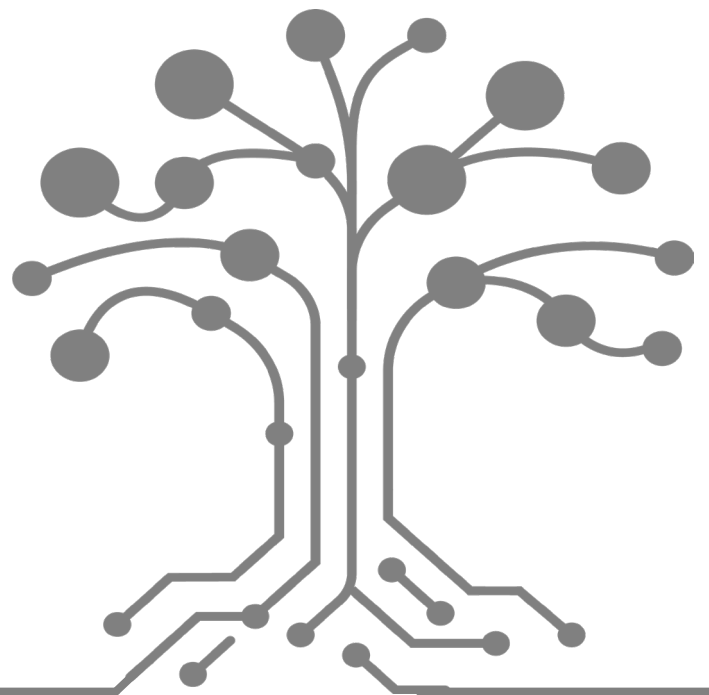


DIGITALISATION IN ENVIRONMENTAL ASSESSMENT

International frontrunners



Colophon

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Introduction

The onset of the DREAMS project in October 2020 initiated an exploration of completed and ongoing international projects utilising digitalisation within environmental assessment (EA). The focus is on Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA).

The purpose of this review is multifaceted and essentially help to:

- *Establish a state-of-the-art:* The accumulation of completed and ongoing projects for employing digital solutions within EA provides an overview of the current status of digital transformation in an international setting.
- *Learn from international experience:* Whether it be from completed or ongoing projects, there is accumulated knowledge from case studies that can provide valuable takeaways for informing future initiatives in adopting digital solutions.
- *Facilitate a community of knowledge-sharing:* There is an ambition to be able to continue the learning process and exchange of experiences among international actors. For this reason, a purpose of this review is also to promote a network between these international actors so that navigating the novel field of digital solutions involves an opportunity for mutual support.
- *Understand DREAMS within the current digitalisation context:* Being able to situate DREAMS within the current context of digital transformation permits an understanding of how the ambitions of DREAMS compare to international efforts.

This report is a documentation of the case studies, both describing the relevant digitalisation projects and the experience and reflections gained as a result of those initial projects. The content is based on interviews conducted in October and November 2020 with representatives from different organisations currently involved in the digitalisation of EA. This content was summarised by the authors of the report, and thereafter sent to the corresponding interviewees to guarantee accuracy and allow for commenting and review. The report is publicly available to all interested readers.

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Summary

This report highlights some of the current international cases that utilise digital solutions to improve various aspects of the EA process. Interviews with various international organisations have revealed broad functions for these digital tools as well as variation regarding where in the EA process they can be employed. Table 1 provides an overview of the different initiatives and their international significance, as well as the status of implementation and the related organisation.

Initiative	Digitalisation content	Status	Contact organisation
Australia			
IBSA/IMSA	Well-established data systems for collecting and sharing biodiversity/marine data to inform EA	In place	WABSI, The Western Australia Biodiversity Science Institute
NLP extraction	Frontrunners in making data from historical EA reports accessible through digital means	Ongoing	WABSI
Environment Online	An online dashboard where stakeholders, including the community, can upload, access and share project information throughout the EIA process	Upcoming	WABSI
SAFE	High ambitions for a shared analytic framework to improve decision-support, reporting and transparency of EA process	Upcoming	WABSI
eBase	Frontrunners in automating impact identification and report generation	In place	Xodus Group
Denmark			
DREAMS	High ambitions for a digital baseline and cause-effect tool synthesising past EA experience to support EA practitioners	Upcoming	Aalborg University and DK Consortium
Denmark's Environmental Data Portal	Well-established portals for storing and sharing geographically-linked environmental data to inform EA practice	In place	Ministry of Environment of Denmark, GBIF
The Netherlands			
Project Decision System	Legislative reform for establishing a data baseline and a common repository for collecting decision standards	Upcoming	Ministry of Infrastructure and Water Management
iReport	Frontrunners on digital interfaces to EA reports, and working on online real-time commenting within EA reports	Upcoming	Royal HaskoningDHV
The United Kingdom			
Industry Evidence Programmes	A frontrunner project for establishing digitally accessible sector-by-sector evidence notes to inform future EA practice	Upcoming	Royal HaskoningDHV
Primer and Outlook Journal	Publications consolidating digital solutions and case studies, that also provides suggestions for future steps in digitalisation	In place	IEMA, Institute of Environmental Management & Assessment
Scotland			
SEA Gateway & Database	A well-established repository for SEA reports along all stages of the SEA process, including open access to report and metadata	In place	Scottish Government
Industry Evidence Programmes	Interesting example of informing an open online database with monitoring data and citizen science input.	In place	Scottish Environment Protection Agency

Lastly, as digitalisation of EA to some extent involves rethinking EA processes, it may be obvious to consider relating digitalisation to other topical developments, such as the integration of the Sustainable Development Goals (SDGs). Using digital tools to link the SDGs to EA are an integrated part of the DREAMS project.

This makes SDGs a priority of the project as does understanding how they contribute to the assessment of impacts and decision-making. Representatives from other organisations and projects expressed a unanimous consensus that the SDGs draw parallels to the ambitions of EA and would present new opportunities for more comprehensive and well-rounded assessments. However, they are still absent within the respective digitalisation projects and there are no current plans for future integration. Thereby, the SDGs do not yet have a prominent role in EA and the DREAMS project remains a frontrunner in this regard. Yet, the inherent interest from the various organisations suggests that a lacking integration of SDGs is more a reflection of methodological uncertainty than an indication that they do not have a place within EA and any digital tools that may accompany the process.

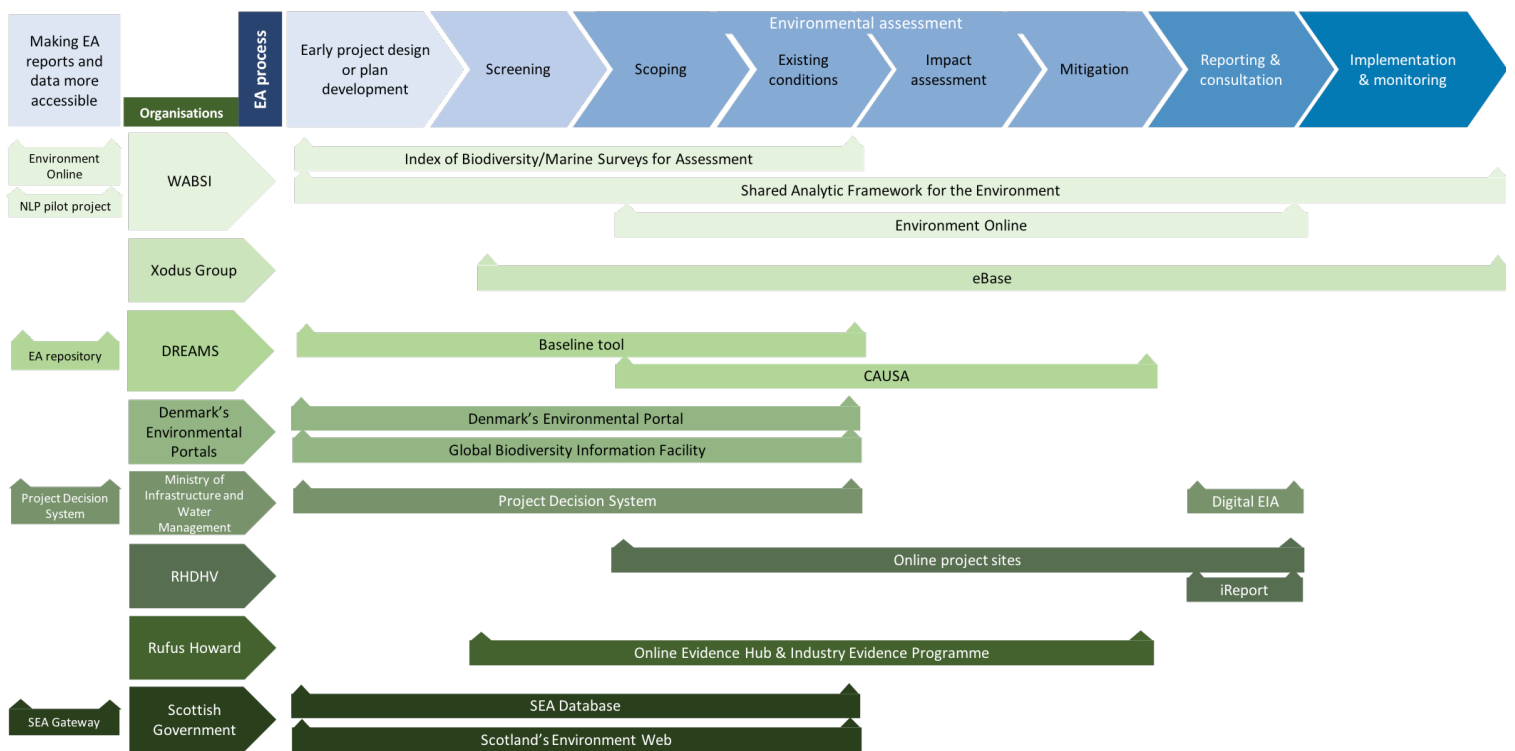


Figure 1 provides an overview of how these tools relate to EA and attempts to synthesise the initiatives described in the remainder of this report.

