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NATIONAL OCIMS

Oceans and Coastal Information Management System

Progress Report

Lauren Williams

20 February 2019

NATIONAL OCIMS

Vision, Mission and Objectives

Vision

Develop a locally relevant and globally cognisant technological solution that supports the ecological conservation and socio-economic potential of South Africa's oceans and coasts through information and decision-support for effective governance.

Mission

Integrate current and future systems, information and expertise into a user-friendly and **cost effective** national Oceans and Coasts information system for the benefit of relevant stakeholders.

Objectives

decision making support

strategic and operational planning

protection oceans and coastal environment

economic growth and job creation

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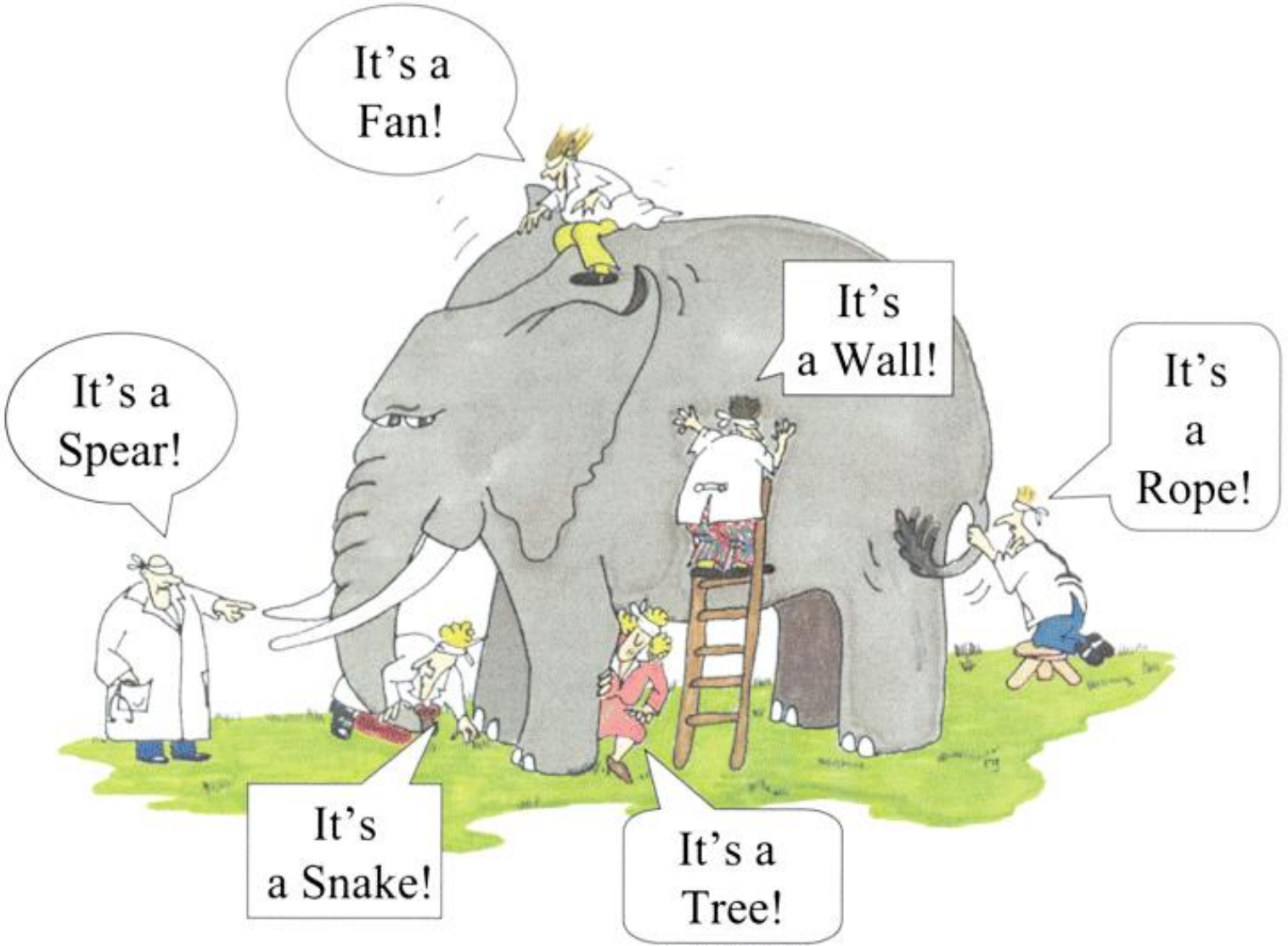
OCIMS? What is it?

- System of systems – A one-stop-shop
- It is NOT a data repository
- Comprises of a Core System
- Decision Support Tools (DeST
- Data searching for any ocean and coastal related informatic
- Document Library



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OCIMS? Where is it?

- If you are connected to the internet, you have access to OCIMS: www.ocims.gov.za

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Introduction

- 2018/19 is year 4 in our 5 year OCIMS development cycle;
- Largest stakeholder turnout (over 180 attendees – Nov 2018)
- OCIMS Core and 9 Decision Support Tools
- Marine Information Management System
- Established user communities
- PARTNERSHIPS

- Harmful Algal Bloom
- Ops at Sea
- Coastal Flood Hazard
- Integrated Vessel Tracking
- Coastal Viewer
- Marine Spatial Planning
- Water quality
- Oil spill / Bilge Detection
- Fisheries Support

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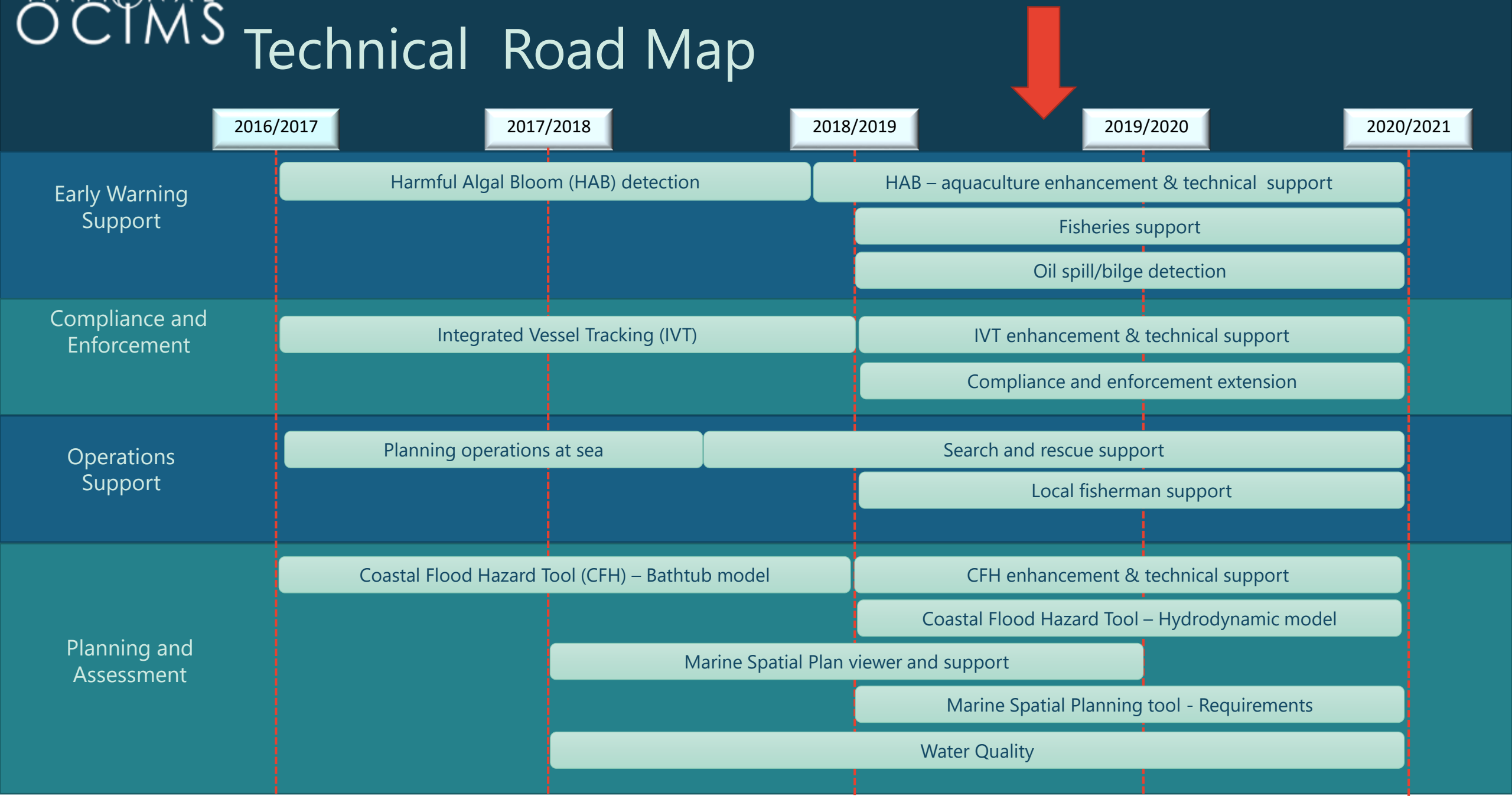
Technical Road Map



