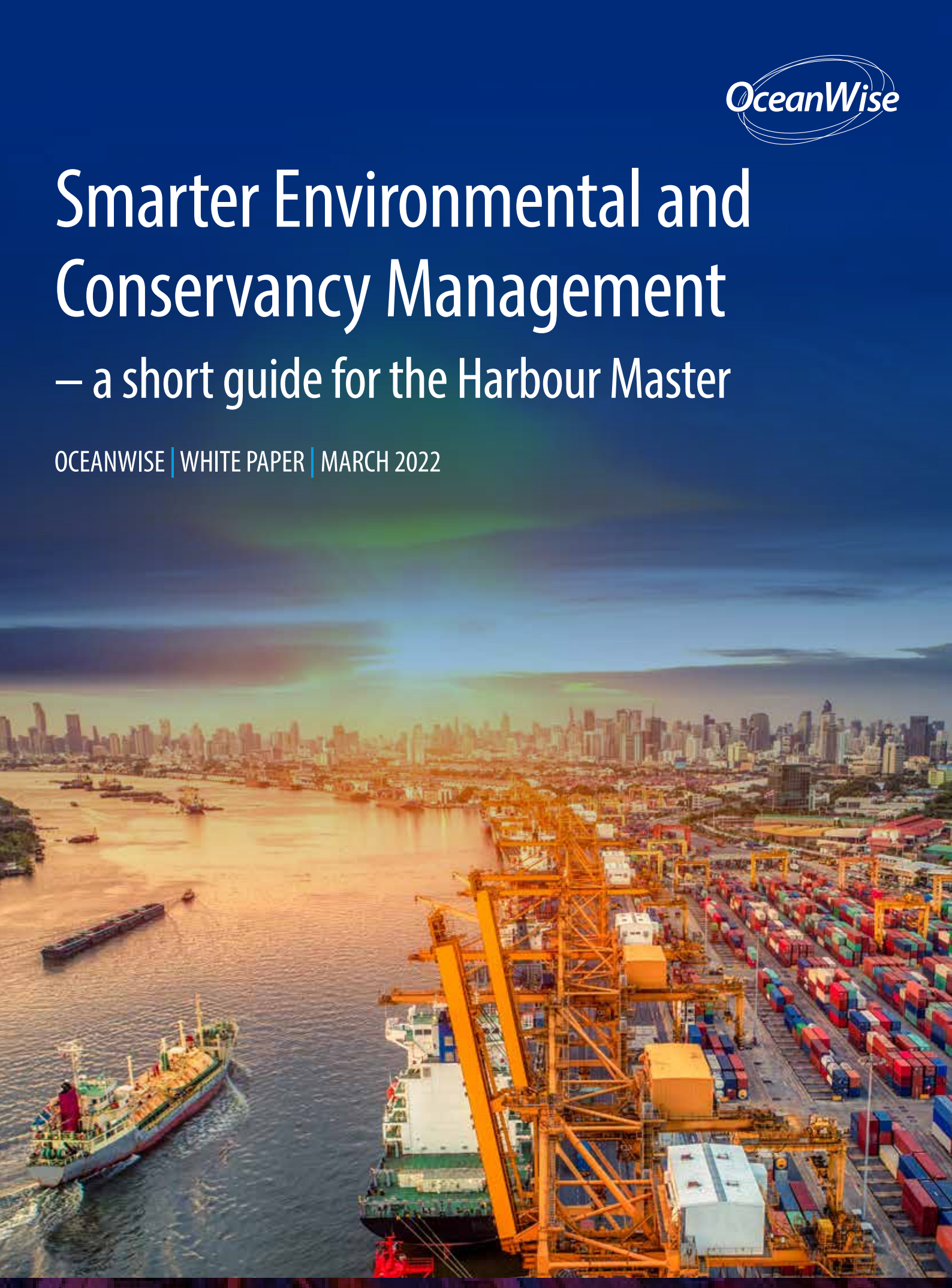
OceanWise

Smarter Environmental and Conservancy Management

– a short guide for the Harbour Master

OCEANWISE | WHITE PAPER | MARCH 2022



“To be truly ‘smarter’, and to benefit from new technologies, a port must also review its core infrastructure and policies around people, processes and information. Simply transferring or digitalising existing ways of working could make matters worse.”

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Introduction

This paper considers how 'Smart' techniques can be applied to environmental and conservancy management and compliance activities, and how Smarter Management can be applied holistically to realise even greater benefits.

Who this is for

It is designed as a guide for Harbour Masters and others responsible for managing or overseeing environmental, conservancy and compliance aspects of a port or harbour.

With the increasing emphasis on sustainability, many ports have responded to ensure that their operations are environmentally sustainable and committed to working towards improved environmental performance through focused action on the following areas: air quality, energy conservation, climate change, waste management, noise management and water (both consumption and quality) management.

