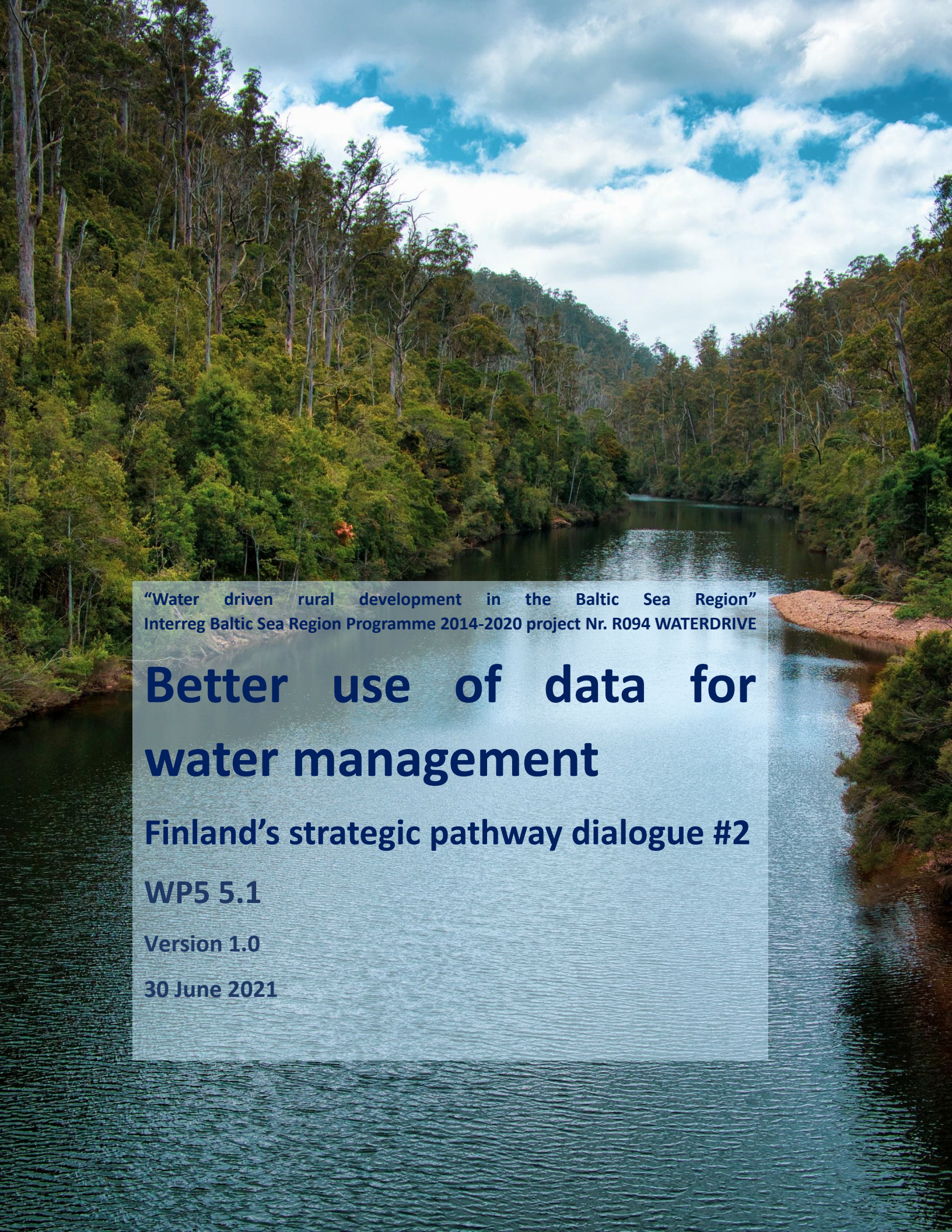

"Water driven rural development in the Baltic Sea Region"
Interreg Baltic Sea Region Programme 2014-2020 project Nr. R094 WATERDRIVE

Better use of data for water management

Finland's strategic pathway dialogue #2

WP5 5.1

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Finland	Finnish Environment Institute	
Finland	Baltic Sea Action Group	
Finland	Finnish Field Drainage Association	
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Note! This pathway report is based on the national pathway documents and results of the SWOT analysis as of 8 June, before the Waterdrive partner meeting where these pathways were presented. This report is a draft and will be updated during the further dialogue process in autumn 2021.