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Marine Information Management System (MIMS)

- For every frontend (OCIMS), there's a backend (MIMS);
- MIMS IS a data repository;
- System is managed by a team of PEOPLE;
- Follow international ISO standards;
- Caters for different data types

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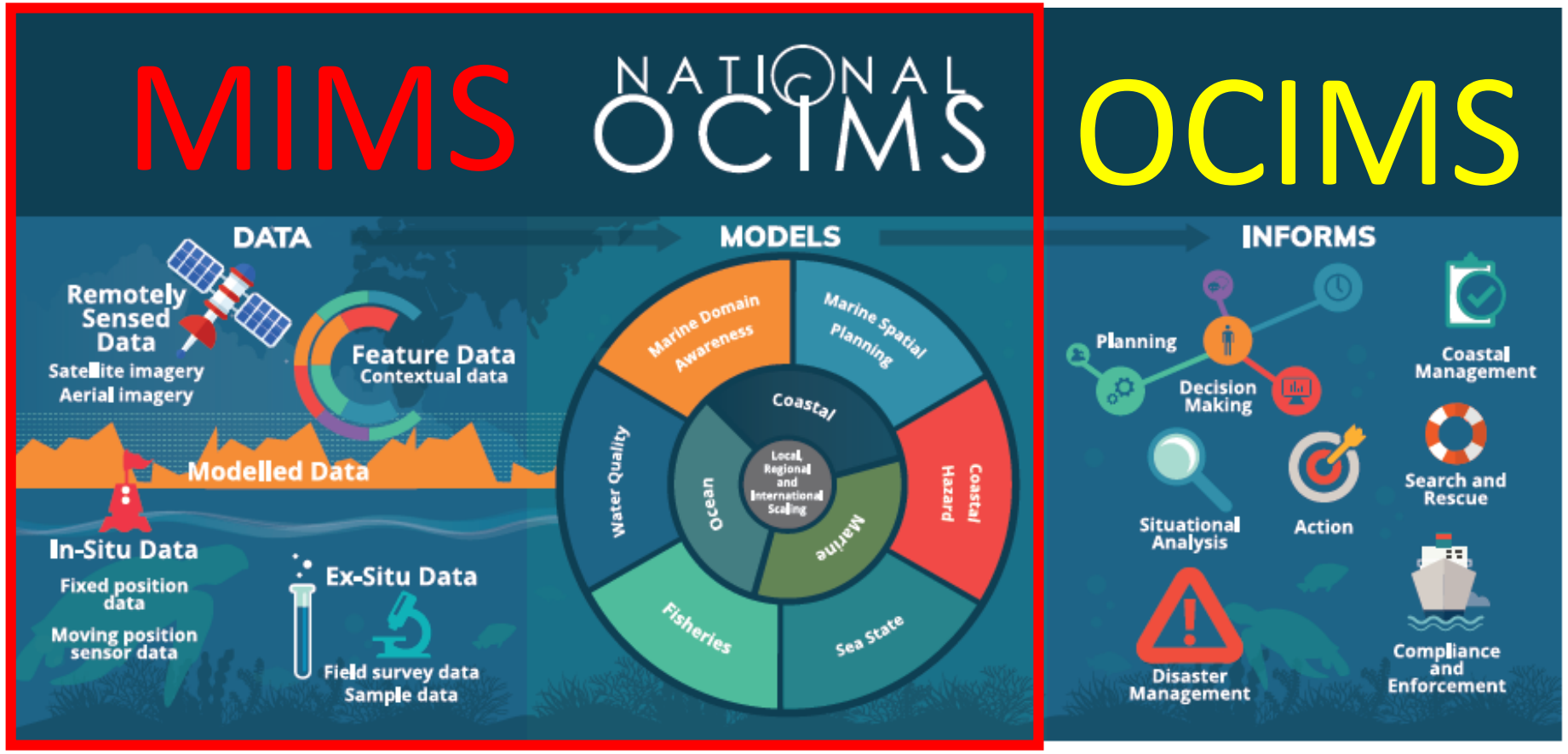
Conceptual Model



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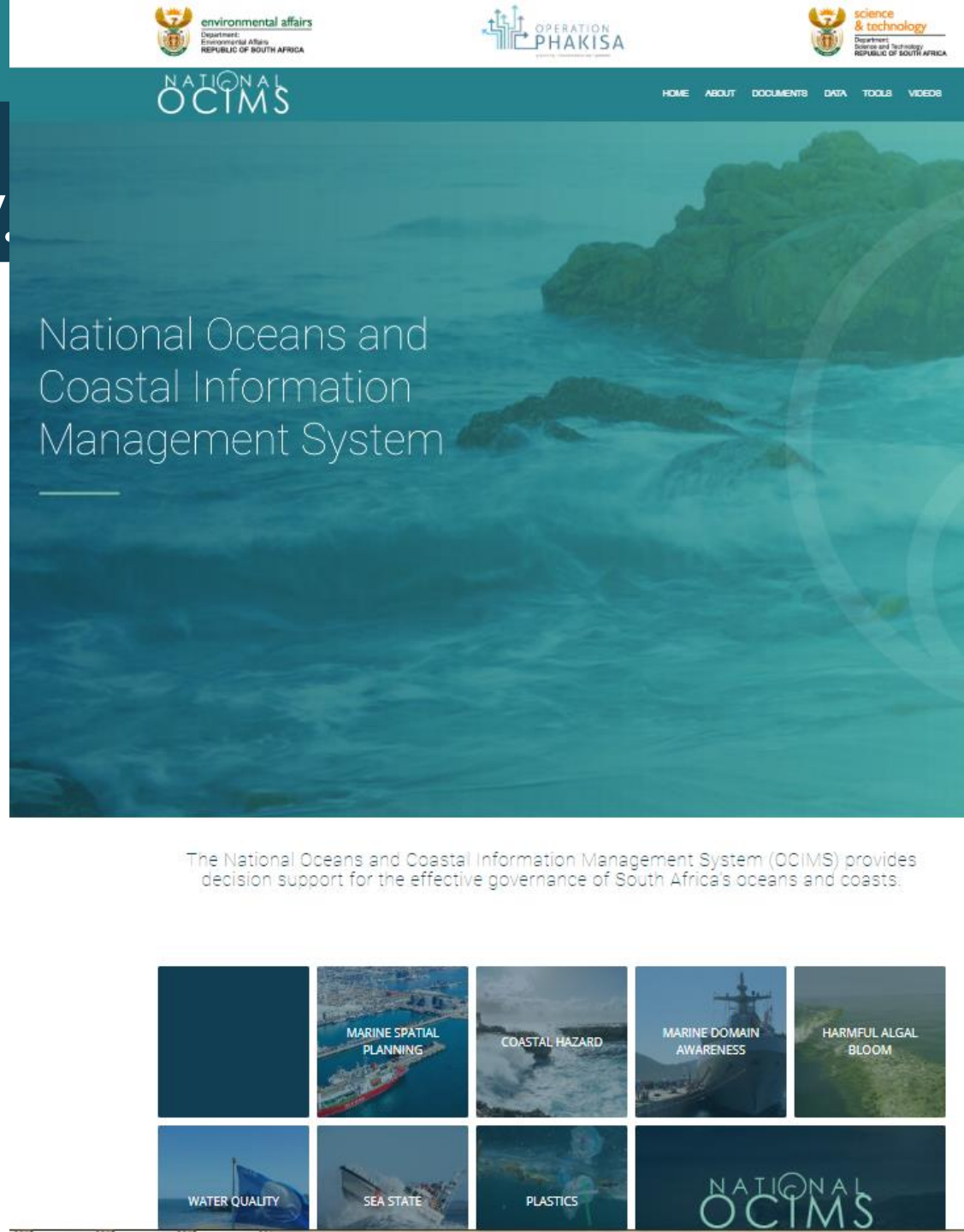
OCIMS Core (www.ocims.gov.

