

# High Density Bathymetry on the Web

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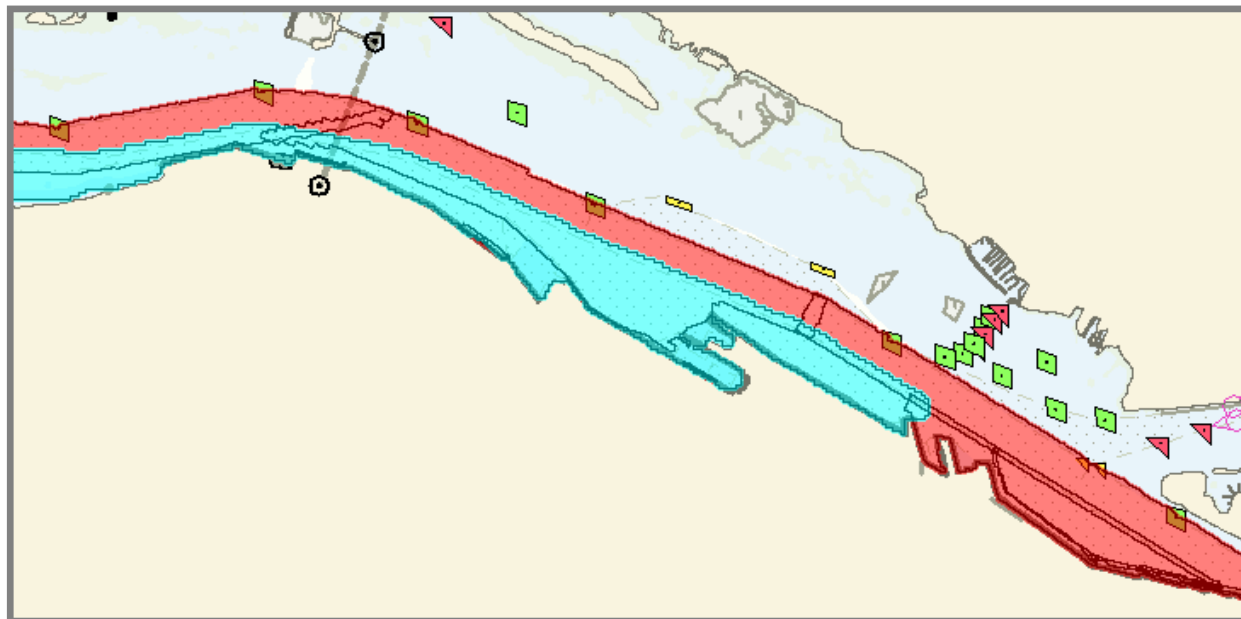
# Market Trends

- **Electronic Delivery**
  - View, Select, Download Bathymetric Datasets
  - Immediate Availability 24/7
  - Automated System
- **Standardized Data Formats**
- **Integration with Popular Tools and Applications**
  - Google™ maps
  - Navigation, Scientific Research, Engineering, etc.