Western Australia

Sharing biodiversity and marine data in a common database: IBSA/IMSA

A negotiation for wider access to shared data led to the development of a common biodiversity and marine indices and data-stores in Western Australia, namely Index of Biodiversity/Marine Surveys for Assessment (IBSA/IMSA). These programs focus on “opening access to data used in environmental assessments to improve efficiency for proponents, confidence for regulators and transparency for the community” (Chris Gentle). When performing surveys for a project, proponents submit survey information and corresponding metadata (such as project title, author, year, survey type, and more) to the system. Survey reports, metadata and data must be submitted, and all metadata is published. Proponents can voluntarily choose to publish the survey data to make the data available for extended use. This option is taken by a majority of proponents and is a leading indicator of a positive cultural change in sharing data. In 2020, the Western Australian Government, through the Department of Biodiversity, Conservation and Attractions, is currently establishing a [Biodiversity Information Office](#), which will curate and integrate this data with Western Australian Government surveys and other survey data with the intention that these databases from other commons will be linked together to create one comprehensive data asset managed by the Government of Western Australia.

Index of Biodiversity Surveys for Assessments (IBSA)

Showing 1 to 20 of 930 surveys

Sort by **Most recent** Name Relevance Organisation Projects per page 20 50 100 500

1 2 3 4 5 6 7 >

Filter results

▼ Refine Clear all

Receiving agency

- Department of Mines, Industry Regulation ...
- Department of Water and Environmental R...
- Environmental Protection Authority (118)

Assessment type

- Native vegetation clearing permit (805)
- Proposal (121)

Author

Search by Date Range

Geographic filter

Filter by geographic region

RECONNAISSANCE AND TARGETED FLORA AND VEGETATIO...

Started 1.2 years ago
Ecoedge
IBSA-2020-0268.
Reconnaissance and Targeted Flora and Vegetation Survey condu...
Status: Project Ended
Start date: 09 October, 2019
End date: 09 October, 2019

SOUTH COAST HIGHWAY - MUNGLINUP BIOLOGICAL SURVEY

Started 5.3 years ago
GHD
IBSA-2020-0264. Flora survey and fauna survey and targeted flora survey conduc...
Status: Project Ended
Start date: 30 September, 2015
End date: 27 September, 2016

SOUTH COAST HWY BIOLOGICAL SURVEY SLK 371.5 - 3...

Started 3.3 years ago
Damien Rathbone, Dr Gillian Craig & Dr Sandra G...
IBSA-2020-0263. Flora and fauna survey with targeted flora survey conducted f...
Status: Project Ended
Start date: 06 September, 2017
End date: 18 November, 2017

GOOMALLING-MERREDIN RD UPGRADE: TARGETED MYGALO...

Started 2.6 months ago
Biota Environmental Sciences
IBSA-2020-0462. Terrestrial invertebrate fauna conducted for Main Roads, for ...
Status: Project Ended
Start date: 19 October, 2020
End date: 22 October, 2020

Stakeholders

Development phase

- WABSI: Led the development of the approach and benefits case for opening access to data.
- Department of Water and Environmental Regulation: Developed the IBSA/IMSA systems and led the communications and engagement programs.
- Community: They have to understand the data. There is potential for a data credibility gap, if the data that is collected is different than expected.
- Politicians: Supported the culture change to digitally transform EA and funded the program initiatives.

Use phase

- Proponents: They have to be convinced to publish data to enable the data commons.
- Department of Water and Environmental Regulation: They are the receivers of the data and lead communications with proponents.
- Department of Biodiversity, Conservation and Attractions: They are establishing the Biodiversity Information Office to create an integrated biodiversity data commons.
- Scientists and Consultants: They have to collect the data, refine the standards and interpret the data.

Takeaway

Sharing information in a common database is a highly relevant way to improve EA practice. According to the interviewees, the most prominent hurdle is the cultural shift that providing open access to data requires, especially for proponents and industry. The primary challenge revolved around understanding and promoting collective benefit that lies in sharing data. Understanding key challenges (competitive advantage, intellectual property, community capacity to interpret shared data, not increasing overhead and cost, standard development) resulted in challenging dialogues between all stakeholders; it took 18 months from conception to implementation for the IBSA shared biodiversity data system. This process was reduced to 9 months for the IMSA shared marine data system. The consensus is that all stakeholders have benefitted from increased data availability and that the establishment of the Biodiversity Information Office to curate and develop an integrated data asset is significant progress.

Extracting knowledge from EA reports: Pilot project in natural language processing

Occurrence data for species and spatial data from static maps

With the help of SAS Analytics Company, WABSI conducted a pilot in natural language processing. SAS was asked to extract data from 100 machine readable PDFs of EA reports that WABSI provided, in order to gain a better understanding of what information can be extracted from these texts. WABSI had not provided annotated notes and for this reason, the data that was extracted was unprompted.

“We gave SAS Analytics Company about 100 old reports. They are machine readable PDFs, but they are dumb, there is nothing clever about them. We threw it at them and said, run it through your magic machines and tell me what black magic can happen... What they could extract from these reports is sensational.” - Chris Gentle

SAS Analytics was able to provide results almost instantly, meaning that from WABSI's experience, it is not necessarily a significant time investment. The most significant findings from this pilot were the ability to geocode from static maps (locating latitude and longitude), extracting the frequency with which a species is named, and linking species references across reports using the geocoding.

Causal relationships and interpretation from text

A parallel project, performed by CSIRO, works to extract interpretations and assumptions, as well as causalities and outcomes, from the written text within approximately 2,000 reports, a total that includes the reports also submitted to SAS. Briefly told, this research examines the extraction of 'knowledge triples' from static text, extracting causal relationships between entities using natural language processing and artificial intelligence.

This project is still ongoing and for this reason, the results are not yet conclusive. However according to an initial feasibility study extracting conservation data for koalas from a sample of the documents, approximately 80% of sentences were deemed eligible for providing data. CSIRO was able to extract knowledge from 85% of those sentences in the form of causal relationships between entities ('knowledge triples'), and that the data that was extracted covered about 95% of the content of the sentences. This is ongoing research and for more information on the process, challenges, and outcomes of the feasibility study, view this [presentation by Dr. Stephen Wan](#).

Takeaway

The findings from these initial pilot projects support the potential in extracting data from static PDFs and that the data from historical EA reports can be accessed and accumulated through digital means. The interviewees were optimistic regarding the opportunities for data extraction in the future and its ability to contribute to informing future EA processes.

Ongoing initiatives

IBSA/IMSA and a pilot project in natural language processing constitute WABSI's initial investigations in digital solutions. WABSI is working to develop a model for a shared analytic framework to enable robust, repeatable and sustainable analytics for regional environmental assessment. This is a parallel activity with the establishment of [Biodiversity Information Office](#) and is intended to support the digital transformation through the Department of Water and Environmental Regulation Environment Online program.

Collecting EA reports: Environment Online

[Environment Online](#) is described as a “digital one-stop-shop” that stores environmental assessments, approvals, and compliance and will also allow “users to apply, submit, monitor and review submissions and approvals...” at the [website](#).

In this way, Environment Online will not only provide access to completed EIA reports, but will become an online dashboard where stakeholders, including the community, can upload, access and share project information throughout the EIA process. The platform will also feature real-time analysis of project data, providing information on the values and pressures of a given region. Environment Online is an ongoing initiative and is expected to be released in 2021.

Stakeholders

Development phase

- Department of Water and Environmental Regulation
- WABSI

Use phase

- Industry
- Proponents
- Government officials
- Consultants
- Community



Optimising decision-support: Shared Analytic Framework for the Environment

The Shared Analytic Framework for the Environment (SAFE) intends to use data for decision-support and shared analytics, which includes optimising data to understand cumulative impacts and generate a data basis for decision making, reporting and transparency. SAFE will work to link different data commons and build a simulation system, identifying values and pressures for a particular region, that can be used to test outcomes and project alternatives. It is anticipated that the framework will require user training in understanding the software as well as training in order to interpret output.

“It is a great opportunity to go back into those previous EIAs and extract the data and information to build a basis for future decision-making... You can get a great benefit from drawing in even the past 10 years of data and build a solid basis for machine learning and assessment” - Owen Nevin

The analytic framework will be owned by the Western Australian Government, but proponents, regulators and the community will have free access and be able to run and improve the framework.

Stakeholders

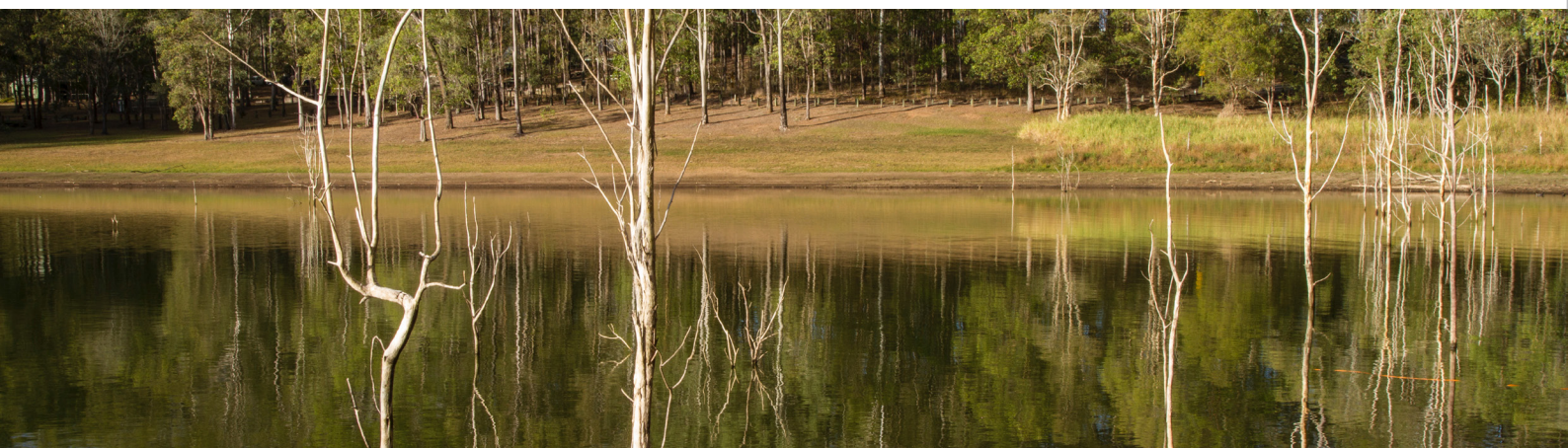
Development phase

- WABSI: They have developed the framework along with Western Australian Marine Institute of Science (WAMSI).