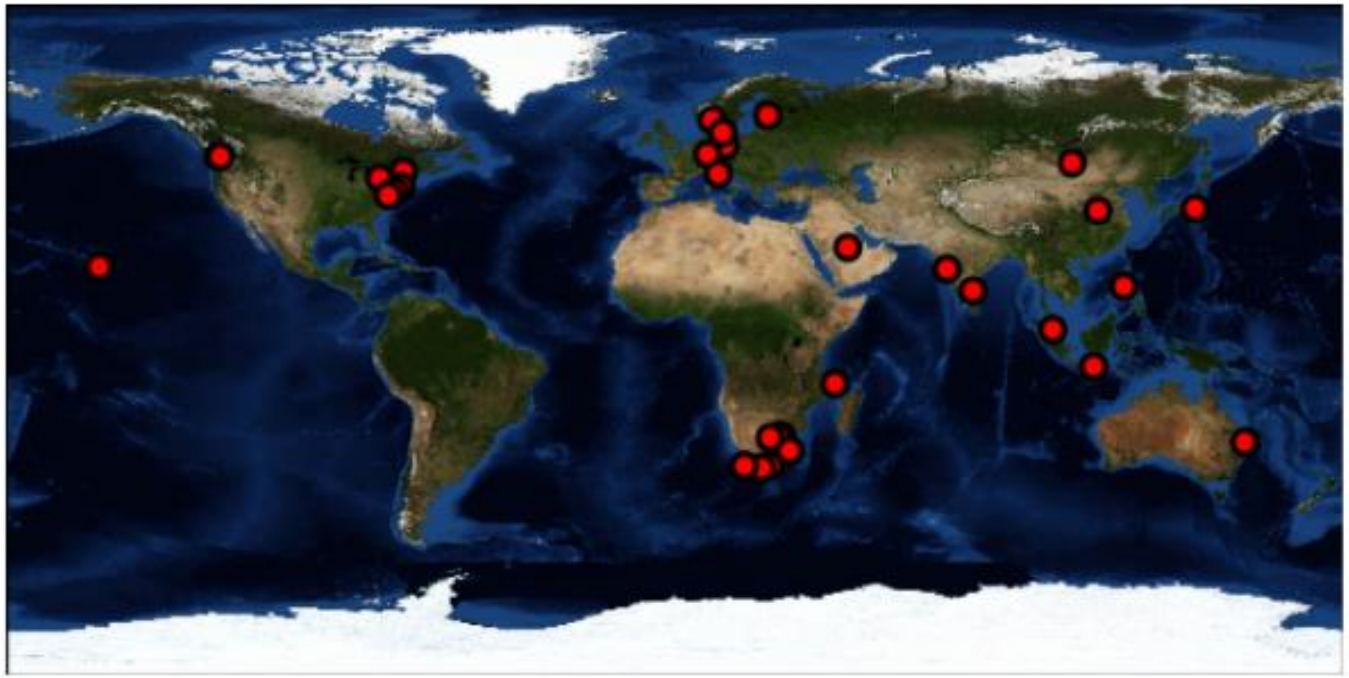
- Here you will find:
  - General information
  - Links to documents
  - Links to DeSTs
  - Data search function
  - Instructions and videos
- What's new?
  - Blogs – communicating science
  - Twitter Feed (@OCIMS_SA)
  - Weather information (weather-atlas.com)
  - Feature stakeholders/partners



OCIMS Core

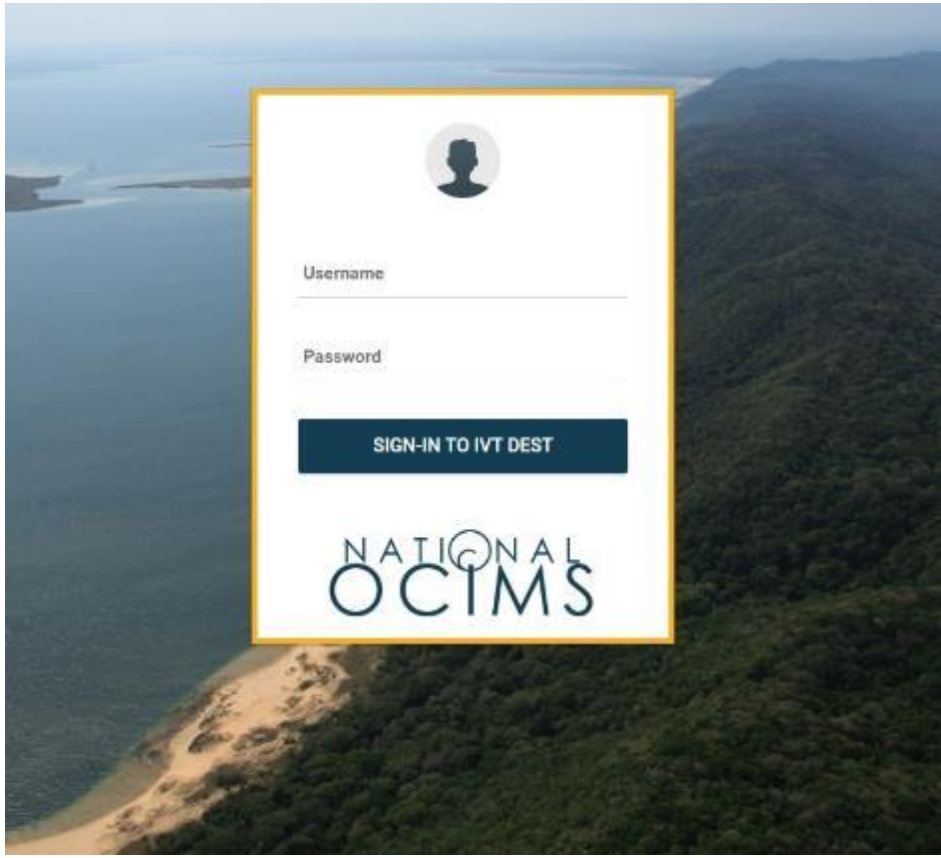
- Auto-generated Monthly reports:
  - Coastal Flood Hazards
  - Coastal Operations at Sea
  - OCIMS Core
  - Harmful Algal Bloom
  - Marine Spatial Planning

OCIMS Core – Analytics



Highlights: Integrated Vessel Tracking

- Integration of datasets from various sources including
  - DAFF – VMS data;
  - SAMSA – Satellite AIS;
  - SANSA – SAR images;
  - Transnet – Radar data.
- Support from DoD (SA Navy and IMT) and SSA
- New features:
  - Can incorporate camera feeds;
  - Geofencing – Vessels entering MPAs – Phakisa MPAs
  - Automatic detection of dark targets and manual "flagging"
  - Additional layers e.g. Sea Surface Temperature



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Search for ship name/mmsi/

0

student

Legend Speed Ship-Names

Select All
- Cargo
- Tanker
- Passenger Vessels
- High-speed Craft
- Tugs and Special Craft
- Fishing
- VMS Vessel
- Pleasure Craft
- Radar
- Aircraft
- GPS
- Ground-Station
- Nav-Aid
- Unspecified