What we mean by Port Conservancy

According to the UK Port Marine Safety Code Conservancy is: "Managing and maintaining the port and harbour environment so that it is fit for purpose".

As well as the above, Conservancy also involves environmental sustainability, related to such things as air quality and energy conservation.

The responsibility for the day-to-day management of environmental and conservancy compliance usually lies with the Harbour Master. However, a wide range of port personnel are involved, impacted or accountable. These range from trustees and board members to third-party contractors and suppliers, from external stakeholders and regulatory bodies to users and the general public.

Conservancy involves the management of a diverse range of environmental aspects of the port:

- Hydrographic surveys
- Navigation and hydrographic information, including weather and tide conditions
- Dredging
- Aids to Navigation
- Wrecks
- Regulating Harbour Works

Ref: The MCGA Port Marine Guide to Good Practice

A harbour authority has a duty to conserve the harbour so that it is fit for use as a port and a duty of reasonable care to see that the harbour is in a fit condition for a vessel to utilise it safely.

What we mean by Smarter Management

'Smart' initiatives involve adopting new technologies and improving the connectivity between people and systems. Often it is also means implementing Big Data, the Internet of Things (IoT) and Artificial Intelligence (AI) or Machine Learning to improve processes and drive efficiencies.

However, these buzz phrases can be confusing and too conceptual in context and take attention away from the fundamental changes that are necessary to achieve smart port status.

But what does this mean for the Harbour Master when it comes to managing conservancy and the environment?

Managing conservancy, keeping others informed and ensuring compliance is a daily challenge.

Being 'smart' requires informed decisions across the organisation, underpinned by good data governance and management. Doing things more efficiently and effectively will result in becoming a smart port, a journey that is open to all ports, large or small.

To be truly 'smarter', and to benefit from new technologies, a port must also review its core infrastructure and policies around people, processes and information. Simply transferring or digitalising existing ways of working would be a missed opportunity and could even make matters worse.

The key features of 'smarter management':

- **Data Governance:** having data governance and management policies and procedures in place.
- **Connectivity:** investing in 'open' systems that can integrate with third-party systems. Data sharing, storing and maintenance is at the heart of smarter management.
- **Digitalisation:** adopting latest digital technologies, moving away from paper and file based reporting and storage
- **Automation:** reducing manual tasks, streamlining processes, delivering alerts and triggers
- **Intelligent data:** having the ability to turn data into meaningful information.
- **Real-time information:** access to real-time data via connected sensor networks.

The smart port concept is part of a broader technological shift, which creates a pathway towards the automated, partly-digitised equipment of today, the remote operation of equipment, and the development of autonomous maritime systems, both at sea and onshore.

Benefits of Smarter Management

Being informed

- Easy access to dashboards, alerts and triggers leaving nothing overlooked or missed
- Focus on relevant information to support more informed decisions
- Conservancy tools at your fingertips. For example schedules for Port activities such as dredging, surveying and licensing

Resilience and risk reduction

- Real-time status reporting, regular maintenance and management of equipment leading to fewer failure points
- Adopting systematic maintenance, never having a critical failure and ensuring built-in redundancy
- Awareness of the location status of your assets such as Aids to Navigation

Compliance and reporting

- Being aware of what needs to be done to achieve and maintain compliance across all port activities
- Reporting to regulatory bodies, ensure deadlines are known and met. Never missing a critical survey or dredging licensing deadline
- Managing deadlines efficiently to eliminate the last-minute dash where mistakes often occur. Instead schedule time required for the task and have oversight of upcoming requirements.

Data availability

- Access to key data and information anytime anywhere
- Respond quickly and easily to enquiries and keep key stakeholders informed
- Provide self-service data access to other users, in the right format (including internal users, stakeholders and regulatory authorities)

Smarter management can realise a plethora of benefits for both the Harbour Master and the port as a whole

Fit for purpose

- Being confident in the data and information you are using to make critical decisions
- Implement data governance and management procedures that consider the many aspects of data quality, it's accuracy, age, relevance, fitness for purpose, accessibility and provenance
- Implement policies that ensure data is captured, stored, validated, and can be used consistently and efficiently

Efficiencies

- Automating and streamlining key processes, and routine activities, that also reduce the chance of human-error
- Not wasting time or resources on repetitive tasks
- People not spending time searching for data, or repurposing it before they can use it
- Having the information available to effectively prioritise activities and budget resources

Barriers to Smarter Management

Disparate systems

- Legacy systems of different ages, proprietary supplier-specific systems, and a fragmented approach to IT preventing data sharing and system integration
- Lack of data governance
- Misconception that the IT department is solely responsible for data and information management