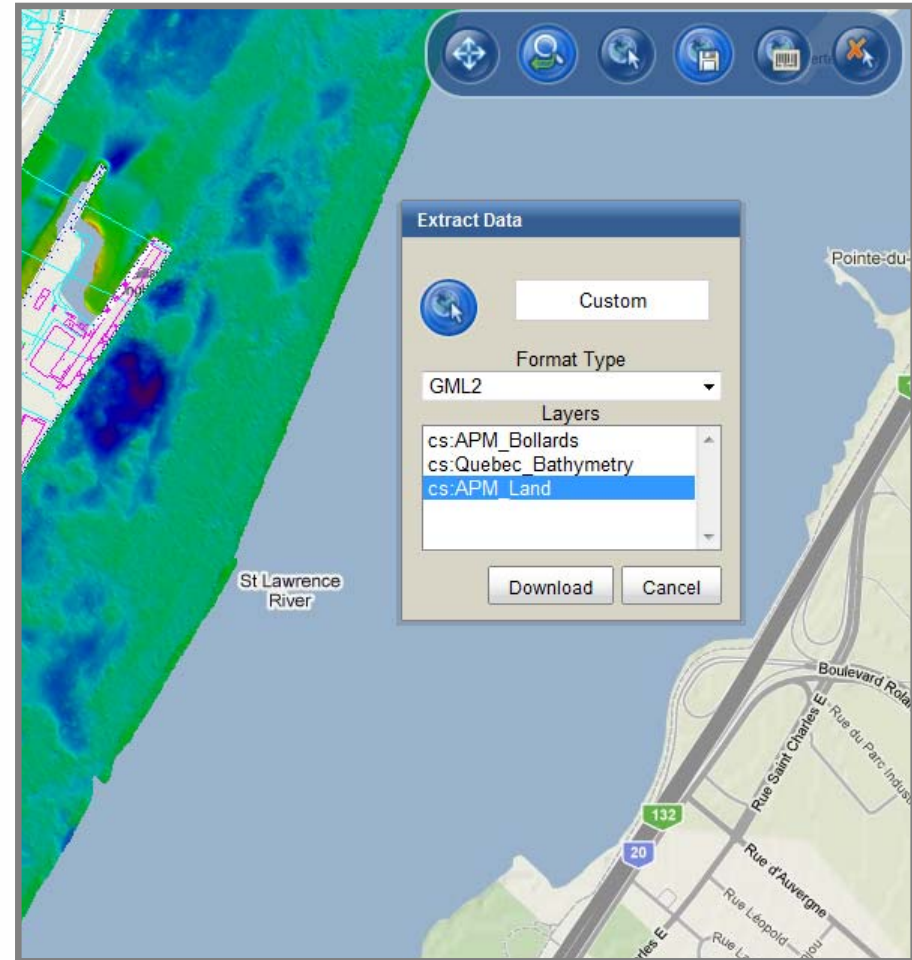
# Issues to Consider

- Effort required to maintain updated content
- Ease of locating desired product
- Offering products that are adapted to specific needs
- Maintaining system performance



# Various Requirements

- Availability of datasets:
  - in various projections
  - in various resolutions
    - re-sampling (down sampling)
  - in various formats
    - ASCII, image-based, gridded
  - with varying content
    - shoal biased, average, uncertainty, etc.
- Mechanisms of selection:
  - Metadata discovery
  - Graphical selection





## Main Issue

It can become very difficult for organizations to offer pre-packaged datasets that meet everyone's needs.

This leads to request for custom products which burdens the organization with maintaining multiple versions of datasets, **ESPECIALLY** if dealing with a file-based production environment.



# Various Technology / Approaches

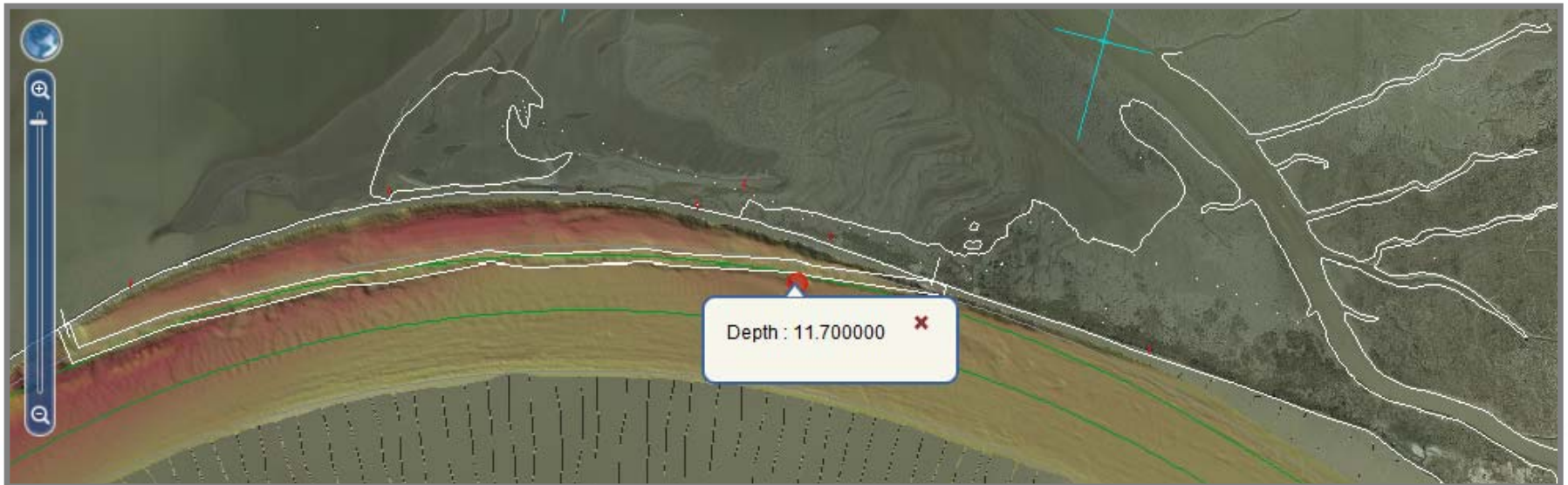
- Direct download of CAD or GIS files
- Direct download of ASCII XYZ
- Direct download of bathymetric surfaces (e.g. BAG format)
- Using Web Service Standards
  - **Open Geospatial Consortium Inc. (OGC)**