- SAR Detection
- Transponder Detection
- Radar Detection

Track Speed [knots]
0-5 6-10 11-15 16-20 21+

500 km

CURRENT SHIPS | GEOFENCES | SAR | CAMERA

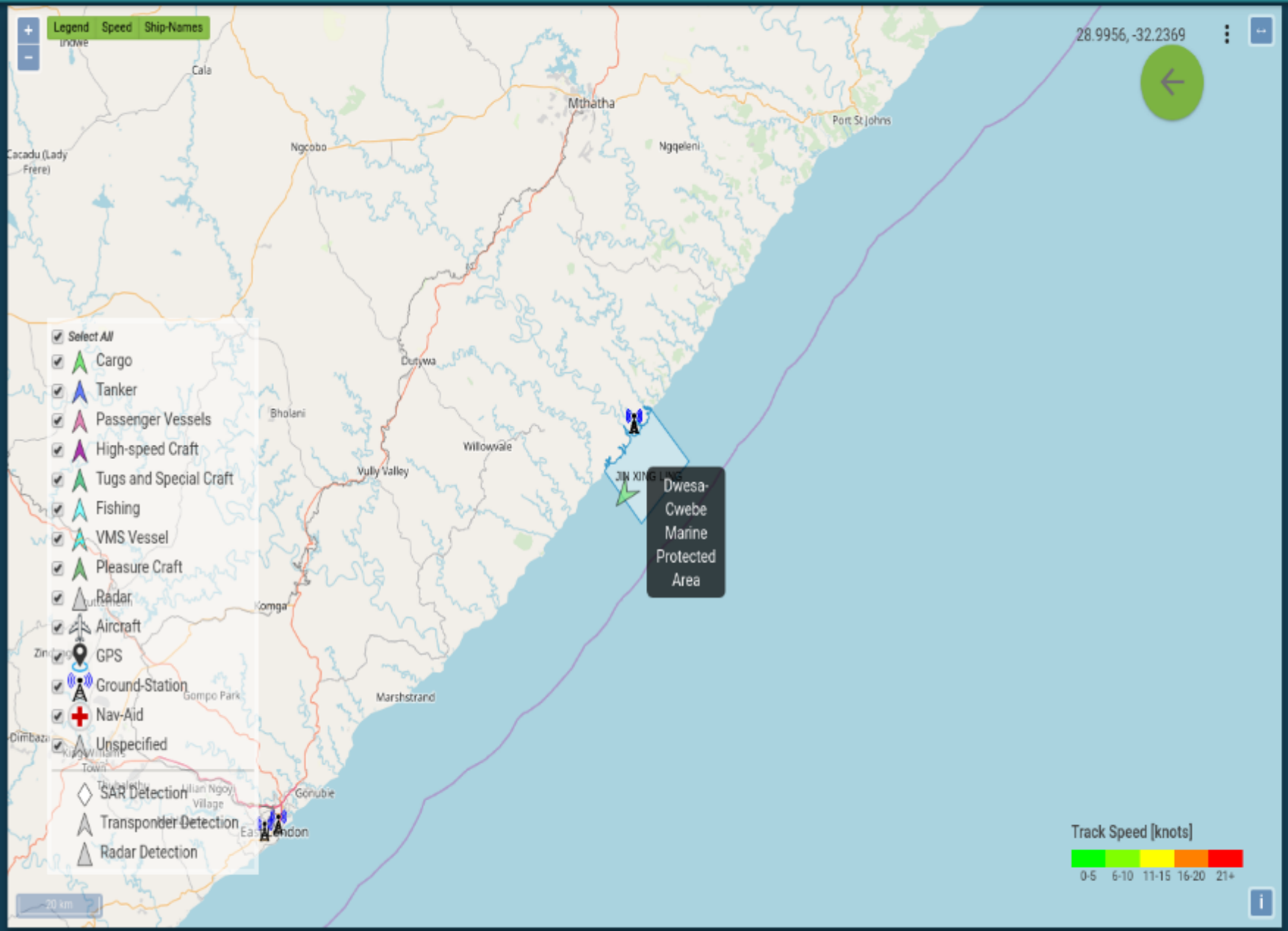
MMSI	Name	Callsign	Flag	Remove All
601048000	SA AGULHAS	ZSAF	ZA	remove

Ship Details

Name	SA AGULHAS
MMSI	601048000
Position	[-33.75 , 27.74]
Position	S33°44.844' E27°44.467'
IMO	7628136
Callsign	ZSAF
Source ID	fusion.all
Reported Time	10/22/2018, 3:08:16 PM (SAST)
Heading	66.60 °
Flag State	South Africa
Track	Refresh Remove
Avg.Speed	6.38

PAS 7.7 knots

Image supplied by Marine Traffic



CURRENT SHIPS | GEOFENCES | SAR | CAMERA

Name	Select Geofence
Dwesa-Cwebe Marine Protected Area	☑
Langebaan Lagoon Marine Protected Area	☐
Sixteen Mile Beach Marine Protected Area	☐

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Search for ship name/mmsi/ 0 student

Legend Speed Ship-Names

23.6659, -34.7522

Select All
Cargo
Tanker
Passenger Vessels
High-speed Craft
Tugs and Special Craft
Fishing
VMS Vessel
Pleasure Craft
Radar
Aircraft
GPS
Ground-Station
Nav-Aid
Unspecified
SAR Detection
Transponder Detection
Radar Detection

CPO BREMEN

Track Speed [knots]
0-5 6-10 11-15 16-20 21+

20 km

CURRENT SHIPS GEOFENCES SAR CAMERA

Image	Date	Detections	Sensor	Beam
☑	2018-10-20T17:11:26.000Z	67	RS2	OSVN
☐	2018-10-19T17:41:16.000Z	26	RS2	SCNB
☐	2018-10-19T02:07:35.000Z	1	RS2	OSVN
☐	2018-10-18T16:30:54.000Z	81	RS2	OSVN

Detected Ship Details

Name	CPO BREMEN
MMSI	229655000
Position	[-34.74 , 23.67]
Position	S34°44.626' E23°40.461'
IMO	9450387
Callsign	9HA3490
Heading	117 °
Flag State	Malta
Length	131 m
Width	67 m
Confirm Dark Target	Yes No

Ship hh

Image supplied by Marine Traffic

NATIONAL OCIMS

Search for ship name/mmsi/

0

student

Legend Speed Ship-Names

Select All
Cargo
Tanker
Passenger Vessels
High-speed Craft
Tugs and Special Craft
Fishing
VMS Vessel
Pleasure Craft
Radar
Aircraft
GPS
Ground-Station
Nav-Aid
Unspecified

SAR Detection
Transponder Detection
Radar Detection

Track Speed [knots]
0-5 6-10 11-15 16-20 21+

200 km

CURRENT SHIPS GEOFENCES SAR CAMERA

Description
Hamburg, Germany
CSIR Smart ADS-B
Sydney Bridge
Waterfront Smart AIS

CSIR Smart ADS-B

GRAB IMAGE

Please contact the OCIMS team if you have a camera feed you would like to see here.