Use phase

- Industry
- Proponents
- Consultants
- Government officials
- Community

It is the general consensus that the development of IBSA, IMSA, the Biodiversity Information Office, the Environment Online and a Shared Analytic Framework are essential components in digitally transforming environmental assessment in Western Australia. Many of WABSI's digital efforts are described in their report, [Digitally Transforming Environmental Assessment](#).





Background and source: Western Australian Biodiversity Science Institute

The Western Australian Biodiversity Science Institute (WABSI) is an independent institute that provides biodiversity knowledge and serves to join industry, government, researchers and community in managing Western Australia's biodiversity. For more information, see:.

In preparation for developing digital solutions, WABSI set out to identify and minimise the barriers for a transition to digital environmental assessment and mapped data types, data lifecycles, and data workflows that unfold between EA stakeholders. They discovered that a digital divide

between proponents (typically large, well-funded firms) and regulators proved to be a hurdle in EA practice that challenges EA efficiency. Therefore, their priority became improving the coherence of data and tools between stakeholders. WABSI has led the scoping and approach for collecting baseline data from environmental surveys (IBSA/IMSA) and has performed an initial investigation of data extraction from historical EA PDFs. The IBSA/IMSA programs are led and implemented by the Western Australian Department of Water and Environmental Regulation.

Meet the interviewees:



Chris Gentle

Is the Program Director for Information Management at The Western Australian Biodiversity Science Institute



Owen Nevin

Is the Chief Executive Officer of The Western Australian Biodiversity Science Institute

Automating impact identification and report generation: eBase

eBase is a web-based tool centered around optimising EIA workflow by increasing efficiency as well as streamlining the process where possible. It does so by firstly, linking the factors of an impact assessment through relational models, in which activities of a particular project and corresponding receptors can be linked to relevant impacts for that particular region. A description of potential impacts is provided in an impact summary available to stakeholders of a particular project. In addition, stakeholder summaries detail the stakeholders that need to be consulted for these impacts. The following step is to select the relevant controls in order to mitigate the identified impacts, which must be individually screened and deselecting a control must be justified.

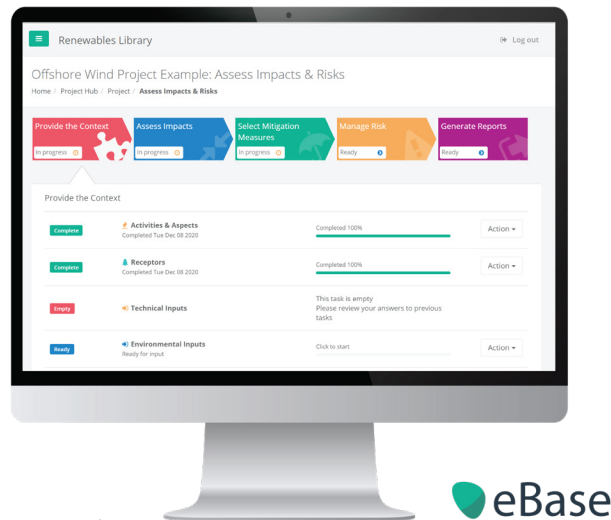


A primary output of the tool is autogenerated text that has been previously written and submitted to the system, describing these factors that have been linked and their relation to the project type. In pursuit of workflow efficiency, this autogenerated the reusable content of impact assessment that is typically reproduced anew for every EIA report and can feed directly into an environmental report. This text can be produced in various word-document templates that can be contextualised for the individual project. The templates can generate commitment registers, mitigation registers, technical basis of assessments, scoping reports, EIA reports, etc. These autogenerated reports can range from 50 to upwards of 400 pages.

“It is really just capturing a lot of common information that we use, writing it in a way that we can use it repeatedly, and from there we can build various workflows, tools or interfaces to access the information” - Petrina Raitt

The auto-generation of text also means that the output that is produced is only as good as the input that is provided. However, the idea is that text describing general impact descriptions, etc., only needs to be written once, and when automating the repetitive work, then there is more time for improving content of the report and strengthening decision-making.

“An objective for us has always been to create something which makes our work easier to do so that we spend less time working, and with the time that we do spare... we can focus on new information, like finding out data gaps, or improving environmental outcome, or looking at new solutions” - Petrina Raitt



Stakeholders

Development phase

- Green Light Environmental & Xodus Group

Use phase

- Consultants
- Project developers

Takeaway

eBase has to date been employed in several EIA processes and has been estimated to reduce the time spent on conducting an EIA by approximately 40%. The tool is able to reduce time on preparatory work, which amounts in substantial cost-reductions. Nevertheless, the interviewees also note the complications this provides in having to promote eBase as a tool, as it directly threatens to replace some of the work for the people who would benefit most from the system.

The interviewees also found that there was a greater hesitancy to share data than originally anticipated, meaning that the original vision for eBase was a platform in which users were buying data, just as much as they were purchasing the software. However, upon realising that users wanted ownership of their own data and were keen on maintaining their own way of writing impact assessments, the business strategy for eBase has digressed from these prior visions for greater collaboration between consultants towards data management for the individual client. This has nevertheless created a new business opportunity in which eBase has become a platform for storing and curating a consultant's own data in a project library in which qualifying the data and maintaining currency is also the responsibility of the users.

Ongoing initiatives

The vision for eBase is a wider integration of geographic data in order to improve knowledge management of regions, so that its data management and use extends beyond the individual project. Therefore, the further development of eBase is centered around geographic precision of data as well as strengthening the communicative aspects for relevant stakeholders.

Elaborating the function of eBase

The further development of eBase is on strengthening the GIS component and linking the data to geographic regions, so that receptors, impacts, and controls are automated for the particular location of a project. In this case, a user would only need to select a location and an activity in order to locate impacts and generate potential impact mitigation.

There is also an interest in tailoring eBase to the individual stakeholder, so that the frontend information that is produced is of direct interest and relevance to the particular stakeholder accessing the information. This is coupled with an aspiration to make the tool more accessible, allowing clients to find information quicker and in a more digestible and interactive way. Reporting is nevertheless still restricted to static word documents, as is required by legislation. This means that unless a legislative change is enabled, clients will first and foremost require a written document output, limiting other means of digital formatting and expression.

Stakeholders

Development phase

- Green Light Environmental & Xodus Group

Use phase

- Consultants
- Project developers

Background and source: Xodus Group

Xodus Group is a leading consultancy in global energy and currently uses a digital EIA tool, eBase, to streamline impact identification and EIA reporting. The motivation for digitalisation was an interest in shifting from manual work towards automation.

Meet the interviewees:



Petrina Raitt

Is a founder and Managing Director for eBase and works as an Environment Manager for Xodus Group.



Stacey Fidgeon

Is a Digital Manager for eBase and now works as a Digital Developments Delivery Lead for Xodus Group.

Denmark

Digitally supporting environmental assessment for Sustainable Development Goals: DREAMS

The DREAMS project has three interesting elements included in this report: Gathering a comprehensive repository of EA reports, establishing an environmental baseline tool, and developing an effect assessment tool (CAUSA).

Gathering a comprehensive repository of EA reports

Currently in Denmark, EA reports are not collected into one common digital system and lay scattered across various platforms. For this reason, the initial step in the DREAMS project is to develop a system for collecting historical EAs as well as storing future reports. This way, the reports will be easier to access and can be stored together with metadata extracted from the reports. Collecting reports in this common system will guarantee a systematisation of all future reports and will be the foundation for further data extraction that will supplement both the baseline and the CAUSA tools.

Establishing an environmental baseline tool

An existing environmental baseline tool, hosted at the Danish Environmental Portal will be expanded and developed within the environmental parameters' human health, nature and climate. This tool will e.g. utilise machine learning to capture data from existing EA reports, general environmental reports and research articles to support better and faster environmental baseline studies. This system will be GIS-based to allow for an easy identification of environmental baseline information within a specific geography. The baseline tool will be linked directly to Denmark's Environmental Portal (see Danish Environmental Data Portals).

Developing an effect assessment tool: CAUSA

CAUSA will be a tool for providing overviews of cause-effect relations and mitigation measures for different activities assessed within an EA. The CAUSA tool will be linked to the environmental baseline tool and the geographic spatial data that corresponds. Identifying these causal relations will mainly use the data from the existing EA reports in the repository and rely on algorithms and machine learning to extract and make sense of the data.