Variety of data formats

- Not having metadata (data about data)
- Varying data formats (paper, disparate systems etc)
- Lengthy data manipulation for reporting
- Complexity of data – marine, bathymetry, meteorological, tidal data are complex data forms and all have a spatial element. Also, this is highly variable, ever-changing data so require systems to handle this

Multiple stakeholders

- A wide range of stakeholders who need to have access to and use information, each having different needs in terms of frequency, level of detail and format

Finding the right solution

- Contracting work due to existing relationship or because 'easy to do' rather than choice based on merit and competency
- Avoiding extra unnecessary costs – only pay for what you actually need

IT infrastructure

- Security, network and platform restrictions often constrain improvements
- No overall governance leading to fragmented or disconnected IT systems (or systems that are costly or inefficient to maintain)
- Obligations with existing suppliers for functions that aren't needed or suited to all end users

Organisational structure

- Lack of definition of who is responsible for which datasets
- Departmental 'silos' can prevent change and inhibit the sharing of knowledge, data and best practice
- Investment is piecemeal and not part of an overall data strategy
- Decisions are made on a life cycle basis or are forced due to unforeseen equipment failure

Culture

- A natural resistance to change, exacerbated by the conservative and cautious approach within industry
- Can be made worse by lack of technology-savvy staff
- Failure to get the necessary buy-in of all involved at an early stage

Resources

- Just not having the time or budgets to address issues and implement solutions
- Expecting people to update or upgrade systems and still do their 'day job'
- Not having the knowledge or understanding of data governance

How to approach Smarter Management

What is the best approach for your port?

Each port is unique and has different challenges. The pathway to Smarter Management for your port is totally dependent on your current infrastructure and the particular barriers you have.

There is no 'one size fits all' approach, but the fundamental building blocks, understanding and approach are consistent across all types and sizes of organisation. This is a good starting point. You need to be driven by your own status and understanding of the topic, as well as your specific needs and objectives. Take into account what you already have and make sure that you invest in the right tools at the right time.

Evaluating your investments will be key to success. Whether it's replacing an outdated weather monitoring system or implementing data governance, each project needs to deliver incremental operational improvements and keep you on the pathway to smarter management.

Test each investment by asking these questions;

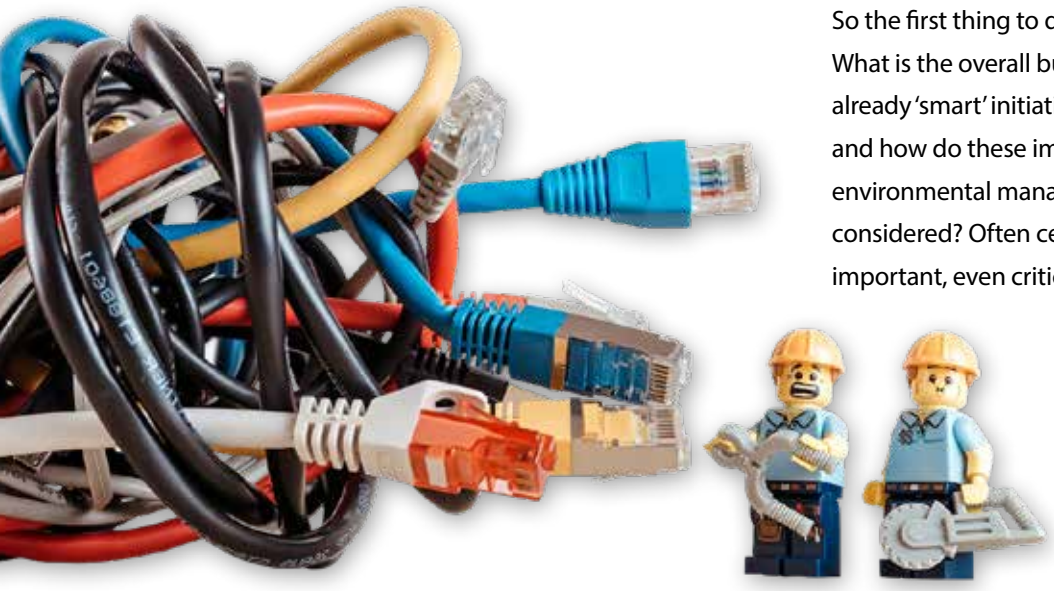
1. Does this allow me to share data and information with others and other applications?
2. Is the data stored centrally, and can I access the metadata?
3. How does this increase my resilience and reduce my risk?
4. How does this make me or my team more efficient?

Top down or bottom up?

Ideally, the movement to Smarter Management should be a strategic one, led and supported by senior management, and supported by the whole organisation. This is what we would call a 'top down' approach.

However, decisions can be made at a departmental or operational level on a piecemeal basis that can really help you progress towards smarter management. It has to be recognised that decisions made in isolation may also hinder future improvements, as they are taken without the bigger picture viewpoint.