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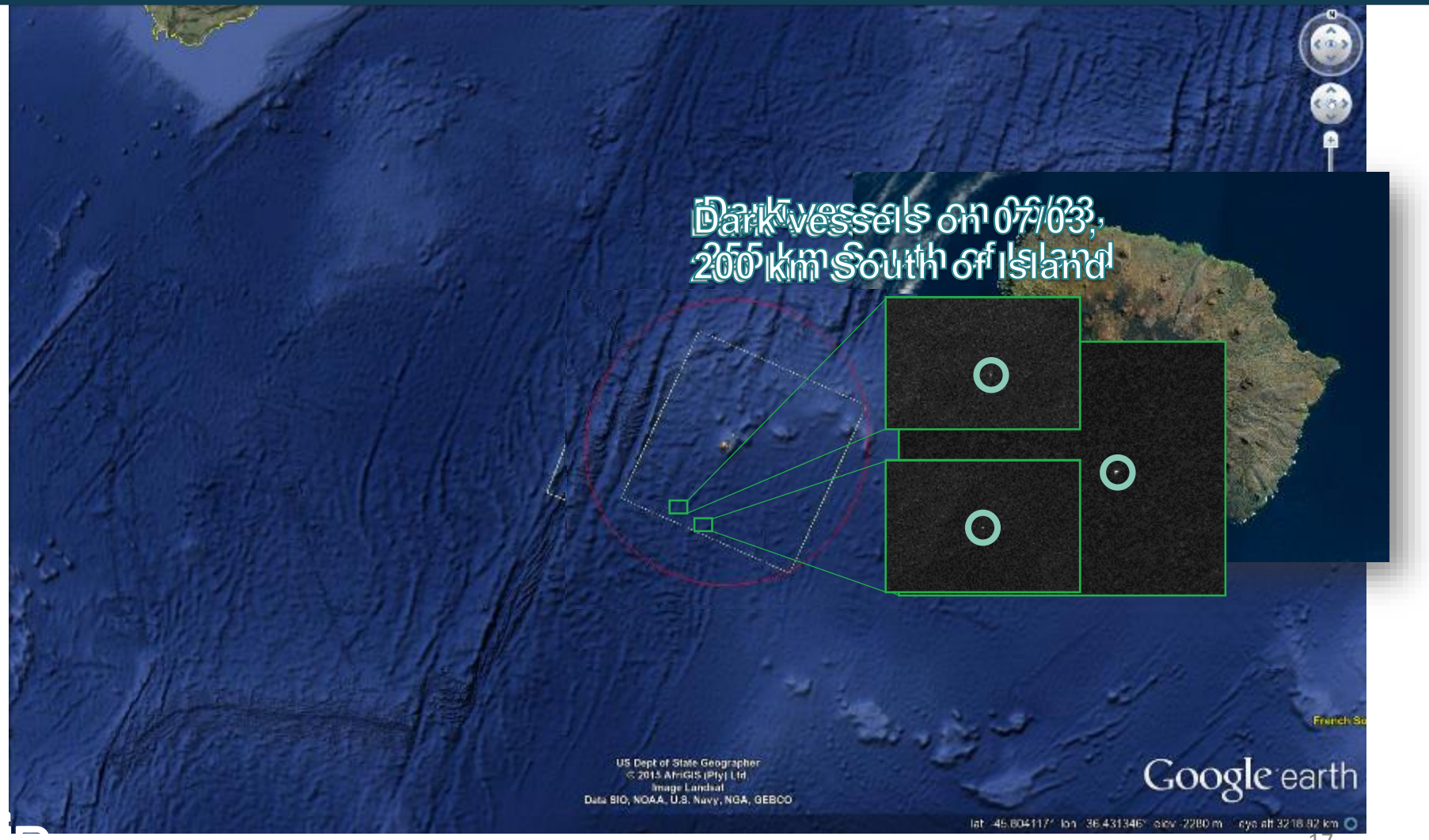
SAR Pilot Study

- Month long campaign that ran from 12 June to 10 July 2015.
- All images acquired between 2AM and 3AM. Vessels at this time almost invisible to naked eye.
- Eight 500km x 500km images which covered 80% of the EEZ, twice weekly.
- Five images contained one or more vessels detected without AIS transponders (dark targets).
- This campaign highlighted the importance of SAR as the only technology available to monitor these large areas independently.

SAR Pilot Study



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SAR Pilot Study

- Image 1: 12 June -> 1 detection (500km West)
- Image 2: 16 June -> No detections
- Image 3: 19 June -> No detections
- Image 4: 23 June -> 2 detections (255km South)
- Image 5: 26 June -> 3 detections (300 km North-West)
- Image 6: 30 June -> No detections
- Image 7: 3 July -> 2 detections (200km South)
- Image 8: 10 July -> 2 detections (200km South)
- Total dark targets between 12 June and 10 July: 10

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SAR Pilot Study

Vessel fishing in a marine protected zone

Highlights: Harmful Algal Blooms

- Technical Advisory Group has been formally established
- Stakeholders:
  - Aquaculture farms
  - Commercial fisheries
  - Subsistence fishers
  - ABALOBI
- Uses Modis and Sentinel satellites to detect algal blooms
- Also receives data from buoys deployed and the user community
- Alerts are sent out when blooms are detected

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Highlights: Harmful Algal Blo

- Algal Bloom was initially detected on 19 November 2018 in False Bay;
- Image was provided via social media;
- The colour of the bloom indicated that it may be toxic – DAFF was alerted;
- A DAFF official has tentatively identified the bloom as Lepidodinium chlorophorum, which should not pose a risk to human health;
- The bloom does have the potential to result in anoxic conditions, which may lead to marine mortalities.

- Algal bloom observed through OCIMS HAB DeST

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Harmful Algal Bloom Decision Support Tool

Harmful Algal Bloom Risk

Area	2018-11-19	2018-11-18	2018-11-17	2018-11-16	2018-11-15	2018-11-14	2018-11-13
Namaqua Shelf	blue	grey	red	grey	red	blue	blue
Greater St Helena Bay	blue	grey	blue	blue	blue	blue	blue
SW Cape	blue	grey	blue	grey	blue	blue	blue
False Bay	red	grey	red	blue	red	grey	blue
Overberg	red	grey	blue	blue	blue	blue	blue
Langeberg	blue	grey	blue	blue	blue	blue	blue
Garden Route	red	red	red	blue	blue	red	blue
Algoa Bay	red	red	blue	red	grey	blue	blue
Wild Coast	blue	blue	grey	red	grey	grey	blue
KZN South Coast	grey	blue	grey	red	blue	blue	blue
KZN North Coast	grey	blue	grey	red	blue	blue	blue
Elephant Coast	grey	grey	grey	grey	blue	blue	grey

HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-19

SEEK TO SPECIFIC DATE: -1 DAY +1 DAY

Now viewing:
Blooms from Chl-A Analysis

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Harmful Algal Bloom Decision Support Tool

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-11-21	2018-11-20	2018-11-19	2018-11-18	2018-11-17	2018-11-16	2018-11-15
Namaqua Shelf	High	High	High	No Data	High	No Data	High
Greater St Helena Bay	High	High	High	No Data	High	High	High
SW Cape	High	High	High	No Data	High	No Data	High
False Bay	High	High	High	No Data	High	High	High
Overberg	High	High	High	No Data	High	High	High
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	High	No Data	High	High	High	High	High
Algoa Bay	High	High	High	High	High	High	No Data
Wild Coast	High	High	High	High	No Data	High	No Data
KZN South Coast	High	High	No Data	High	No Data	High	High
KZN North Coast	High	High	No Data	High	No Data	High	High
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

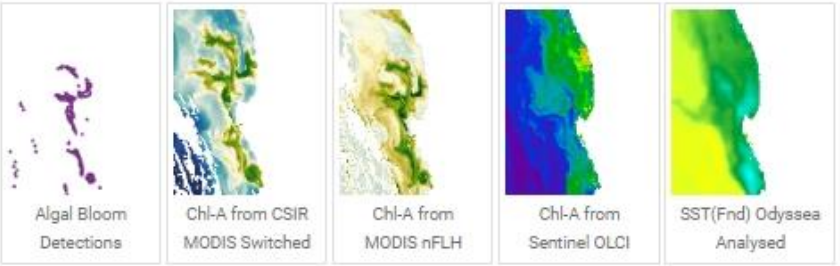
HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-21