# The Web Services Approach

OGC® offers:

- Web Map Service (**WMS**) and Web Map Tile Service (**WMTS**) to request simple images of the data for viewing
- Web Feature Service (**WFS**) to query data attributes or extract basic vector line work such as the bathymetry surface boundaries
- Web Coverage Service (**WCS**) to download gridded datasets
- Catalogue Service Web (**CSW**) to allow data discovery mechanisms





# Data Storage and Maintenance

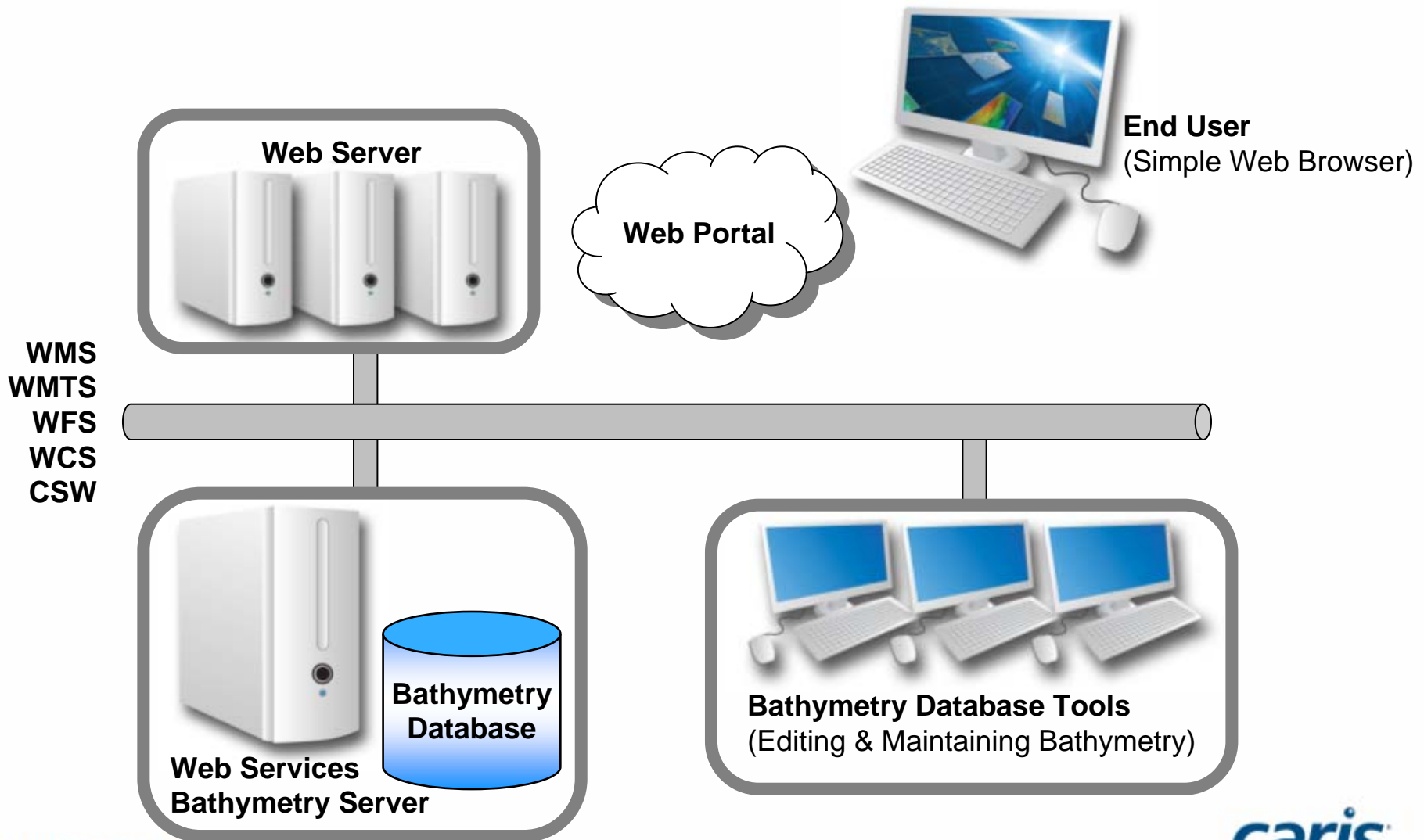
Web Services were developed to help the communication between the end-user and the provider. That is however only half of the equation.