So the first thing to do is look at the bigger picture. What is the overall business strategy? Are there already 'smart' initiatives being actioned or discussed, and how do these impact on conservancy and environmental management? Have they been considered? Often centralised decisions can overlook important, even critical, issues that affect operations.



The development of a Smart Port should be something that stems from a strategy

Data governance policy

Data is probably the second most valuable asset your organisation has, after its people. Being smart means being smart with your data – so you need to turn it into a valuable company asset and treat it as such.

Clear data management policies are required – the absence of them has probably led to many of the current issues you have. These will underpin your smarter management initiatives and are a fundamental requirement:

- Conduct a data audit to find out what you have, where it is stored, how much you have and what you are using it for. This will show you where you are on the data management pathway.
- Create a data policy and data management plan. These standards and policies should be dealt with in the same ways as other business management polices such as Quality, Health and Safety and Environment. Make sure they are easy to maintain, achievable and include how you deal with data retention, archiving and destruction (DRAD).

At **OceanWise**, we have built significant experience of helping ports, small and large, move forward on their smarter management journey.

Talk to us to find out how you can start your own journey, or join one of our 'Introduction to Data Management for Ports Courses'. Further details at www.oceanwise.eu/about-us/oceanwise-for-ports/

Small Smarter investments, upgrades and replacements

Every decision about technology investment is both an opportunity to move down the pathway to smart management or put another obstacle in the way. This is where the top down and bottom up approaches meet.

- Have a clear picture/plan of what critical systems need reviewing, upgrading, or replacing in the next few years and what contracts are up for renewal.
- Understand how these will impact your smarter management journey. For example, will your new VTS be able to take weather data from your current monitoring system, or will your new monitoring system be able to integrate with your VTS? What survey management solution does your survey contractor use, and can they provide data in the format you want?

Culture

Smarter Management often requires a culture shift in your approach. Inertia and the 'we've always done it this way' attitude are often the biggest obstacles. You need to understand that any technology project is also about culture change management, both personal and organisational. It won't just happen because you want it to happen. This requires education and training – and planning. And often, the best way forward here is to solicit some external help.

- Educate, train, and demystify change – talk to all levels of the organisation and get them on board by talking in their language and demonstrating real benefits in their own terms, be this financial, operational, or technical.

Your Smarter Management Checklist

Where should you start? To help you identify where you can start on your journey, here are some typical signs that point to areas where ports could benefit from smarter data management.

Do you use multiple data sources, people, and systems to manage your environmental samples and dredging licences?

Smarter management will:

- ☑ Simplify your data manipulation and improve planning, management and delivery of conservancy and compliance reports
- ☑ Reduce reliance on out-dated, unreliable systems and reduce time spent consulting with others

Do you regularly have limited or no access to reliable environmental information (tides, wind, current, air etc)?

Smarter management will:

- ☑ Produce results quickly and in a variety of formats for use in multiple applications (VTS, PPU's etc.)
- ☑ Make sure that your environmental monitoring systems are fit for purpose and resilient
- ☑ Ensure that you have the right data, in real time, when you need it and in the right format
- ☑ Integrate your instruments and sensors into a single system
- ☑ Enable sharing with other organisations – weather forecasters, dredgers, website developers, dynamic underkeel clearance

Do you spend a lot of time producing your own hydrographic charts?

Smarter management will:

- ☑ Streamline chart production processes using innovative tools
- ☑ Automate your data sampling, conversion and processing
- ☑ Provide results quickly and in a variety of formats for use in multiple applications (VTS, PPU's etc.)

Do you use multiple datasets and software tools to create charts?

Smarter management will:

- ☑ Improve efficiency by taking control of your datasets and managing them in a central system
- ☑ Give faster access the latest data and improve data sharing and analysis

Do you regularly draw on published paper charts when making decisions or assessing a situation?

Smarter management will:

- ☑ Collate key information into a geospatial database
- ☑ Easily display, manipulate, and communicate complex issues

Do you spend too much time searching or having to ask others for relevant information?

Smarter management will:

- ☑ Reduce data 'silos' by consolidating formats
- ☑ Get your hands on the data you need faster
- ☑ Ensure you have the latest data to support critical decisions
- ☑ Easily share data with other users and systems

Do you often have to react to changing tidal and weather conditions by delaying traffic or berthing schedules due to lack of reliable real-time information?

Smarter management will:

- ☑ Make safer decisions with confidence
- ☑ Give you reliable real-time tide and weather conditions
- ☑ Provide access to real-time data via other critical platforms, such as pilotage and VTS systems

Notes

References and Other Useful Resources

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OceanWise provides applications, services and tools that enable safer and smarter management of marine operations.

OceanWise offers a range of training and consultancy services worldwide to support the understanding and implementation of Data Management, Data Policy, Data Strategy and Data Governance.

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Published and produced by OceanWise Ltd.