SEEK TO SPECIFIC DATE: -1 DAY | +1 DAY

PICK DATE: 2018-11-21

Now viewing:
Blooms from Chl-A analysis



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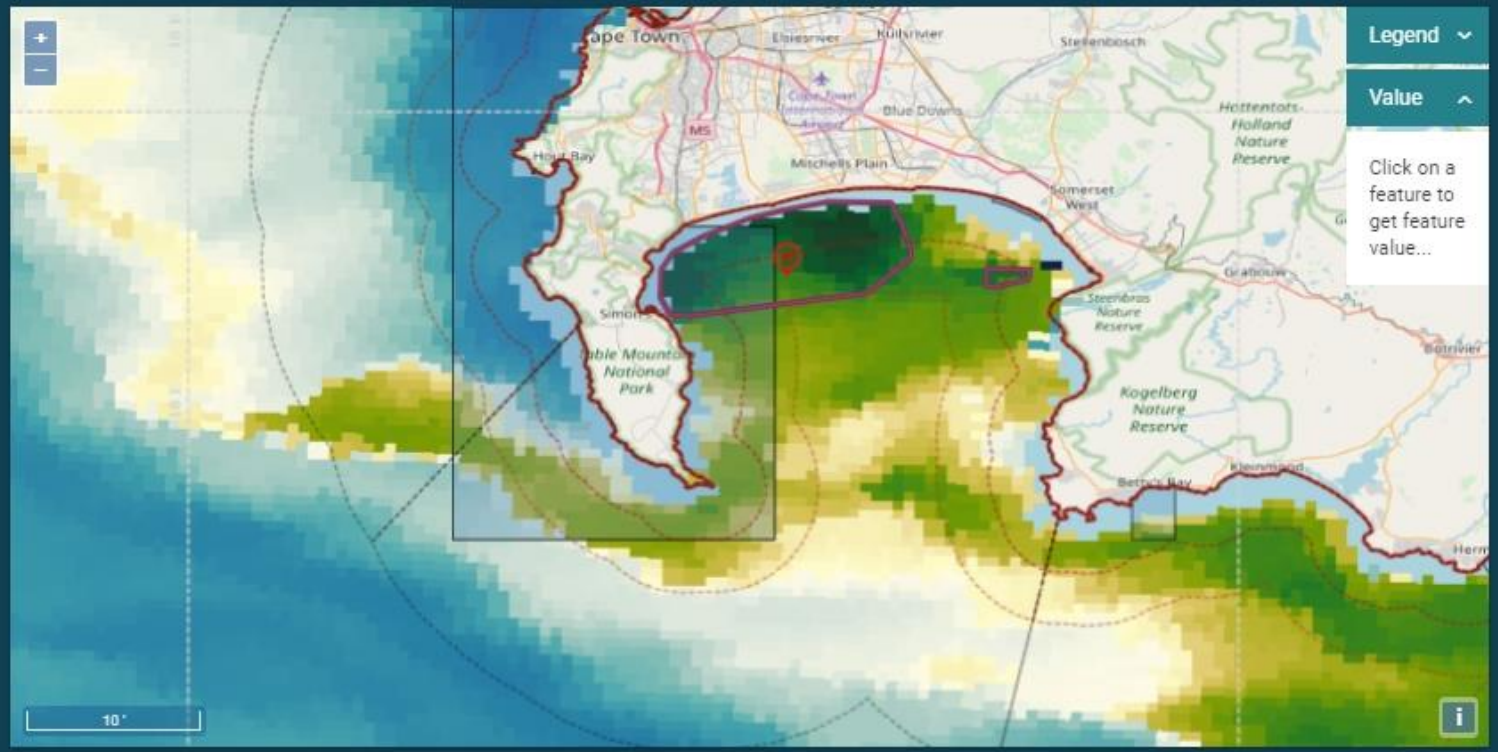
Harmful Algal Bloom Decision Support Tool



HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-22

SEEK TO SPECIFIC DATE: -1 DAY | +1 DAY

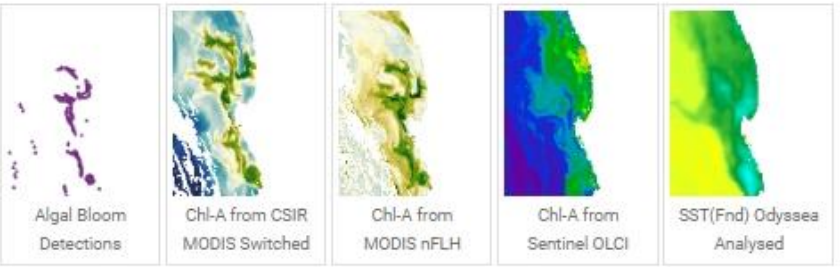
PICK DATE: 2018-11-22

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-11-22	2018-11-21	2018-11-20	2018-11-19	2018-11-18	2018-11-17	2018-11-16
Namaqua Shelf	High	Stable	Stable	Stable	No Data	High	No Data
Greater St Helena Bay	High	Stable	Stable	Stable	No Data	Stable	Stable
SW Cape	High	Stable	Stable	Stable	No Data	Stable	No Data
False Bay	High	High	Stable	High	No Data	High	Stable
Overberg	Stable	Stable	Stable	High	No Data	Stable	Stable
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	Stable	Stable	No Data	High	High	High	Stable
Algoa Bay	No Data	Stable	Stable	High	High	Stable	High
Wild Coast	Stable	Stable	Stable	Stable	Stable	No Data	High
KZN South Coast	Stable	Stable	High	No Data	Stable	No Data	High
KZN North Coast	Stable	Stable	Stable	No Data	Stable	No Data	High
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

Now viewing:
Blooms from Chl-A analysis



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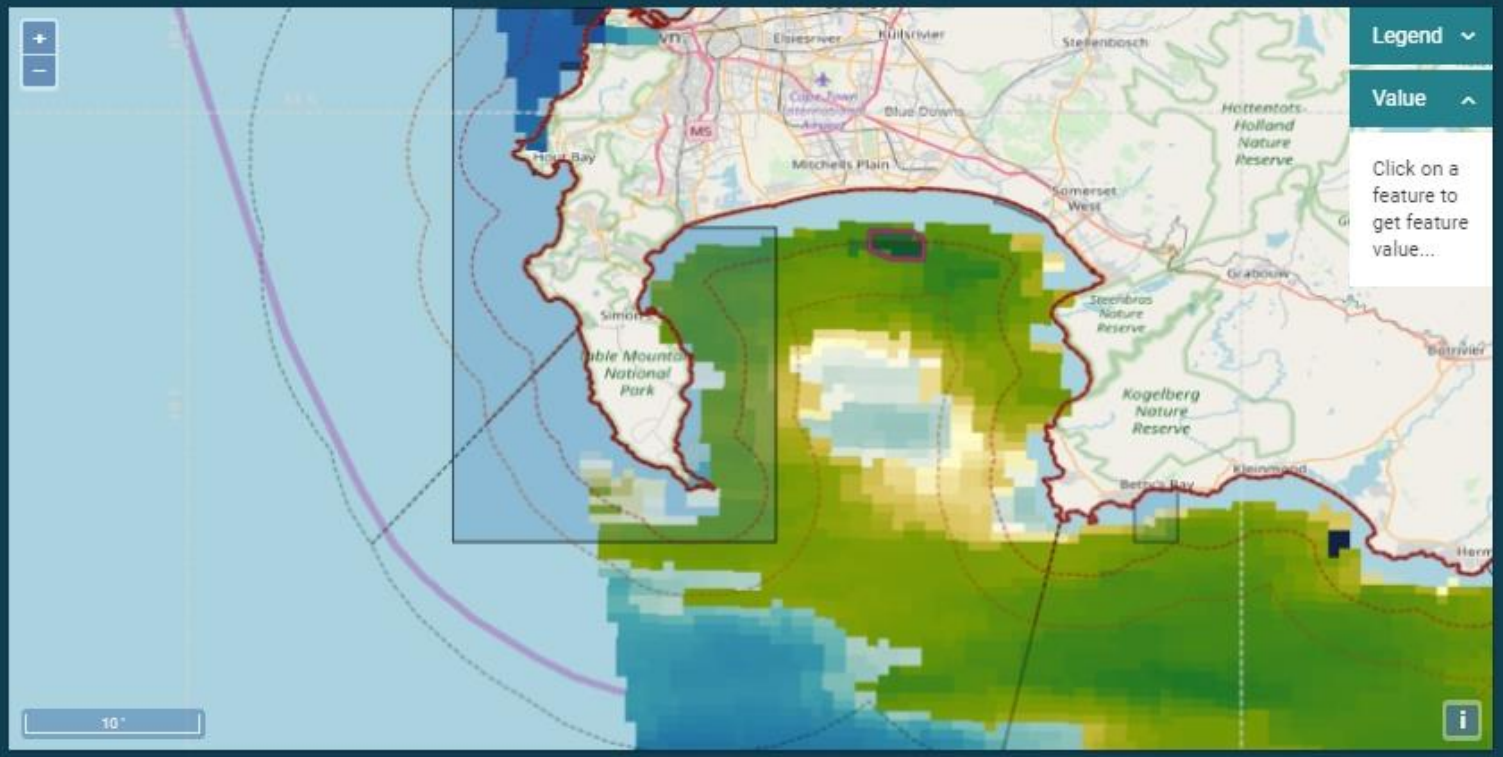
Harmful Algal Bloom Decision Support Tool



HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-23

SEEK TO SPECIFIC DATE: -1 DAY +1 DAY

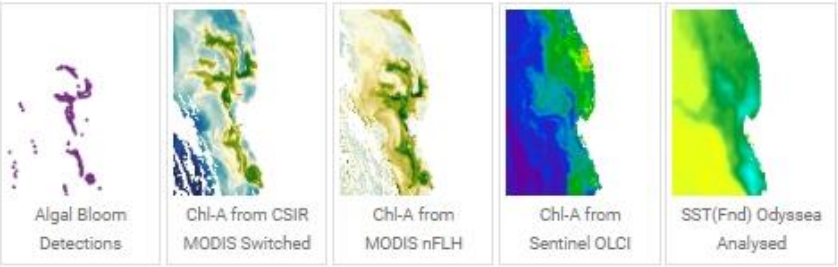
PICK DATE: 2018-11-23

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-11-23	2018-11-22	2018-11-21	2018-11-20	2018-11-19	2018-11-18	2018-11-17
Namaqua Shelf	Stable	High	Stable	Stable	Stable	No Data	High
Greater St Helena Bay	High	High	Stable	Stable	Stable	No Data	Stable
SW Cape	Stable	High	Stable	Stable	Stable	No Data	Stable
False Bay	High	High	High	Stable	High	No Data	High
Overberg	Stable	Stable	Stable	Stable	High	No Data	Stable
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	Stable	Stable	Stable	No Data	High	High	High
Algoa Bay	High	No Data	Stable	Stable	High	High	Stable
Wild Coast	High	Stable	Stable	Stable	Stable	Stable	No Data
KZN South Coast	Stable	Stable	Stable	High	No Data	Stable	No Data
KZN North Coast	Stable	Stable	Stable	Stable	No Data	Stable	No Data
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

Now viewing:
Blooms from Chl-A analysis



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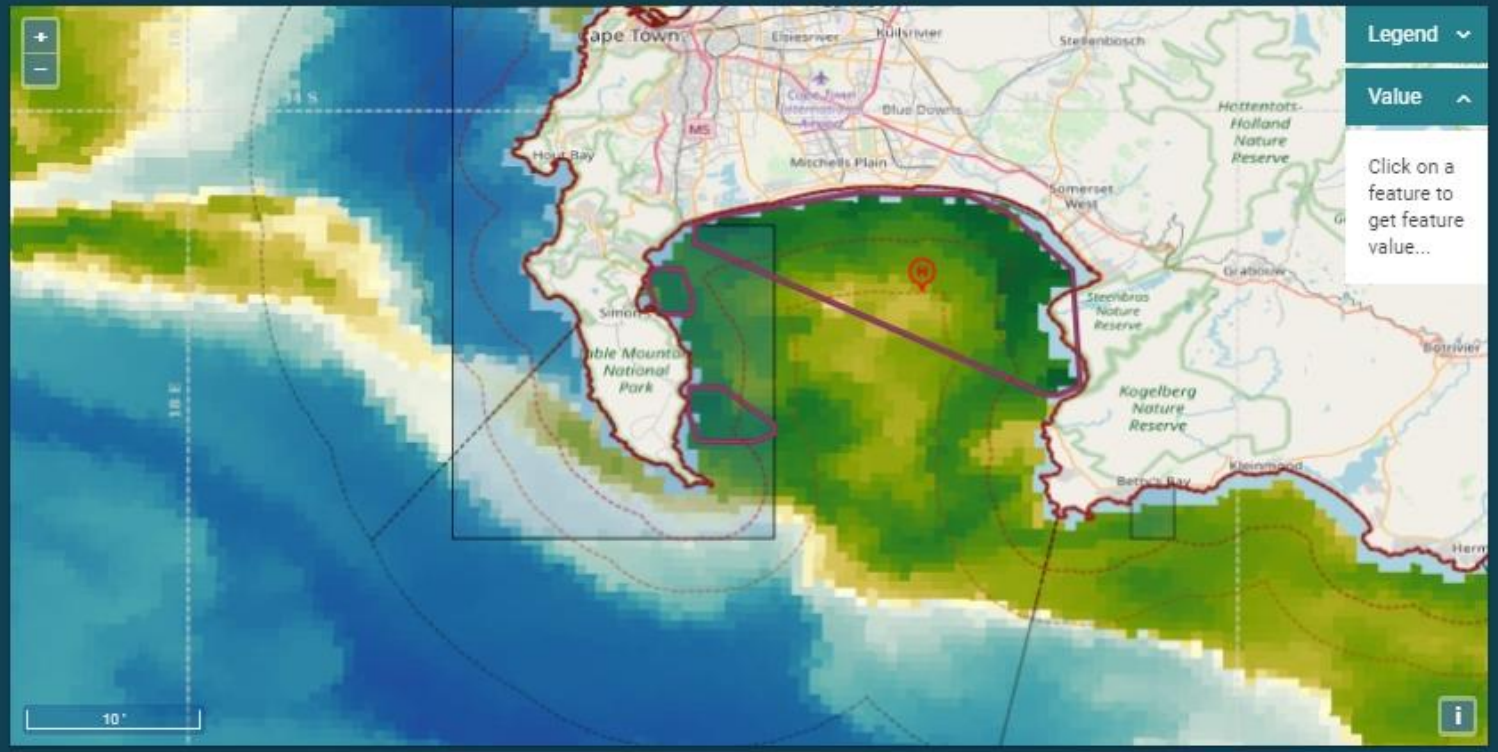
Harmful Algal Bloom Decision Support Tool



Harmful Algal Bloom Risk

High Bloom Activity · Stable / Unknown · No Data

Area	2018-11-24	2018-11-23	2018-11-22	2018-11-21	2018-11-20	2018-11-19	2018-11-18
Namaqua Shelf	High	Stable	High	Stable	Stable	Stable	No Data
Greater St Helena Bay	High	High	High	Stable	Stable	Stable	No Data
SW Cape	High	Stable	High	Stable	Stable	Stable	No Data
False Bay	High	High	High	High	Stable	High	No Data
Overberg	Stable	Stable	Stable	Stable	Stable	High	No Data
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	Stable	Stable	Stable	Stable	No Data	High	High
Algoa Bay	Stable	High	No Data	Stable	Stable	High	High
Wild Coast	No Data	High	Stable	Stable	Stable	Stable	Stable
KZN South Coast	Stable	Stable	Stable	Stable	High	No Data	Stable
KZN North Coast	Stable	Stable	Stable	Stable	Stable	No Data	Stable
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-24