Stakeholders

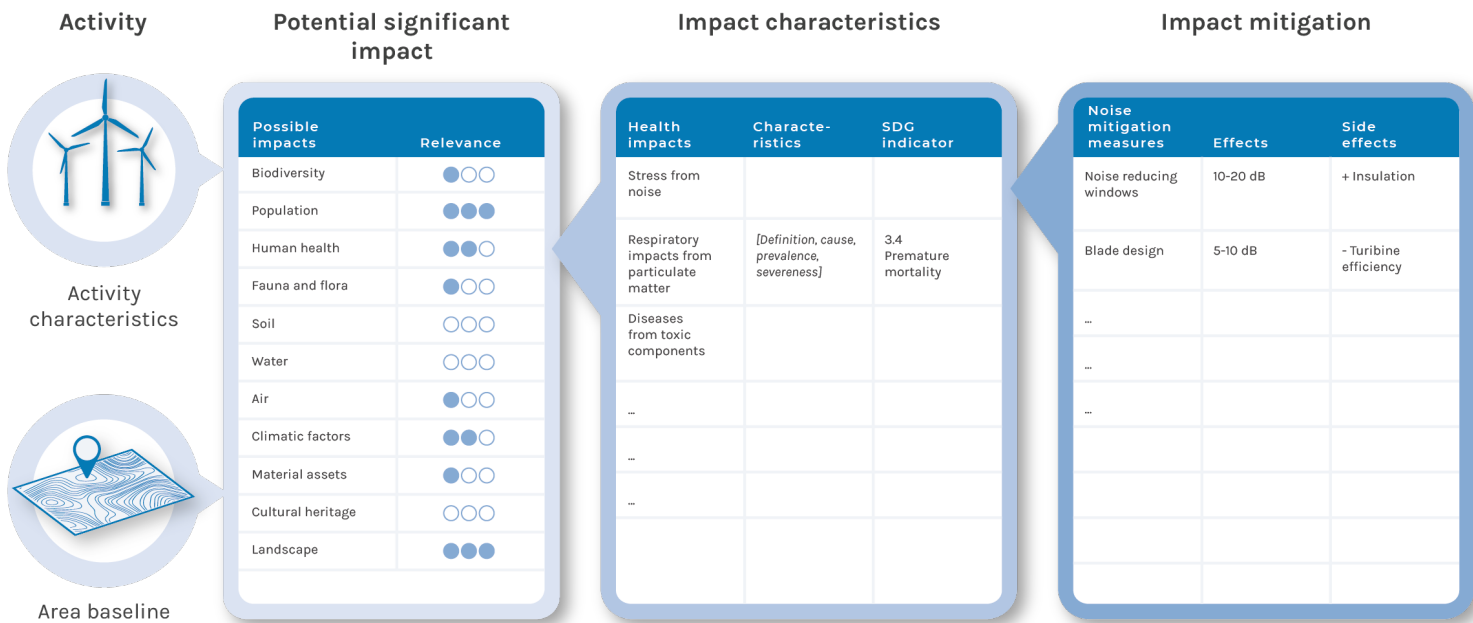
Development phase

- DREAMS Consortium

Use phase

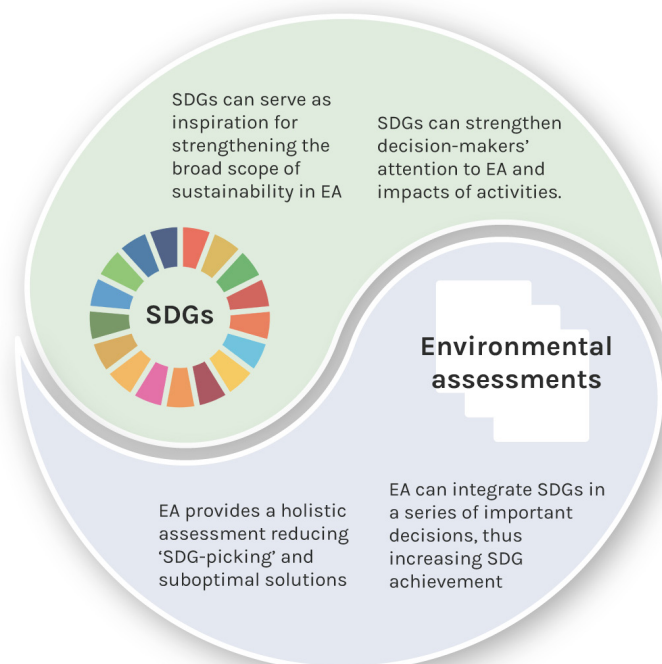
- EIA and SEA practitioners
- Local and regional authorities
- Government officials
- Project developers
- NGOs
- Community

Effect tool interface



Integrating the Sustainable Development Goals (SDGs)

The DREAMS project aims to integrate the Sustainable Development Goals (SDGs) into the digital tools, so that the 17 global goals also contribute to better decision-support and enhanced impact assessment. The DREAMS project is still in its early stages, and for this reason, the precise role of the SDGs is still undefined. A concrete integration into both the baseline and CAUSA tool will be explorative and will take shape as the project progresses, tailoring to the needs of the consortium as well as tool development. Preliminarily, the ambition is to integrate the SDGs in such a way that provides thorough systematic overviews of how they relate to baseline data as well as the impacts of a project or plan.



Takeaway

The DREAMS project has recently started, but the experiences of forming the project consortium and exploring potentials give some takeaways: The expected value creation of societal solutions on digitalisation of environmental assessments are massive and entails cost savings, better plans and projects, and a better societal dialogue due to open access to past experience for all EA actors. Cost savings are due to more focused EA reports, less manual work, better reuse of data, and savings due to earlier approvals.

The DREAMS project is internationally interesting due to its priority to societal open access solutions in digitalising EA. The DREAMS project has succeeded in gaining great support from a series of EA actors within and beyond the consortium; everyone sees benefits in making a common pool of experiences and data.

Background and source: Aalborg University and Danish Consortium - The DREAMS project

The DREAMS project was initiated in October 2020 as a collaborative project between a Danish consortium of 16 partners (consisting of proponents, consultancies, authorities, and researchers) and is funded by the Innovation Fund of Denmark. The project is led by the Danish Center for Environmental Assessment at Aalborg University.

The aim of the DREAMS project is to develop digitalised decision support tools to advance the EAs ability to integrate the Sustainable Development Goals (SDGs) and enable better and more democratic decision-making processes. The project consists of 16 partners that will collaborate in the development of a repository of historical and future EA reports, a baseline tool and an effect-assessment tool.

Meet the Executive Management:



Lone Kørnøv

Is Project Leader of the DREAMS project and works as professor at the Danish Center for Environmental Assessment.



Ivar Lyhne

Is Deputy Leader of DREAMS and works as associate professor at the Danish Center for Environmental Assessment.



Nils Høgsted

Is Deputy Leader of DREAMS and Head of Secretariat for the Danish Environmental Portal.



Denmark's Environmental Portal

Denmark's Environmental Portal is a GIS-based database that collects spatial data for Denmark nation-wide. This data is open access and is used as a data foundation in EAs conducted within Denmark. The portal first and foremost consists of Denmark's Arealinformation, ranging from data on nature, to cultural heritage, to soil pollution, and topographic terrains, just to name a few. The portal, besides providing data, also allows a user to download or draw polygonal shapes in order to indicate project areas and browse through data layers of relevance to the project. In addition to areal information, the portal allows access to Denmark's Nature Data, which allows a user to locate information on particular species of a given area as well as nature types, also geographically based.

Stakeholders

Development phase

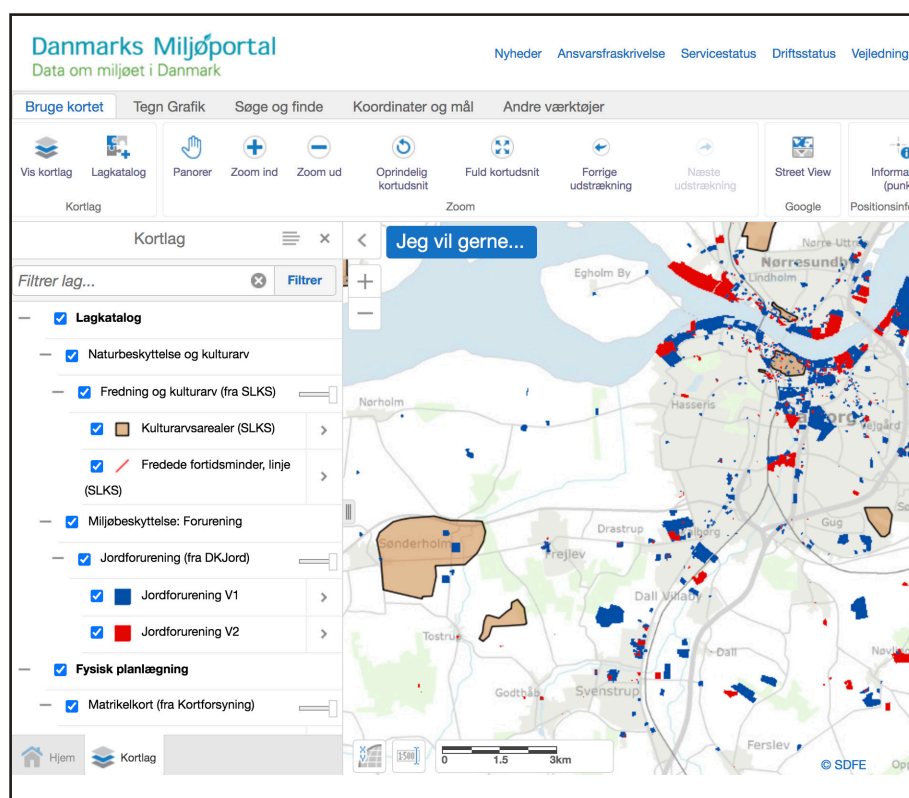
- Ministry of Environment of Denmark
- Registered users: They upload and qualify data. Municipalities are obligated to ensure the currency, accuracy and quality of the data.

Use phase

- EIA and SEA practitioners
- Local, regional and national authorities
- Consultants
- Project developers
- Community
- NGOs

Takeaway

Denmark's environmental portal is a well-established and functional system. The data is widely used by EIA and SEA-practitioners that benefit from the shared data to produce EAs of higher quality.