A performing system on the server side must also be in place to handle all types of requests and respond rapidly.

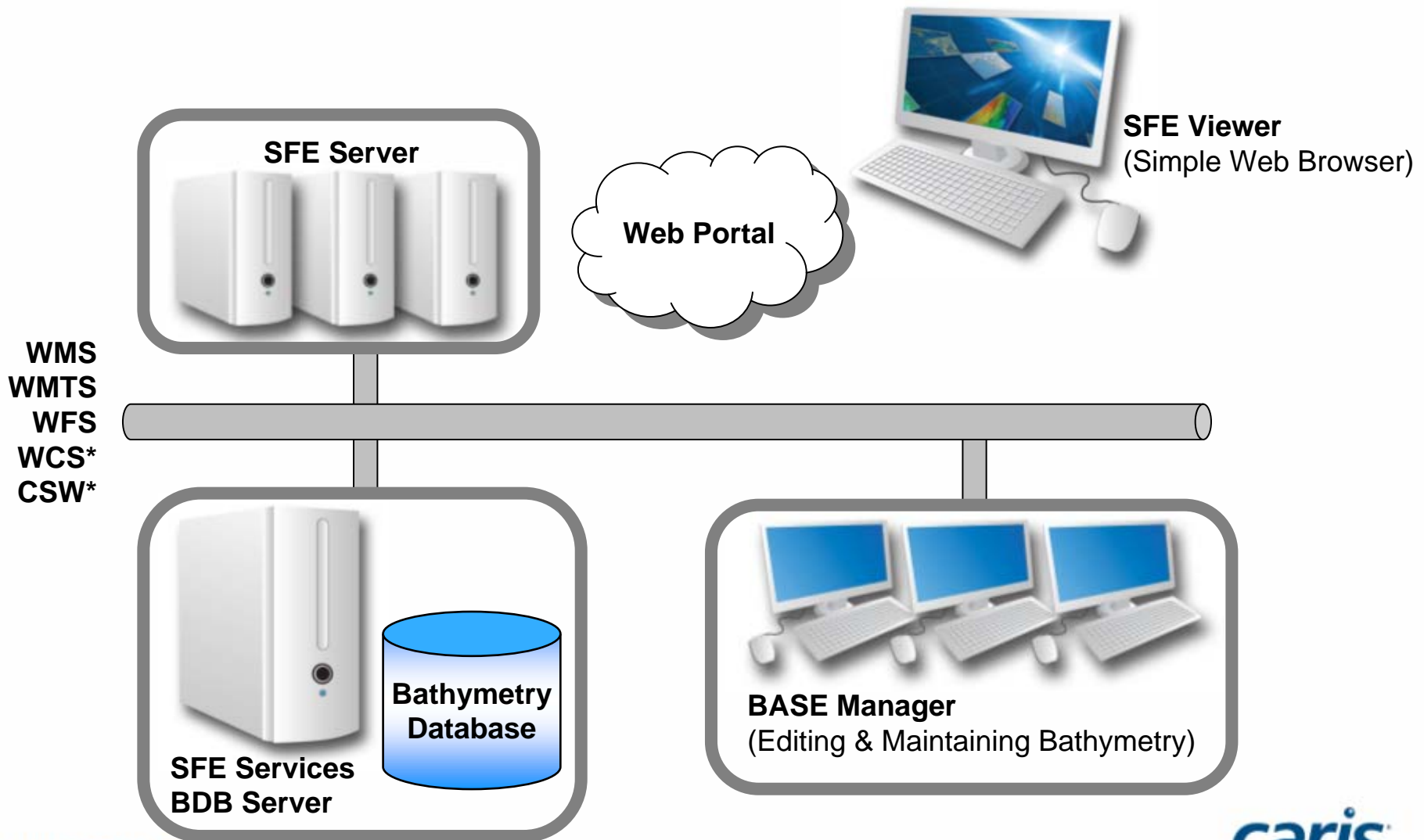
A **database solution** to maintain the data holdings on the server addresses many potential issues including the **automatic maintenance** of the most recent products as well as the ability to respond to Web Service Requests with **customized products on generated demand**.