Contents

Background

Waterdrive-project builds on the results of previous international projects and literature in advancing holistic catchment level water management through better acknowledgement of the suitable conditions for productive agriculture and the potential synergies with field productivity, climate resilience and wider environmental benefit. The project's emergence coincided in Finland with the new four-year 70 MEUR programme for water protection which looks to strengthen water management i.a. from the catchment perspective (Ministry of the Environment). A joint task group with the Ministry of Agriculture and Forestry, involving also regional authorities was established for the programme. In parallel, to acknowledge the role of both agriculture and forestry in water management and climate resilience, Ministry of Agriculture and Forestry, in consultation with the Ministry of the Environment, coordinated a stakeholder process and published *Water management guidelines for agriculture and forestry* in 2020 (hereinafter: Guidelines) (Ministry of Agriculture and Forestry, 2020). The Finnish partners of the Waterdrive project consortium actively contributed in the process and also as authors.

As a way to enhance the strategic communication of Waterdrive results, the partner countries have chosen one or more national strategic development pathways which are based on Waterdrive work and results and support wider national testing and anchoring of the results. Based on two stakeholder events organized by Finnish Environment Institute in January 2020 and January 2021, two development pathways were selected within the national activity 5.1 (WP5) of the Waterdrive project. This report concerns the pathway #2 "More efficient use of data and tools". A separate document is made of the other pathway "Catchment level coordination" (pathway #1). Additionally, a third pathway dialogue was defined to explore the potential to recognize environmental and sustainability attributes in agricultural land value.

Waterdrive-project emphasizes spatial planning on the catchment and landscape scales as a water management tool. Spatial planning, which utilizes high resolution data and appropriate modelling results, helps recognize different landscape features and land uses, their contribution to nutrient losses and nutrient retention and target appropriate water management measures in optimal locations. The lessons from field activities and workshops with stakeholders tell that digital maps which integrate different data layers are also effective communication tools. Waterdrive project will demonstrate this by a story map to be published later this year. The story map illustrates a way to use different data sources for building joint understanding of the pressures and mitigation measures and to coordinate the planning of measures. The idea promoted by Waterdrive is that digital information should not only be available for and used by trained specialists, but that relevant data and modelling results, should be made available for all concerned actors involved in water management and sector or administrative boundaries should not limit access to relevant data. Digitalization and data integration are priorities also in the abovementioned Guidelines and enable more inclusive and multi-benefit water management. Thereby, the pathway is in line with the Guidelines and aims to find concrete steps for their implementation.

The pathway and this document are intended to support the national dialogue and communication on the topic, building of a joint vision of how enhanced use of data could support the strategic objective of more holistic water management.

Strategic development pathway: better use of data for water management

Description and aim

This pathway explores the potential to increase the availability, accessibility and use of relevant data and modelling results for holistic cross-sector water management. It focuses on the decision processes by concerned stakeholders from the regional administration (and river basin authorities) to the local project level. The pathway aims to identify the opportunities and critical implementation steps to increase the use of data and the effectiveness of systematically collected science-based data in water management decisions, thereby also contributing to the implementation of the water management Guidelines (MoAF 2020). As an outcome of the pathway, all relevant information is available for those working in river basin andwater management.

Framing of the pathway and datasets included

The pathway builds on the long-term work where the Finnish Environment Institute and Natural Resources Institute (and its predecessors), with collaborating partners, have been instrumental in systematic development of tools for river basin management and site-specific water and soil management. This work has also been extended to the Baltic Sea Region cooperation, for instance, within the Baltic Compass project (see Tattari et al 2012). Hence, there is a solid basis for assessing further needs and potential, resting on the expertise of the Waterdrive partners. On the forestry side, it is fair to acknowledge the related work by the Finnish Meteorological Institute and forest centre Tapio.

The pathway includes an enhanced SWOT-analysis focusing on the availability, accessibility and use of existing data. The pathway is limited to systematically collected, mainly nation-wide datasets, covering scientifically monitored natural parameters and anthropogenic data such as land use and infrastructure. It is concerned with data relevant for river basin and water management and the use of that data. Farm specific economic data, administrative process data and political data is framed out. Also other information sources, such as local knowledge, values, tradition, word-of-mouth and other unrecorded information, however relevant it may be for water management actions, is not covered by this pathway. Mathematical models are included only insofar as they have nation-wide coverage and results are available for river basin planners (VEMALA and RUSLE models).

Pathway scope and steps

This document outlines the development pathway and further steps in the process, which is intended to be driven by the committed national stakeholders. At this stage, the pathway has been described, an enhanced SWOT analysis performed (see below) and an initial stakeholder contacts made to prepare for more profound engagement and dialogues in autumn. An internal task force from the Waterdrive partners and a reference group involving persons from outside the partner organisations been established. As part of the pathway dialogue, the following steps should be discussed and completed.