Velkommen til Danmarks Naturdata

Her kan du søge i data fra myndighedernes naturregistreringer

🔍 Søg en art, et sted, en myndighed eller andet i Naturdatabasen...

SØG

Søg arter

Her kan du søge arter fundet i forbindelse med myndighedernes naturovervågning. Udvælg et område på kort og se forekomsten af arter. Sorter fx på fredningsstatus eller invasive arter. Du kan også hente enkeltregistreringsrapporter.

📍 START SØGNING

Background and source: Denmark's Environmental Portal

The portal is a joint public partnership between the Ministry of Environment, Local Government Denmark (KL) and Danish Regions. KL is the association and interest organization of the 98 Danish municipalities, while Danish Regions is the organization for the five regions in Denmark. The portal functions as an independent portal, which operates across regulatory boundaries.

Meet the interviewee:



Nils Høgsted

Is Head of Secretariat for the
Danish Environmental Portal

A platform for biodiversity data: Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF), located in Denmark, provides open access to biodiversity data and has launched an initiative to encourage companies to publish their data. GBIF promotes sharing, discovery and re-use of data using common standards to enable interoperability across four classes of datasets, i) **metadata datasets** describe methodologies, taxonomic/geographic/temporal scope and the role of individuals involved, ii) **checklist datasets** that catalogue taxonomic names, iii) **occurrence datasets** providing evidence for the existence of named species at a particular location and time, and iv) **datasets** which associate species occurrences with a particular survey or sample, including information on sampling protocols, sampling effort and abundance.

Get data How-to Tools Community About

GBIF | Global Biodiversity Information Facility

Free and open access to biodiversity data

OCCURRENCES SPECIES DATASETS PUBLISHERS RESOURCES

Search 

WHAT IS GBIF? ABOUT GBIF DENMARK

Occurrence records
1,644,431,635

Datasets
55,405

Publishing institutions
1,624

Peer-reviewed papers using data
5,224

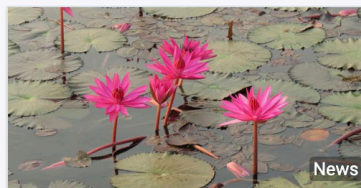


News

New call to promote the mobilization and use of biodiversity data in Asia

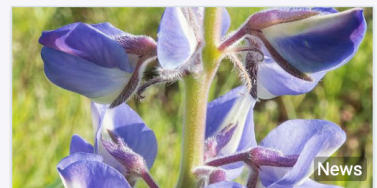


Data4Nature: Share to protect



News

Call for proposals for the 2021 Capacity Enhancement Support Programme



News

Final newsletter of 2020 (so glad we made it)



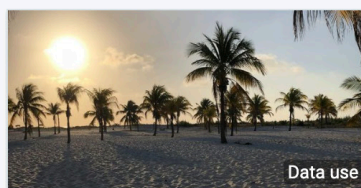
News

GBIF releases new guide for publication of data on sensitive species



Project

New video: an invitation to the private sector



Data use

The impact of climate change on islands



News

Task group to enhance GBIF-enabled research on species linked to human diseases

In collaboration with the International Association for Impact Assessment (IAIA), GBIF has updated a guidance document on Best [Practices for Publishing Data from Environmental Impact Assessment](#). This [report](#) encourages practitioners and consultants to “... improve the curation, archiving and management of primary biodiversity data captured during environmental impact assessments (EIAs) and environmental and social impact assessments (ESIAs)”. The report also mentions the UN Sustainable Development Goals as a commitment that justifies an interest in more effective decision-making.

In addition, GBIF is supported by the [Equator Principles](#), a voluntary reporting framework that provides financial institutions and their clients with a common baseline for identifying, assessing and managing environmental and social risks. The latest Equator Principles update in 2020 includes a provision for financial institutions to ‘encourage the client to share commercially non-sensitive, project specific biodiversity data with GBIF and relevant national and global data repositories.’ Announcing this new provision, GBIF [noted](#) that shared environmental data can greatly increase transparency and reduce duplication of effort, saving time and money to help make both businesses and regulators more efficient, effective and socially responsible.

GBIF has worked closely with WABSI in the data accumulation and management for IBSA/ IMSA. It has also recently collaborated with Agence Française de Développement (AFD) to engage public development banks and development agencies in adopting biodiversity data-sharing policies, under the [Data4Nature initiative](#).

Stakeholders

Development phase

- GBIF
- EA practitioners: They are expected to contribute data from impact assessment

Use phase

- EIA and SEA practitioners
- Community
- NGOs

Takeaway

GBIF enables EA practitioners to increase the transparency and re-usability of the data they generate for assessments, contributing both to global biodiversity knowledge and to future baseline data for assessments.

Background and source: GBIF

GBIF—the Global Biodiversity Information Facility—is an international network and data infrastructure funded by the world’s governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth.

Meet the interviewee:



Tim Hirsch

Is Deputy Director and Head of Participation and Engagement



The Netherlands

Developing digital versions of EA reports

In an effort to reduce the text of reports as well as increase the accessibility and understandability of the EIA process, the Ministry has explored options for the digital production of written EIAs. These digital reports utilise animations and figures to relay information and communicate project design and decisions.

“I think one of the main goals of digitalisation is the accessibility of the information, old school information is hundreds of pages, while an interactive tool gives more access to information that is required by the public” - Hans de Vries

One example is the dike reinforcement project, [Houtribdijk](#), in which the content that is otherwise presented in a lengthy PDF, is now available as an online platform with animations and videos that supplement the written text. Currently, the efforts for using digital reporting is primarily a result of national initiatives by the government, but there are also a number of private initiatives.

The digitalisation of the reports is a supplementary feature to the written report, rather than a replacement. Often, the digital reports are integrated late in the project process.