# Simplified Architecture



# CARIS Architecture





## Workflow (clip / zip / ship)

- Select dataset(s) of interest graphically or via metadata searches with a CSW.
- Specify resolution (if gridded surface)
  - Data can be down sampled but not vice versa.
- Specify projection (if offered)
- Specify content (e.g. which depth layers to include)
- Specify format (e.g. 32-bit GeoTIFF, BAG, XYZ, KMZ)
- Download
  - If size greater than x, system can inform user once requested data is ready for download.
- Use locally on user's PC



## In Summary

There are multiple approaches to publishing data to the Web but the organization must consider several factors including the objective of the end result.

Increasing awareness, interoperability requirements, and more sophisticated end-user applications indicate a need for standardized approach.

Web Service standards and powerful database technology exist today to meet these needs and streamline the data delivery process.

**THANK YOU!**

**QUESTIONS?**

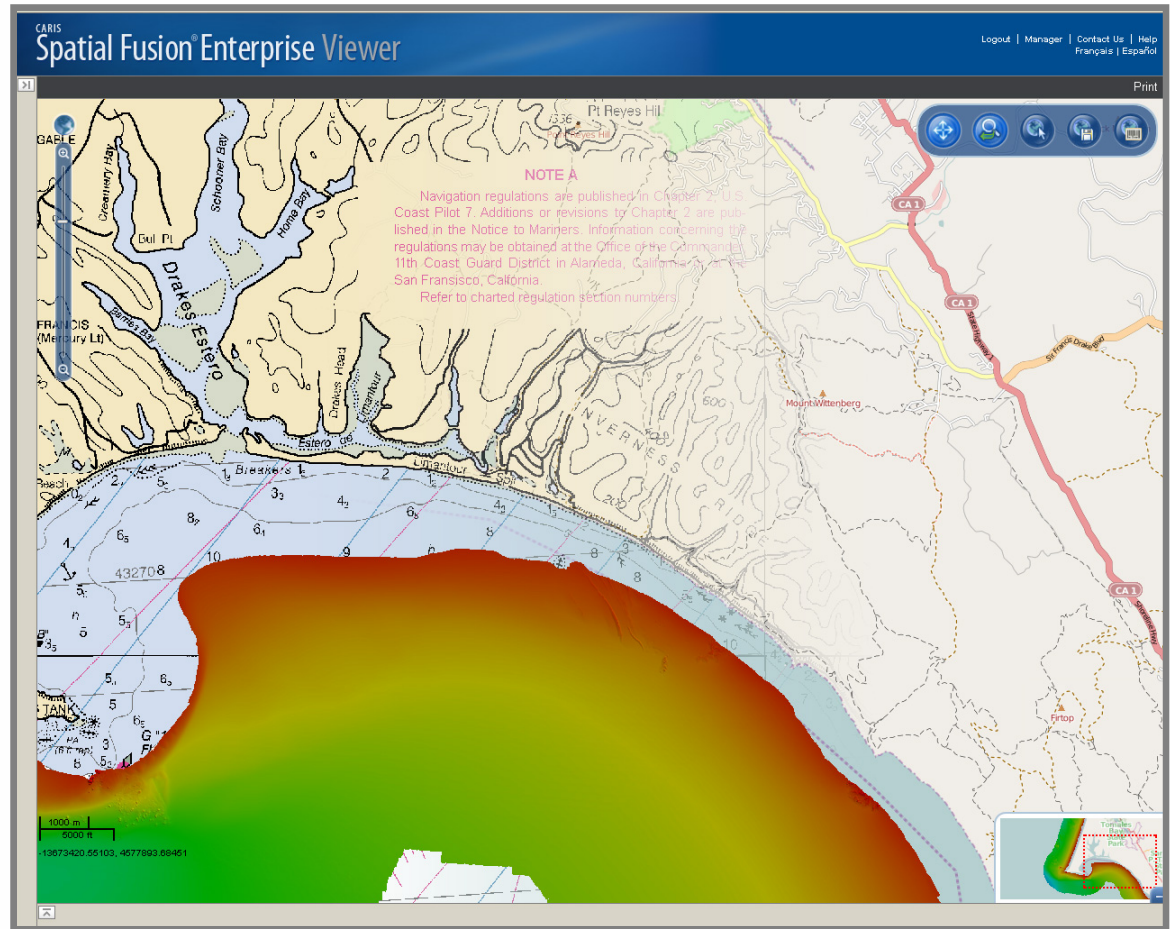
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