1. Define the relevant information for river basin and water management. Define what is necessary and attainable resolution (level of precision). ¨

2. Assess the risks associated with the parallel use of different information and information collected by different means.

3. Map the datasets and models (VEMALA, RUSLE) by their availability, accessibility, intensity of use and active users:
    a. Data existing and in use
    b. Data existing, but not easily accessed/not widely known
    c. Data existing, but restricted
    d. Data necessary, but not existing

4. Assess how to advance the use of the data in the above categories (a-d), the associated costs and the cost-effectiveness of these improvements.

5. Map key actors and their roles. Agreeing on the responsible party for overseeing the pathway.

6. Define implementation guidelines with key actors (based on the enhanced SWOT completed within the task team)

7. Define a tangible goal and vision for the pathway.

8. Monitoring, evaluation, learning and development.

Engagement of stakeholders in the pathway

The pathway is presented as a communication topic which invites the administration and other actors to consider the opportunities provided by data and digitalization. Ideally, a joint vision and objectives would be defined, individual development steps agreed and advanced by appropriate management steps. These could be related to administrative practices, agreements on data sharing, revision of administrative processes or R&D projects. In terms of projects, the pathway could be used to guide, for instance, priorities in upcoming calls in the water management programme which focus on either development of new data collection and utilization methods or training and planning. Also, the pathway could inspire academic degree or post doc studies as well as business innovations. It is critical, that the stakeholders find the aim, purpose and scope of the pathway relevant and worth exploring further. In preparing the pathway, stakeholders within the Waterdrive partnership, both partners and associated organisations, as well as individual external persons were included and consulted. The organisations of the persons involved are listed in Appendix 2.

Vision 2030

The pathway thus far lacks a clear and concrete objective, which is easily understood by all parties. The aim "All relevant information is used by the concerned actors in water management", sets the direction, but leaves open the definition of "relevant information" as well as the outcome which results once the

pathway aim is reached. Formulating a vision and more specific steps and metrics is a task for the stakeholder dialogue planned for autumn 2021.

SWOT -analysis

An enhanced SWOT-analysis has been performed by the task group identifying the strengths, weaknesses, opportunities and threats associated with data and use of data in water management. Here is a translated summary of the SWOT, the full SWOT is provided in Appendix 1. The strengths and weaknesses describe the current situation while opportunities and threats reflected the pathway as implemented in its defined scope.

STRENGHTS	OPPORTUNITIES
• Joint commitment to streamlining, openness, digitalization and connectedness of data • Lots of good, comprehensive, open data, also GIS/map • Good nation-wide models and time series • Field drainage plans in digital images	• Joint data interface to promote use of open data • Trust-building • More comprehensive joint planning and goal-setting • Prioritization, targeting and adaptation of measures • More effective planning, implementation, monitoring and communication with digitalization and new sw • Opening motives behind decisions

WEAKNESSES	THREATS
• Missing data • Coded and restricted data • Data poorly available, not known by users • No knowledge of the intensity of use of different data • Special skills and software needed • Human factors and deficiencies	• Limitations and applicability not understood • Neglecting field observation and local knowledge • Some parties object open data principle • Privatization of data • Lack of resources lead to poor quality and obsolesence • We reject data and results we do not understand or which conflicts our perceptions • Base decisions too much on open data

Guidelines for implementation based on the enhanced SWOT

The enhanced SWOT enabled to identify critical considerations in implementation that help address the points highlighted in the SWOT. These guidelines build on the identified strengths, strengthen weaknesses, tap on the opportunities and mitigate risks associated with the aim of increasing the use of systematically collected data.

- Define a joint cross-sector goal
- Invest in education and training
- Re-evaluate processes and practises (in administration, among professionals)
- Secure engagement, communication
- Prioritize to minimize costs, maintain focus and stakeholder buy-in
- Consider and secure needed resources
- Preserve a sound scientific basis and integrity

Pathway as a dialogue activity of the Waterdrive project and beyond

The pathway is initiated and coordinated at the initiation stage by the Finnish Environment Institute Waterdrive team. Other Waterdrive partners support this work. An inter-ministerial task force has been established for the joint water programme in which a first call for projects was completed last winter. This group will be introduced to both pathway #1 and #2 and the Waterdrive results for Finland overall. In addition, links to introduce the pathway ideas to both newly funded water related projects (call in

autumn 2020 for 3 MEUR for projects in 2021-22) as well as to the planning group of the upcoming call in autumn 2021. In addition, Waterdrive partners and task group members are themselves implementing projects and carrying out operations where the pathway elements and ideas can be implemented. One such project is the LaserVesi-project (*Laser scanning in water management as part of sustainable land use and forest planning*). There is also representation in the steering groups of relevant projects by members of the pathway task force.