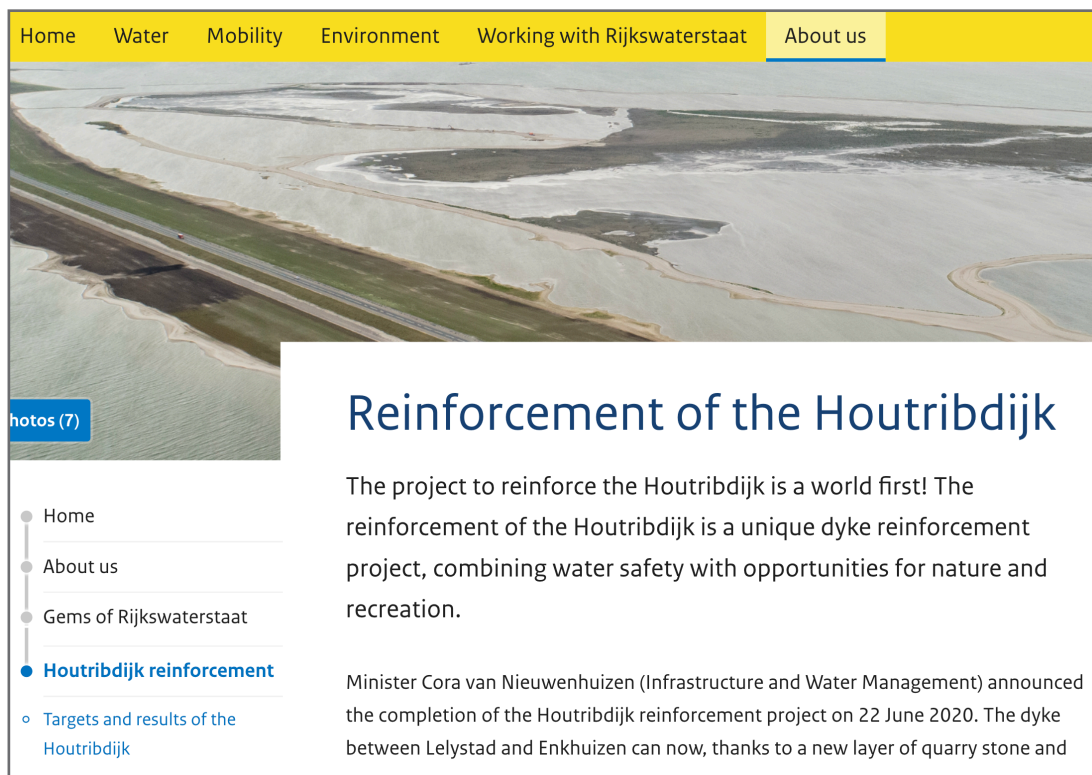
Stakeholders

Development phase

- The Ministry of Infrastructure and Water Management
- Consultants

Use phase

- Project developers
- Community
- Consultants
- Government officials

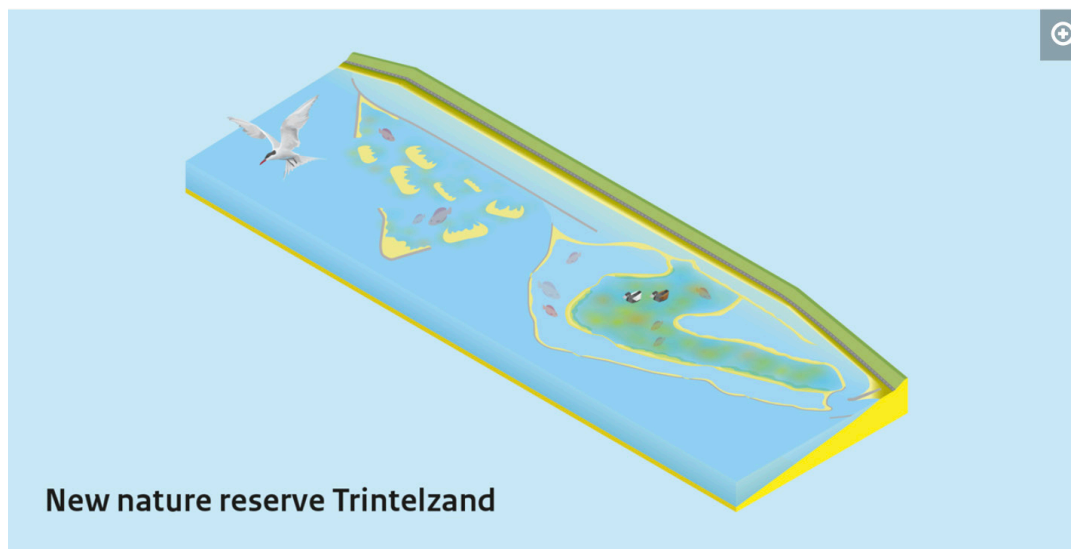


The screenshot shows a digital report interface. At the top is a yellow navigation bar with links: Home, Water, Mobility, Environment, Working with Rijkswaterstaat, and About us. Below the navigation bar is a large aerial photograph of a coastal area with a dike and water. On the left side, there is a sidebar with a 'fotos (7)' button and a list of navigation items: Home, About us, Gems of Rijkswaterstaat, **Houtribdijk reinforcement** (highlighted with a blue dot), and a sub-item 'Targets and results of the Houtribdijk'. The main content area features the title 'Reinforcement of the Houtribdijk' in a large blue font. Below the title is a paragraph: 'The project to reinforce the Houtribdijk is a world first! The reinforcement of the Houtribdijk is a unique dike reinforcement project, combining water safety with opportunities for nature and recreation.' At the bottom of the main content area is another paragraph: 'Minister Cora van Nieuwenhuizen (Infrastructure and Water Management) announced the completion of the Houtribdijk reinforcement project on 22 June 2020. The dike between Lelystad and Enkhuizen can now, thanks to a new layer of quarry stone and

Takeaway

Although precise quantitative data of the overall benefit is unavailable, the interviewees do believe that the digital reports make information more accessible for those otherwise unwilling to read through a PDF of the EIA. However, legislation still mandates hard copies of the reports to be archived for a certain number of years, and therefore, implementing digital solutions aimed at replacing part of the EA process would first and foremost require legislative changes.

This also means that opting to use digital reporting is a matter of clientele interest and is an add-on cost for consultants. The estimated direct cost is an additional 20% of the traditional EA, but the interviewees also note that this could be much lower if digital reporting is coupled with information sharing and open-source data. At times, the Ministry will cover additional costs for a digital EA if a consultancy has a digital tool that they would like to employ. The Ministry conducts an estimate of 20 to 30 EA reports every year, and approximately 4 or 5 of these reports use digital reporting.

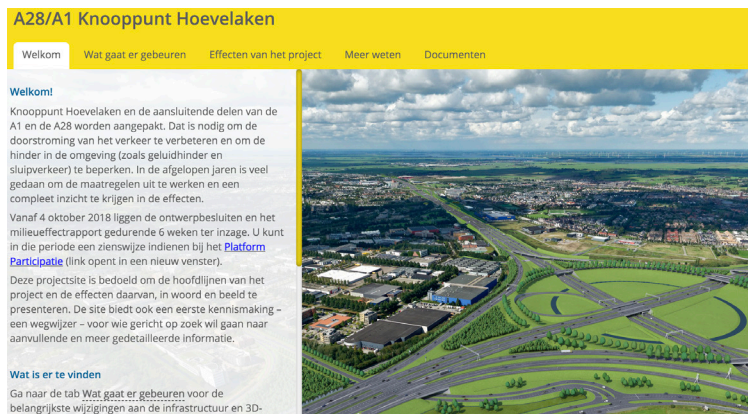


Houtribdijk reinforcement: Building with Nature (March 2019)



Using digital project platforms to increase public participation

As a supplementary feature of the digital reports, the Ministry has engaged in digital means for increasing public participation. They have developed a digital platform in which citizens and other interested stakeholders can get access to the project information and submit concerns for the respective project development. An example is the [A28/A1 highway](#), in which a [link](#) to a platform for public participation is provided within the digital report. The comments from the community are then collected and answered by the authority.



Stakeholders

Development phase

- The Ministry of Infrastructure and Water Management
- Consultants

Use phase

- Community
- Government Officials

Takeaway

Digitally encouraging public participation is expected to increase the amount of hearing submissions from the community, and thereby, the community's engagement in project development. The interviewees believe that whether there are improvements depends on the project, as local projects tend to draw an increased interest from the local community. It is also dependent on how well the digital participation options have been effectively promoted to the community. It has not been possible to quantify the benefits of this platform yet.



Ongoing initiatives

There are currently no coordinated efforts planned to digitalise more reports, and the utilisation of the digital reporting tools remains a matter of stimulating the market through clientele interest. However, an in-progress reform of the Environmental Planning Act will bring about a new digital system, called the Project Decision System, for collecting project decisions and EA reports as well as gathering baseline data.

Developing a digital system: The Project Decision System in the Environmental Planning Act

This reform to the Environmental Planning Act seeks to develop new digital standards for project decisions, in which those making project decisions will submit digital standards with project information to a common digital system. This system will be GIS-based and able to use spatial data to geographically locate projects in the system. Corresponding EIA and SEA reports can be uploaded as an annex to the standard. This system will work to collect all future EA reports but there is currently no initiative to collect historical reports.

The goal is to couple this digital system with a baseline information system, called Information Projects, for noise, water and soil. Baseline systems for various topics already exist, but they are currently not linked, as is the ambition with this new digital system.

“... the basis for this new act was to provide everybody with the same information, so that when developing a new initiative, you are all using the same information and you have the same baseline info for a project. Then you don't have a discussion about facts. The facts are in the system” - Luis Martins Dias

Stakeholders

Development phase

- The Ministry of Infrastructure and Water Management

Use phase

- Project developers
- Government officials
- Consultants

Takeaway

The perceived benefit of this new system is having a government-owned, and thereby openly accessible, system for shared data, that keeps records of approved projects and provides common grounds of data for all users. Originally, the scope of this project was much broader, in which the goal was to develop Information Houses for all data. However, this proved too ambitious, and technical issues such as having to find a software company to make the standards as well as an efficient way to read the system caused the Ministry to narrow the scope of data collection to noise, water and soil. In addition, incorporating feedback through monitoring is recognised as an important future initiative, but the current focus will remain on establishing a baseline and providing uniform access to this underlying environmental information.



Background and source: The Ministry of Infrastructure and Water Management

The Ministry of Infrastructure and Water Management in the Netherlands has primarily engaged in digital EA reporting, but has also used digital means for enhancing public participation.

Meet the interviewees:



Luis Martins Dias

Is a Senior Advisor for the Ministry of Infrastructure and Water Management



Hans de Vries

Is a Managing Consultant for the Ministry of Infrastructure and Water Management



Bart Barten

Is a Senior Advisor for the Ministry of Infrastructure and Water Management

Providing digital EISs: iReports

The iReports started as a pilot project established and partially funded by the Ministry, in which a digitalised report was created for a completed EA report. Following the successful pilot, RHDHV has now completed more than 10 digital EAs as iReports already, including scoping reports, main documents, Natura 2000 documents, etc.

The purpose of an iReport is to create a digital project website with (multiple) publications of a project that can take a user through the entire project development process as well as be transparent about the decisions that were made along the way. The iReport is currently sold as a service that is supplementary to the traditional EA process, paid for by the project developer or authority.

An example of an iReport is the scoping report for a water dike project, [Sterke Lekdijk](#). Here a user can browse through information regarding the project and explore animations, videos and maps that appear in conjunction with the text that they supplement.

Part of this process is being able to access project details through online project sites that gives access to project details, a project timeline, assessment decisions, and allows for communication between stakeholders. Geographic information for the project is also provided and a user can click through varying spatial layers to get an overview of project impacts. Currently, the project sites are being used in the planning phase of the projects and just as with the iReports, the focus is on displaying information through animations and visuals, rather than text.

