforehand	Short-term to intermediate future; participation requires little pre-knowledge	Low to high; depending on venue, time and number of people, conferences can consume large financial resources	Low; coordination of participants and experts needs to be managed effectively
Market Place Events	Low; typically not applicable to policy makers	n/a	n/a	n/a	n/a
Workshops	Medium to high; depending on point in time	Medium; stakeholders need to be willing to travel	Intermediate to long-term; typically requires some pre-knowledge among participants to work effectively	Low to medium; preparation needs time	Low; due preparation and effective facilitation are vital for reaching workshop objectives

Table 3: Assessment table for modes of interactions with site owners

	Overall Suitability	Level of Trust Required	Point in Time	Resources Requirements	Risks and Drawbacks
One-on-one Discussions	High; face-to-face interactions to be preferred over at-a-distance (phone) conversations	Low to medium; less suitable for establishing first contact	Continuously; less suitable for early contact, more suitable as frequent follow-ups to prior interactions	Low if any	Medium; preparation is crucial
Round Tables	Low; more suitable for policy makers	n/a	n/a	n/a	n/a
Conferences	High; networking opportunities are attractive to business representatives	Low; non-binding nature of conferences requires little trust to be built beforehand	Short-term to intermediate future; participation requires little pre-knowledge	Low to high; depending on venue, time and number of people, conferences can consume large financial resources	Low; coordination of participants and experts needs to be managed effectively
Market Place Events	High; site-owners may look for novelties, ESS valuation can be presented to a large audience	Low to medium; non-binding nature of market place events requires little trust to be built beforehand	Short-term to intermediate future; early interaction with frequent follow-ups, e.g. through one-on-one discussions	Low if any	Medium; interactions are short-lived and need to be pitched effectively
Workshops	Medium to high; depending on point in time	Medium; stakeholders need to be willing to travel	Intermediate to long-term; typically requires some pre-knowledge among participants to work effectively	Low to medium; preparation needs time	Low; due preparation and effective facilitation are vital for reaching workshop objectives

4. Recommendations

As global ecosystems are pushed towards their boundaries, ESS valuation presents an important tool for translating the value of natural public goods and services into monetary terms. ESS valuation can contribute to the preservation of natural assets by making them visible, tangible and workable within the economic rationale. Nonetheless, assessing the true value of ESS is a daunting task and should not be conducted without due consideration. Every valuation method is based on a set of assumptions which affect outcomes and introduce elements of significant variability. To stakeholders who are yet unfamiliar with the concept, it may thus seem flawed. In addition, many stakeholders remain critical of the idea that "putting a value on nature" will contribute to the preservation of natural capital. Even more importantly, environmentalists often strongly oppose applying utilitarian approaches of ESS valuation and highlight the intrinsic non-use value of nature. It is therefore absolutely paramount to concisely explain the rationale of ESS valuation and clearly communicate its benefits when promoting such methodologies among the above mentioned stakeholders.

As of today, **ESS valuation has not received mainstream awareness and is conducted in few cases only**. Some important groundwork has been laid by the TEEB-initiative (The Economics of Ecosystems and Biodiversity) in 2007, and while it managed to achieve recognition on a broader scale due to its comprehensiveness and findings, the initiative failed to introduce ESS valuation in mainstream economic thinking. In order to promote ESS valuation and create conducive market conditions, this paper has presented several modes of interacting with stakeholders and promoting ESS valuation as part of the DESSIN project. While there is a large number of interest groups that may be taken into account, this paper focusses on two groups of stakeholders which affect demand for ESS valuation to a larger extent: regulators and site owners.

A practical approach to reaching both regulators and site owners is to use existing conferences as a venue for offering individual sessions and workshops on ESS valuation in the water sector. In that, a large number of stakeholders can be familiarized with the concept. A list of eligible venues is proposed in Table 4 in Annex I and may serve as a basis for promotional activities in 2017 and 2018. In addition, direct interactions with site owners and water companies may be sought to promote ESS valuation on a one-to-one basis. Exemplary companies are presented in Table 5 in Annex II.

Regulators play a particular role in that they possess the ability of creating favorable market conditions, thus pushing and pulling the market towards increased uses of ESS valuation tools. As of today, increasing the innovation potential of SMEs and marketing technologies through preserving or enhancing ESS has not achieved mainstream attention. Instead, **innovative features of water technologies often present a USP in themselves and do not benefit from additional promotion through ESS valuation**. Hence, regulations and policy interventions are needed if ESS valuation is to be applied among a wider audience.

In the short-term future, interactions with regulators should focus on one-on-one discussions with policy makers on the European and national level. Here, highlighting the benefits of ESS valuation within existing legal frameworks (e.g. the European WFD) presents a crucial success factor. Once policy makers have gained a sufficient understanding of the subject matter, this may be followed up by round tables to further strengthen the case for ESS valuation. In the intermediate to long-term future, these activities can be complemented by invitations to conferences and workshops which revolve around the application of ESS.

With regards to site owners, short-term interactions can be achieved through attending market place events and conferences. In this, the financial and environmental benefits of ESS valuation should be emphasized, ideally by illustrating impacts through best-practice examples and innovative technologies as per implementation of the DESSIN project. Early interactions should be complemented by follow-up discussions on a one-to-one basis. In the long-term future, workshops can convey a more in-depth understanding of ESS valuation and may increase the attractiveness of ESS valuation among site owners.

4.1 Annex I. Events

The table below lists international events in the water sector in 2017 and 2018 that are of relevance for the DESSIN project and the innovative technologies that are being promoted as part of DESSIN. Some of the events are yet to come whereas others have actually been attended by members of the SUBSOL consortium.