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Appendix 1

SWOT-analysis, 1st step (full version, translated)

Current state	Development path: better utilization of data and tools	
STRENGTHS	**OPPORTUNITIES**	**THREATS**
• The environmental and natural resource sectors' common motivation and objective for data integration, openness and digitalization • Good knowledge about water conditions at the watershed level • Comprehensive GIS and other information and monitoring data on land use, nature, infrastructure, agriculture and forestry available (mappings, inventories; e.g. endangered species) • Special map services for special needs and general use • Good nationwide models (VEMALA, RUSLE) as well as good modelling tools also for smaller scales • Good time series from chosen points (water quality, hydrology), from continuous monitoring for 10+ years • Nearly all field drainage plans available as map images	• Utilizing new data (e.g., data collected by landowners) • Collecting open datasets into one place to enable their better use • Information openness builds trust • Targeting the right actions in the right place, prioritizing targets and evaluating the need for actions • Exploiting the functionality of geographic features e.g. for water control and multifunctional actions • Inclusive modelling (experts, local level workers and authorities together) will enable a common vision and a quick formation of objectives • Digitalization of sub-surface drainage maps	• emphasizing information can lead to a vicious circle of fulfilling of information needs • Model results are interpreted too strictly without considering their limits; risk of quick and simplistic conclusions • Accurate and open information will expose actors to criticism and pressure • Not enough public money => information is privatized • Local field observation is neglected when there is a lot of accurate and seemingly necessary information, and a lot of effort has been put in data collection • The insufficiency of resources to develop and calibrate models • Quality of information materials when diversifying sources and data collection methods • Local stakeholder groups/project owners are not interested in research information and science-based planning and give data authority to experts
WEAKNESSES		
• Relevant information dispersed and only partially useable for the limited group (monitoring, permitting and payment authorities, consulting/advisory, private) • No data on agricultural field's fertilization and tillage history, agricultural practices and P-levels that are usable for research, targeting or monitoring • No thorough mapping of which materials and tools are in the active use by planners and actors implementing measures • The use of information and tools as well as the interpretation of	• Digital materials will help with co-operation, execution and monitoring as well as enable broader planning areas and visualization for citizens in an understandable way • Utilizing automation and remote mapping • By merging information multifunctional (and cost-efficient) actions and minimizing cons; minimizing conflicts between different objectives (e.g., flood protection/agriculture; forestry/water protection; fish populations/field drainage management)	• Humans have a limited ability to process information, additional information is not used • Humans have a high threshold for accepting information that contradicts with their own understanding, world view or opinion • Choosing only the information that we can understand and ignoring the rest • Information can enhance the risk of disagreements and escalations if it can be used tendentiously • Different parties edit and process GIS datasets according to their

results requires subject knowledge, specials skills and software
• Human weaknesses when making decisions about which data to consider in decisions
• **Existing but poorly accessible or poorly known materials:**
  ○ Acidity risk maps (GTK)
  ○ Satellite images (e.g. Sentinel 2)
  ○ Moisture index map
  ○ Forests plot info (lush/bare) and age / height of the trees (VMI)
  ○ Sub-surface drainage maps only in picture format
• **Existing but encrypted or restricted materials:**
  ○ RUSLE erosion maps (made available for farmers in the VIPU system)
  ○ Agricultural practices and history
  ○ Fertilization, use of manure
  ○ P-levels
  ○ Nationwide forest trenchings, forest handling, loggings / logging plans
  ○ Chlorophyll maps, crop maps (e.g. Yara Atfarm)
  ○ Flood risk/sensitivity
  ○ Land parcel registry (ownership), land rent contracts
• **Necessary but missing materials or unfinished models:**
  ○ Sub-surface drainage network is missing from the fields' watershed delineations
  ○ drainage systems, structures from whole basic drainage areas, the structures' condition and age
  ○ soil data is not sufficiently accurate (e.g.
	• Optimizing land use; e.g. using challenging/ low productivity areas/plots for water protection or restoring nature/biodiversity
	• Long term monitoring areas (catchments) will help to evaluate and model trends and scenarios in land use change
	• Long term monitoring supports research as well as implementing new projects and monitoring them, and also the monitoring of aggregate impact
	• Digitalization of River Basin Management Plans and implemented measures (infrastructure, water construction, drainage, river restoration, water protection; incl. administrative measures) monitoring, digital documentation and archiving in GIS (eTPO project)
	• Expanding current pilot sites' monitoring nationwide projects would enhance model development
	• Improvement of geographic information tools/platforms guarantees better utilization of datasets.
	• Regular updating of information which helps accumulation of monitoring data and its maintenance.
	• Geographic information experts' and modelers' co-operation with substance experts will greatly improve the development of nationwide datasets, and helps identify information needs.
	• New more accurate laser scanning materials will enable more accurate identification of drainage networks as well as identification of defective geometry.
	• More accurate and open information pushes for transparency regarding other motives impacting decision-making
		personal need without coordination with other parties
		• Data produced in different ways is mixed
		• Necessary data not openly usable