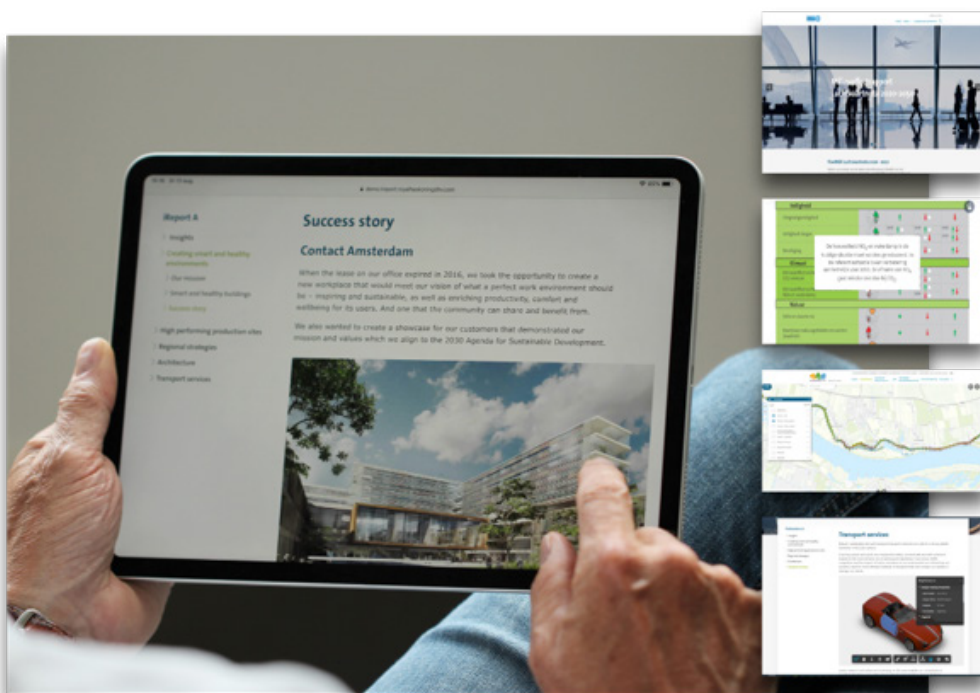
Stakeholders

Development phase

- RHDHV
- Ministry

Use phase

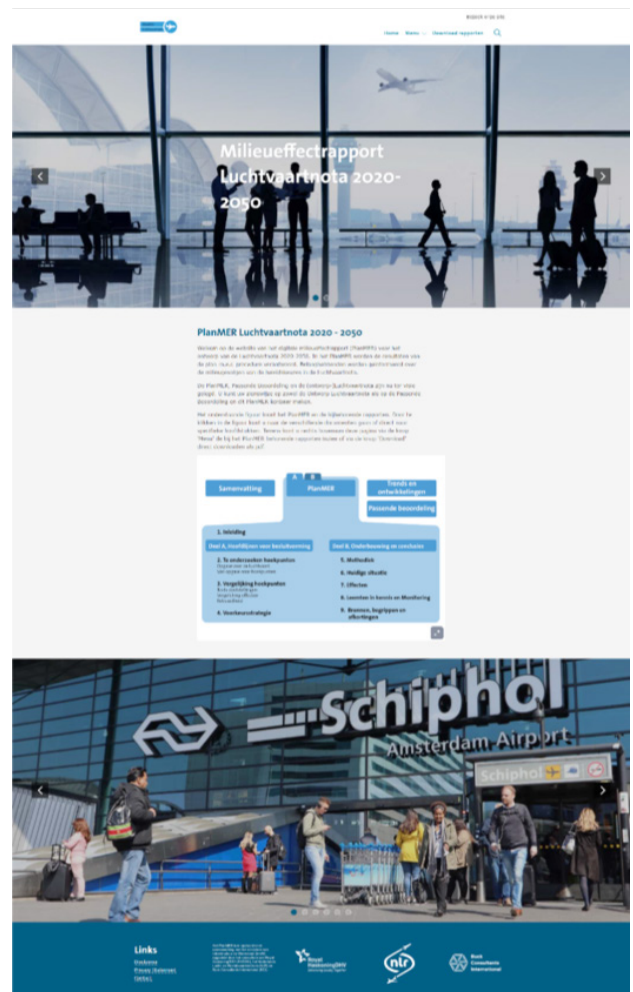
- Proponents
- Competent authorities
- Consultants
- Community, NGOs



Takeaway

From a user perspective, it is expected that the digital interface increases the accessibility of project information and makes the project development process and its corresponding decisions easier to understand. Yet Paul Eijssen notes the changes that having to develop such a report implies for a consultant. He says that there is a learning curve for EA actors expected to develop an iReport, primarily in shifting tendencies from thinking in terms of lengthy reports to thinking digitally and visually.

“We have to go through a digital transformation, also as a company. People are used to writing documents and that means I have to try to get them away from texts and start the process of visualising.” - Paul Eijssen



In addition, Paul states that since digital reporting is just a new way of reporting other than hard copy pdfs, it does not drastically alter the current business model. This, however, may change if cause and effect tools and data commons are adopted. He predicts that digitalisation will become more and more important. It is his experience that the interest and need for digital solutions is growing as a result of the ongoing Covid-19 crisis, and that this is also reflected in new clientele interest for providing means for digital engagement for the community and other stakeholders in the EA process. However, it has not been possible to quantify these benefits yet. In his experience, cost has not been the primary concern for customers. Instead, customers are looking more at the credibility of the tools and the possibilities to reach and engage the public.

Ongoing initiatives

RHDHV remains focused on the communicative function of digitalising EA and are therefore looking to expand the project site to enable public participation.

Incorporating public participation as a feature in the project sites

Come the end of the year, RHDHV is expecting to incorporate public participation as an integrative part of the project site. Interested stakeholders, including the public, can fill in an inquiry or ask questions alongside the digital reports and these comments will also be visible for others accessing the project site. Responses to these inquiries can also be provided directly on the platform. This ensures that project information is transparent, and if allowing the community to actively utilise project sites for commenting, then they are expected to play a larger role in the decision-making process. RHDHV sees digital public participation as a way to engage more people in the hearing process.

Background and source: Royal HaskoningDHV

Royal HaskoningDHV (RHDHV), a consultancy based in the Netherlands, has directed their digital efforts towards digital interfaces for improving transparency of information and community engagement through reducing report text and displaying information through visuals and animations.

Meet the interviewee:



Paul Eijssen

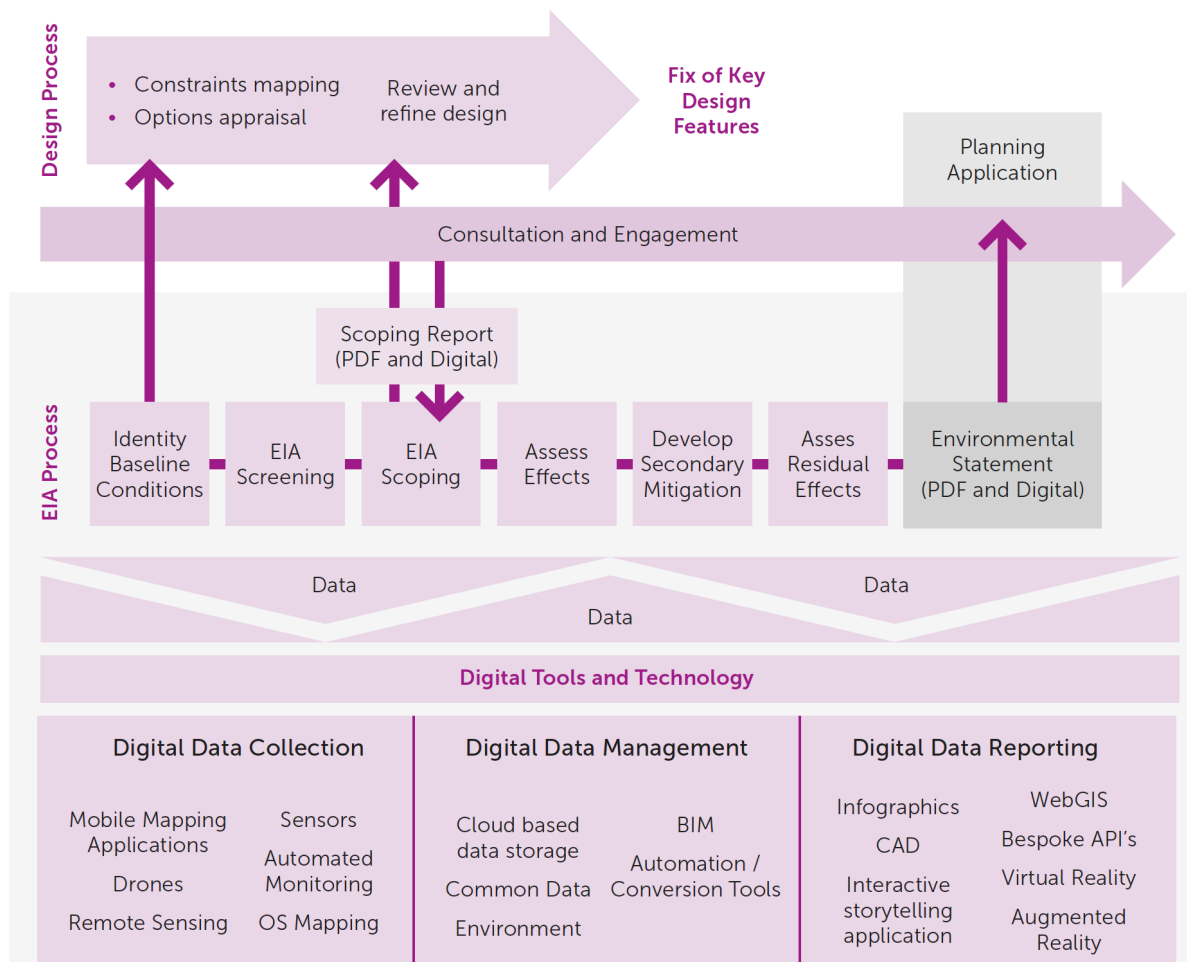
Is a Strategic Consultant for Environmental Assessment and Leading Professional for information management at Royal HaskoningDHV.

The United Kingdom

Reporting and case studies on employing digital solutions: IEMA Primer & Outlook Journal

The **Primer for Embracing Innovation and Digital Working** examines first and foremost different digital tools and their correlation to the EIA process. Here they have created an overview of different tools and where they may aid in optimising the process, as can be seen in the figure below. The Primer begins by mapping the current situation of adopting a digital EIA, highlighting barriers to implementation. It then goes on to localise potentials for integrating digital means as well as the opportunities they may present for making the EIA more efficient in terms of data access, data management, communication, data processing, etc. The **Outlook Journal** delves into individual cases of using various digital solutions in practice.

The Primer and Outlook Journal are a culmination of the experiences gained and knowledge accumulated from an initial investigation of digital EIA. The Primer implies that there is potential for digital tools in all phases of the EIA process and in collecting, managing, and reporting upon this data. The report concludes with future ambitions for IEMA in facilitating digital transformation, such as encouraging regulatory changes, new data standards, and training of users in employing digital tools, etc.



Stakeholders

Development phase

- IEMA Digital Working Group

Takeaway

The Primer is an example of how concepts, potentials and points of interest in digital EA can be commonly defined across actors in the EA sector. The Primer provides a common ground for future initiatives and serves as an eye-opener for the broader society on the possibilities.