During the WssTP event in Brussels in June 2017 for instance, members of the SUBSOL consortium had the chance to discuss links between Ecosystem Services resilience' and food security as well as natural hazard and mitigation strategies through nature-based water technologies. The World Water Week 2007 in Stockholm further offered the opportunity to communicate the importance and opportunities of Ecosystem Services valuation to decision makers in order to promote the uptake of this approach into decision making. Moreover, the EIP Water Conference and International Water Week in Porto in 2017 dealt with "creating opportunities". In fact, the theme was nicely aligned with DESSIN's ambitions to create opportunities for sustainable development in the water sector through valuation of Ecosystem Services.

Overall, it can be concluded that the attended events were important with regard to communicating benefits of the DESSIN approach to decision makers in order to remove barriers and leverage DESSIN innovations. The DESSIN approach was appreciated by many stakeholders who valued the innovative approach of DESSIN. This positive feedback from stakeholders allows the conclusion that even more effort should be devoted to disseminating DESSSIN innovations and to further apply them in other research projects.

Table 4: List of water-related events in 2017 and 2018

Event	Location	Date	Participated
Land Use and Water Quality (LuWQ)	The Hague, Netherlands	29 May – 1 Jun 2017	
World Water Works	Amsterdam, Netherlands	29 – 30 May 2017	
WssTP – Water Innovation Europe	Brussels, Belgium	15 June 2017	X
Blues in the Marshes	Vught, Netherlands	6 – 7 Jul 2017	
CIB W062 Symposium	Haarlem, Netherlands	23 – 25 Aug 2017	
Stockholm World Water Week 2017	Stockholm, Sweden	27 Aug – 1 Sep 2017	X
Internal erosion in embankment dams & their foundations	Delft, Netherlands	4 – 7 Sep 2017	
EIP Water Conference	Porto, Portugal	24 – 30 Sep 2017	X
Porto Water Innovation Week	Porto, Portugal	24 – 30 Sep 2017	X

Wetsus International Congress 2017	Leeuwarden, Netherlands	9 – 10 Oct 2017	
4th Amsterdam International Water Week 2017	Amsterdam, Netherlands	30 Oct – 3 Nov 2017	
Floodex Europe	Amsterdam, Netherlands	31 Oct – 1 Nov 2017	
Aquatech Amsterdam 2017	Amsterdam, Netherlands	31 Oct – 3 Nov 2017	
COP23	Bonn, Germany	6 – 17 Nov 2017	
Hydro17	Rotterdam, Netherlands	14 – 16 Nov 2017	
8th World Water Forum 2018	Brasilia, Brazil	18 – 23 Mar 2018	
IFAT 2018 trade show on environmental technology	Munich, Germany	14 – 18 May 2018	
36th International conference on coastal engineering ICCE2018	Baltimore, USA	30 Jul – 3 Aug 2018	
IWA World Water congress & exhibition 2018	Tokyo, Japan	16 – 21 Sep 2018	
European Water Tech Week Leeuwarden 2018	Leeuwarden, Netherlands	24 – 27 Sep 2018	

4.2 Annex II. Site Owners and Water Companies

Table 5: List of selected site owners and water companies

Company	Location	Contact
Aggerverband	Germany	http://www.aggerverband.de/
Emscher Genossenschaft Lippe Verband	Germany	http://www.eglv.de/
EnBW Energie Baden-Württemberg AG	Germany	https://www.enbw.com/
Erftverband	Germany	http://www.erftverband.de/
Linksniederrheinische Entwässerungsgenossenschaft	Germany	http://www.lineg.de/
Hamburg Wasser	Germany	https://www.hamburgwasser.de/
Hochsauerland Wasser GmbH	Germany	https://www.hochsauerlandwasser.de/
Niersverband	Germany	http://www.niersverband.de/
OEWA Wasser und Abwasser GmbH	Germany	https://www.oewa.de/
Oldenburgisch-Ostfriesischer Wasserverband	Germany	http://www.oowv.de/
RheinEnergie	Germany	http://www.rheinenergie.com/
Ruhrverband		http://www.ruhrverband.de/
Stadtwerke Dessau	Germany	https://www.dvv-dessau.de/
Stadtwerke Erfurt	Germany	https://www.stadtwerke-erfurt.de/
Stadtwerke München	Germany	https://www.swm.de/
Südsachsen Wasser GmbH	Germany	http://www.suedsachsenwasser.de/
Wahnbachtalsperrenverband	Germany	https://www.wahnbach.de/
Wasserversorgung Bayerischer Wald	Germany	http://www.waldwasser.eu/
Wupperverband	Germany	http://www.wupperverband.de/
Brabant Water	Netherlands	https://www.brabantwater.nl/
Dunea Water	Netherlands	https://www.dunea.nl/

Evides Waterbedrijf	Netherlands	https://www.evides.nl/
Oasen	Netherlands	https://www.oasen.nl/
PWN	Netherlands	https://www.pwn.nl/
Vitjens Waterbedrijf	Netherlands	https://www.vitens.nl/
Waternet	Netherlands	https://www.waternet.nl/
Waterbedrijf Groningen	Netherlands	https://www.waterbedrijfgroningen.nl/
WMD Water	Netherlands	https://www.wmd.nl/
Wml Limburgs drinkwater	Netherlands	https://www.wml.nl/

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 619039
This publication reflects only the author's views and the European Union is not liable for any use that may be made of the information contained therein.

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