the peat layers' depth, fertility) ○ Aerial photos (history) imprecisely archived, shooting date missing from the location database ○ Impact of drainage systems and drainage water management on water pollutants, yield, forest growth and nutrient, carbon and GHG losses on mineral and acid sulphate soils ○ Riverbed network (hydrology) does not include smaller water bodies (brooks, ditches) • Digitalization of government and administrative procedures is lagging and advancing at different speed in agriculture and forestry sectors (MMM 2020) • Watershed planning does not completely utilize the opportunities of digitalization		

Enhanced SWOT – guidelines for implementation (original language)

Toimeenpano, mahdollisuuksien ja riskien hallintastrategiat:	***Miten em. vahvuuksia tulee hyödyntää, jotta positiiviset mahdollisuudet realisoituisivat?***	***Miten em. vahvuudet auttavat välttämään uhat? Miten hyödynnetään vahvuuksia riskien minimoimiseksi?***
Mitä kehityspolun toteuttamisessa tulee huomioida? Viitaten kehityspolun tavoitteeseen ja rajaukseen (edellä).	• Miten aineistot olisivat yhden palvelun kautta käytettävissä ja käyttäjillä olisi riittävä osaaminen? • Hallinnon päätettävä yhteinen tavoite ja luotava suunnitelma toimijoiden kapasiteetin kasvattamiseksi (koulutus, prosessit, toimintamallit) • Koulutus • Resurssien riittävyys yhteistyön ja digitalisaation edistämisen kautta • Systemaattinen evaluointi toimenpiteiden toimivuudesta mitatun datan pohjalta, hyödyntäen kaikkea kirjallisuutta • Neuvonta • Koordinointi	• Osallistaminen • Laajapohjainen tavoitteiden määrittely • Oikeudenmukainen transitio • Priorisointi: valitaan yhteiskunnan kannalta tärkeimmät tietoaineistot ja työkalut yhteisesti käytettäviksi ja kehitettäviksi • Viestitään tieteen ja tiedon hyödyt tehokkaasti myös paikallistasolla • Varmistetaan riittävät resurssit tarpeeksi kattavan tietopohjan käytön ja saatavuuden varmistamiseksi kussakin käsillä olevassa kysymyksessä

Toimeenpano, mahdollisuuksien ja riskien hallintastrategiat:	***Mitkä MAHDOLLISUUKSISTA auttavat parantamaan/minimoimaan heikkouksia ja miten mahdollisuuksia tulisi hyödyntää heikkouksien vahvistamiseksi?***	***Mitkä heikkouksista tulee eliminoita, jotta vältettäisiin pahimmat uhat ja riskit? Miten varmistetaan, että nykyiset heikkoudet eivät vahvistu kehityspolun kautta?***
Mitä kehityspolun toteuttamisessa tulee huomioida? Viitaten kehityspolun tavoitteeseen ja rajaukseen (edellä).	• Sektorien ja viranomaisten ja hallinnon tasojen välinen keskustelu yhteisistä tavoitteista ja tietovarantojen priorisointi ja datahallintajärjestelmät ja protokollat	• Sektorien ja viranomaisten ja hallinnon tasojen välinen keskustelu yhteisistä tavoitteista ja tietovarantojen priorisointi ja datahallintajärjestelmät ja protokollat • Seurantakustannusten kattamiseksi vesimaksu veden ja vesi-infran käyttäjille (esim. maatalous) • Vaalitaan tiedeperusteisuutta ja korkealuokkaista vertaisarvioitua tiedettä ja tieteen moraalia • Laaja-alainen viestintä, tiedonjakaminen

Appendix 2

List of organisations of persons involved in the process (in alphabetical order)

Baltic Sea Action Group

Centre for Economy, Transport and the Environment of North Ostrobothnia

Centre for Economy, Transport and the Environment of South West Finland

Centre for Economy, Transport and the Environment of South Ostrobothnia

Finnish Environment Institute (SYKE)

Finnish Field Drainage Association

JAMK University of Applied Sciences

KVVY Tutkimus Oy

Ministry of Agriculture and Forestry

Ministry of the Environment

Natural Resources Institute Finland (Luke)