Developing an evidence base and learning from past EAs: Pilot Industry Evidence Base for Offshore Wind Farms

The **Industry Evidence Programme** (IEP) is an effort to establish a sector-by-sector basis for impact notes that can support evidence-based scoping for future EIAs. A pilot project was conducted in order to develop an Industry Evidence Base for the offshore wind farm sector, which consisted of analysing 50 off-shore wind reports and monitoring the impact claims that had been made in those reports. This pilot project was funded by Royal HaskoningDHV, The Crown Estate and IEMA.

The IEB is not intended to be run by industry alone, but should draw from the knowledge and experience of all relevant stakeholders, such as NGOs, the community, academics, etc. The data that is collected must, in addition to being stored, be analysed and evaluated alongside a community of practice.

Stakeholders

Development phase

- Royal HaskoningDHV
- The Crown Estate
- IEMA

Use phase

- EA practitioners
- Government and regulatory bodies
- Project developers
- Special interest groups
- Academics

Takeaway

The IEP for offshore wind farms shows that data for offshore wind industry is significant but is uncoordinated and its contribution towards strategic decision-making remains thereby under-utilised. In other words, there is a significant amount of valuable knowledge that is neglected when constructing new offshore wind farms and conducting new impact assessments, hindering both efficiency of the EA process as well as the opportunity to make evidence-based decisions. The pilot recommends establishing an online central repository for data and common practice (see Online Evidence Hub) and deploy adaptive monitoring to inform EA scoping.

According to Rufus, commercial and market-focused tendencies in the UK challenge efforts to nationally coordinated and use standard templates, which otherwise would encourage data-sharing and common digital solutions. This means that establishing an evidence bases for all sectors would first and foremost require a cultural shift regarding the ownership of data.

Ongoing initiatives

The findings from the pilot IEB for offshore wind farms led to an interest in exploring opportunities for Online Evidence Hubs to support evidence-based scoping and decisions-making for other sectors and project types.

Developing statements of common ground for reference in EA: The Online Evidence Hub

The Online Evidence Hub is projected to collect all environmental statements, monitoring reports, academic reports, governmental reports, as well as a contain environmental data and GIS location for collected data for varying sectors. Its focal point will be establishing 'statements of common ground' on a sector basis by a corresponding community of practice that detail stakeholder and expert agreements on sector-based scoping and mitigation measures. These 'statements of common ground' will be a reference for evidence that informs future EAs. Rufus predicts that more evidence-based assessments will direct decision-making from precautionary scenarios to scenarios supported by live-monitoring and feedback loops. The Online Evidence Hub will first be created for offshore wind farms and will hopefully set the precedent for other sectors. The project has obtained an initial three years of funding from The Crown Estate and will be supported by a steering group drawn from IEMA and other key governmental and non-governmental stakeholders.

Stakeholders

Development phase

- The Crown Estate
- IEMA

Use phase

- EIA practitioners
- Government and regulatory bodies
- Project developers
- Special interest groups
- Academics

Background and source: Rufus Howard

For Rufus Howard, a digital transformation was inspired by the inefficiencies arising from a lack of systematic review of construction and operational monitoring of past practice, coupled with the ever-increasing size of lengthy EA reports. This encouraged Rufus in 2017, as Chairman of the Institute of Environmental Management & Assessment (IEMA) Impact Assessment Network, to examine opportunities for a more **Proportionate EIA strategy** and to develop a Digital Working Group for exploring what a digital transformation of the EIA process would require. In 2020, as IEMA Policy Lead for Impact Assessment, Rufus worked with the Digital Working Group to deliver a **Primer for Embracing Innovation and Digital Working** as well as an **Outlook Journal for Digital Assessment in Practice** that provides an initial glance into employing digital solutions.

Meet the interviewees:



Rufus Howard

Is the former Director of Sustainable Development at Royal HaskoningDHV. His current roles include: founder and Director of Greenfriars Ltd, a private sustainability consultancy; Policy Lead for Impact Assessment at IEMA; and Environmental and Social Governance Advisor at the International Finance Corporation

Scotland

Collecting and sharing SEA documents: SEA Gateway and SEA database

The SEA Gateway is an online “mailbox” for issuing incoming SEA reporting to consultation companies (NatureScot), Scottish Environmental Protection Agency (SEPA), and Historic Environment Scotland (HES)) for commenting. When a responsible authority prepares any form of SEA reporting, it is sent directly to the Gateway, whereby it is distributed to the relevant consultation authorities and following review, it is returned to the Gateway where the comments are then processed, and the report is returned to its original sender. It is following the processing of comments that the reports are uploaded in the SEA database and is openly accessible for all. Systematically storing them in this system guarantees that data from former reports are available and easy to find. The reports and information are uploaded following the consultation comments for each stage of the SEA process. The consultation authorities are obligated to respond to screening and scoping, and while commenting on the pre-screening and environmental assessment report itself is voluntary, then there is still a 99% response rate. The database only stores SEAs. There are not currently any efforts for creating a similar Gateway for EIAs, as the number is too great, and the resources required to collect and store them would be too demanding.

The screenshot shows the Scottish Government website's Strategic Environmental Assessment Gateway and Database search interface. The page header includes the Scottish Government logo and navigation links: Home, About Scottish Government, Topics, News, Publications, Consultations, and Blogs. The main heading is "Strategic Environmental Assessment Gateway and Database". Below this is a search form titled "Search SEAG" with several filters: Sector, Type of Plan, Program, Strategy (PPS), Latest Stage of Plan, Legislation, and Responsible Authority. There are also fields for Case Number, Name / Title, and Keyword(s). A date filter section allows filtering results between dates, with Month and Year dropdowns. The search results section shows "2632 results returned" and a table with columns: ID, Title, Responsible Authority, Legislation, Stage, and Date Last Modified.

On the database, the reports can be sorted according to project type. The database also links to the legislation and templates for different report types. Under each case, relevant reporting for every stage of the SEA is uploaded, as well as consultation comments and the original report. They are currently collecting metadata that sorts based on plan type (strategy, plan, program, or legislation), plan stage (pre-screening, screening, scoping, and assessment), area, year for submission, and responsible authority. William Carlin suggests that the metadata is not as important to the database as it is to informing other assessments.

A primary motivation for the database is increased transparency of the planning process and being able to involve those otherwise impacted by the plans being approved. In addition, it has also been to minimise the learning curve for SEA reporting and impact assessment by providing information upfront.

“It is a platform for interaction of learning, as well as a platform for the information to be available for the community, who is likely to be affected, and for responsible authorities. It is an extra ailment of transparency...” - William Carlin

The database was first constructed on a minimal budget, justified primarily by the time it might save on administrative tasks. Currently, it is funded by the Scottish Government and is maintained internally by an IT team. It is cloud-based and therefore does not require funding for additional infrastructure.

Stakeholders

Development phase

- Scottish Government

Use phase

- SEA practitioners
- Responsible authorities
- Consultation authorities
- Community
- NGOs
- Wider public

Takeaway

The SEA Gateway has been able to deter the high volume of administrative tasks, such as responding to information requests. Publishing the information publicly allowed for autonomy for the responsible authority in locating and accessing desired data. This saved administrative time for the team, but precise calculation for how much time has been saved has not been possible to calculate.

There are currently ongoing efforts to develop a new National Planning Framework 4, which will develop options for shared platforms that host local development plans for responsible authorities and allow for more interactive access to information. However, any digital solution developed will also need to ensure that it complies with legislation and is accessible to the wider public. The National Planning Framework 4 will be finalised in 2022 and if this proves successful, there may be ambitions to link the local plan databases with SEAs. Nevertheless, more immediate future plans are aimed at tracking the user statistics, quantifying the number of visitors and the frequency with which certain search items are being searched for.

Lastly, there are no experiences regarding opposition to freely accessible planning information, most likely because it has been so integrated in the legislation for planning development. Antonia Georgieva also highlights, “The fact that the legislation says public plans and as they affect Scotland’s people, the public should have access to whatever has factored into decision-making” – Antonia Georgieva.

Although outside of the domain of the Scottish Government, the interviewees introduced Scotland’s Environment Web, which stores data for different environmental topics and makes this data freely available to all.

Scotland's Environment Web

Scotland's Environment Web is an online portal that provides open access to various data that helps to inform SEA and other environmental assessment and is external to the Scottish Government. Data from the monitoring process that the consultation authorities perform feed into the database, but other stakeholders are also able to upload their data to the system. The database also draws from citizen science. The platform is a collaboration between Scotland's environmental agencies.

Stakeholders

Development phase

- Scotland's environmental agencies
- Consultation authorities

Use phase

- SEA practitioners
- Responsible authorities
- Community
- NGOs
- Wider public

Takeaway

There is a need to pay particular attention to how granular the available data is, meaning whether it is available on national, regional, local and site levels. In order to use the data, it was beneficial to produce guides for environmental topics such as climate change, soil and water, that aim to make the data understandable for all and inform the relationships between data and how it should be interpreted.

"We are trying to get to a point where this is not necessarily the domain of specialists" - William Carlin

Background and source: Scottish Government

Implemented in 2005, the EA Scotland Act sets stricter requirements for the formal documentation of environmental impact of plans than otherwise mandated by the EA directive. Through this act, all plans, programmes and strategies are required to consider environmental effects, with at minimum a pre-screening where environmental impact is minimal. Where some effects are likely but are not considered significant, a screening might be more appropriate, and where effects are considered significant, a scoping and assessment report is obligatory. As a result, the Scottish Government has experienced a high volume of SEA reporting, most of which are the pre-screening documentations. In order to be transparent about the SEA plans that were conducted and in order to more easily be able to access former reports, the Scottish Government developed the SEA Gateway and the SEA database.

Meet the interviewees:



Antonia Georgieva

Is an Environmental Assessment and Policy Officer in the Scottish Government



William Carlin

Is a Senior Policy Manager for Environmental Assessment in the Scottish Government



Project Partners



Danmarks Miljøportal
Data om miljøet i Danmark



Project funded by



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