SEEK TO SPECIFIC DATE: -1 DAY | +1 DAY

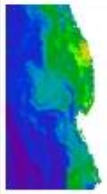
PICK DATE: 2018-11-24

Now viewing:
Blooms from Chl-A analysis


Algal Bloom Detections


Chl-A from CSIR MODIS Switched


Chl-A from MODIS nFLH


Chl-A from Sentinel OLCI


SST(Fnd) Odyssea Analysed

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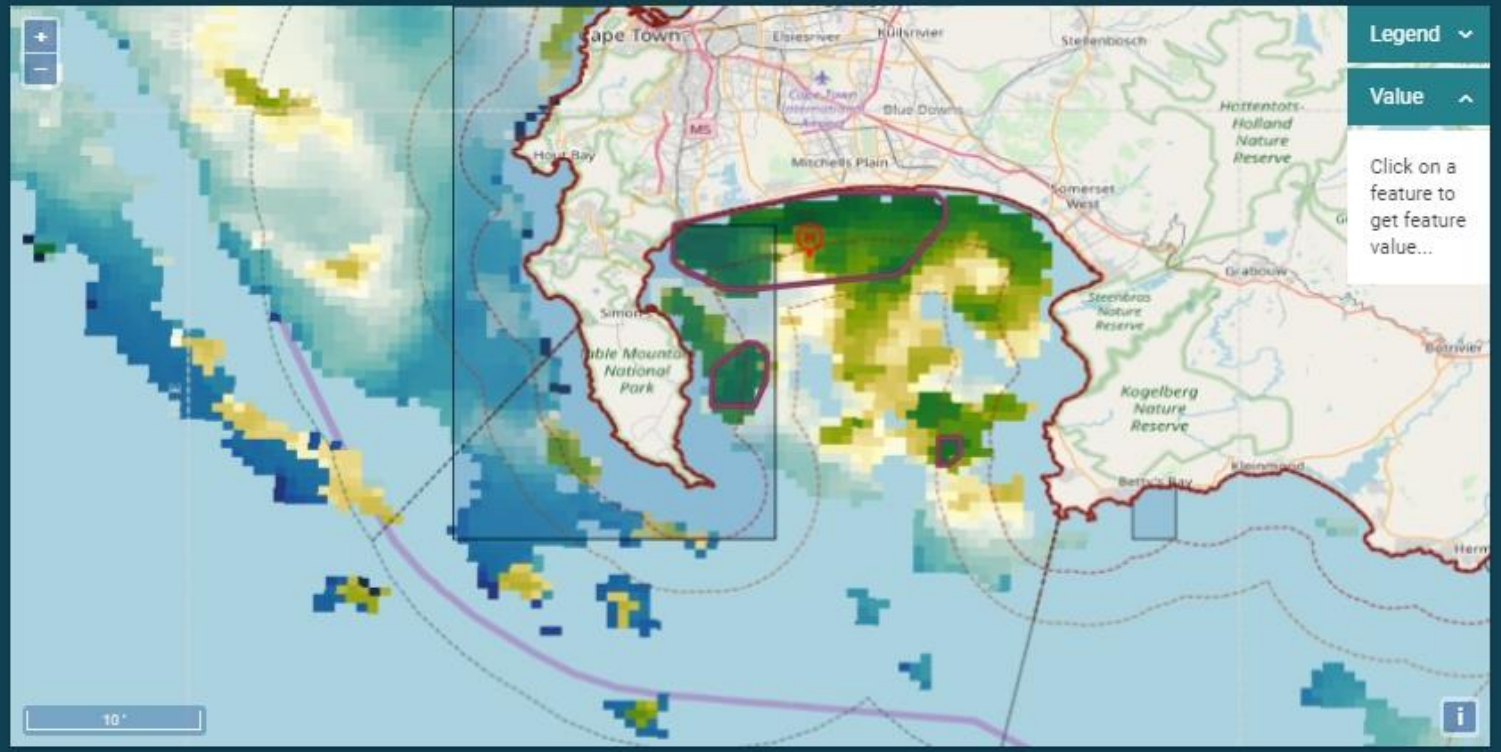
Harmful Algal Bloom Decision Support Tool



HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-11-26

SEEK TO SPECIFIC DATE: -1 DAY | +1 DAY

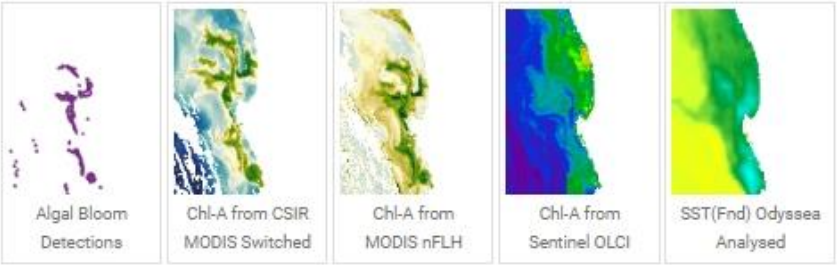
PICK DATE: 2018-11-26

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-11-26	2018-11-25	2018-11-24	2018-11-23	2018-11-22	2018-11-21	2018-11-20
Namaqua Shelf	High	No Data	High	Stable	High	Stable	Stable
Greater St Helena Bay	High	No Data	High	High	High	Stable	Stable
SW Cape	High	No Data	High	Stable	High	Stable	Stable
False Bay	High	No Data	High	High	High	High	Stable
Overberg	Stable	No Data	Stable	Stable	Stable	Stable	Stable
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	Stable	Stable	Stable	Stable	Stable	Stable	No Data
Algoa Bay	Stable	Stable	Stable	High	No Data	Stable	Stable
Wild Coast	Stable	Stable	No Data	High	Stable	Stable	Stable
KZN South Coast	No Data	Stable	Stable	Stable	Stable	Stable	High
KZN North Coast	No Data	Stable	Stable	Stable	Stable	Stable	Stable
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

Now viewing:
Chl-A from CSIR MODIS Switched



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Harmful Algal Bloom Decision Support Tool

HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-12-01

SEEK TO SPECIFIC DATE: -1 DAY +1 DAY

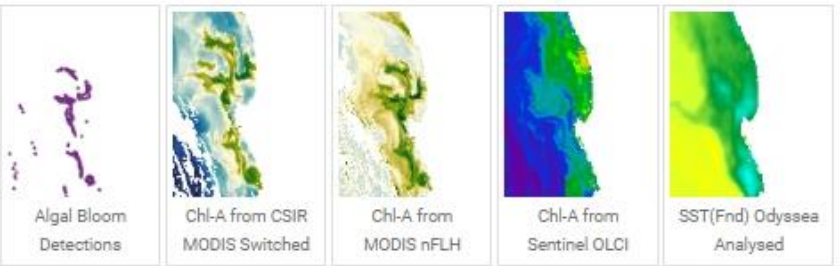
PICK DATE: 2018-12-01

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-12-01	2018-11-30	2018-11-29	2018-11-28	2018-11-27	2018-11-26	2018-11-25
Namaqua Shelf	Stable	Stable	Stable	Stable	Stable	High	No Data
Greater St Helena Bay	High	Stable	Stable	Stable	Stable	High	No Data
SW Cape	High	Stable	Stable	Stable	Stable	High	No Data
False Bay	Stable	No Data	No Data	Stable	Stable	High	No Data
Overberg	High	High	Stable	Stable	Stable	Stable	No Data
Langeberg	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Garden Route	Stable	High	Stable	High	Stable	Stable	Stable
Algoa Bay	No Data	Stable	Stable	Stable	Stable	Stable	Stable
Wild Coast	No Data	No Data	High	Stable	Stable	Stable	Stable
KZN South Coast	Stable	Stable	Stable	Stable	Stable	No Data	Stable
KZN North Coast	Stable	Stable	Stable	No Data	Stable	No Data	Stable
Elephant Coast	No Data	No Data	No Data	No Data	No Data	No Data	No Data

Now viewing:
Chl-A from CSIR MODIS Switched



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Harmful Algal Bloom Decision Support Tool

HIGH RISK AREAS: ST HELENA BAY | SW CAPE | GARDEN ROUTE | ALGOA BAY

DATE ON VIEW: 2018-12-03

SEEK TO SPECIFIC DATE: -1 DAY | +1 DAY

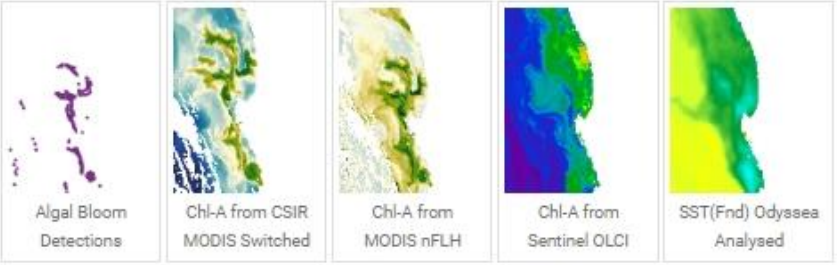
PICK DATE: 2018-12-03

Harmful Algal Bloom Risk

High Bloom Activity | Stable / Unknown | No Data

Area	2018-12-03	2018-12-02	2018-12-01	2018-11-30	2018-11-29	2018-11-28	2018-11-27
Namaqua Shelf	●	●	●	●	●	●	●
Greater St Helena Bay	●	●	●	●	●	●	●
SW Cape	●	●	●	●	●	●	●
False Bay	●	●	●	●	●	●	●
Overberg	●	●	●	●	●	●	●
Langeberg	●	●	●	●	●	●	●
Garden Route	●	●	●	●	●	●	●
Algoa Bay	●	●	●	●	●	●	●
Wild Coast	●	●	●	●	●	●	●
KZN South Coast	●	●	●	●	●	●	●
KZN North Coast	●	●	●	●	●	●	●
Elephant Coast	●	●	●	●	●	●	●

Now viewing:
Chl-A from CSIR MODIS Switched



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science & technology
Department: Science and Technology
REPUBLIC OF SOUTH AFRICA

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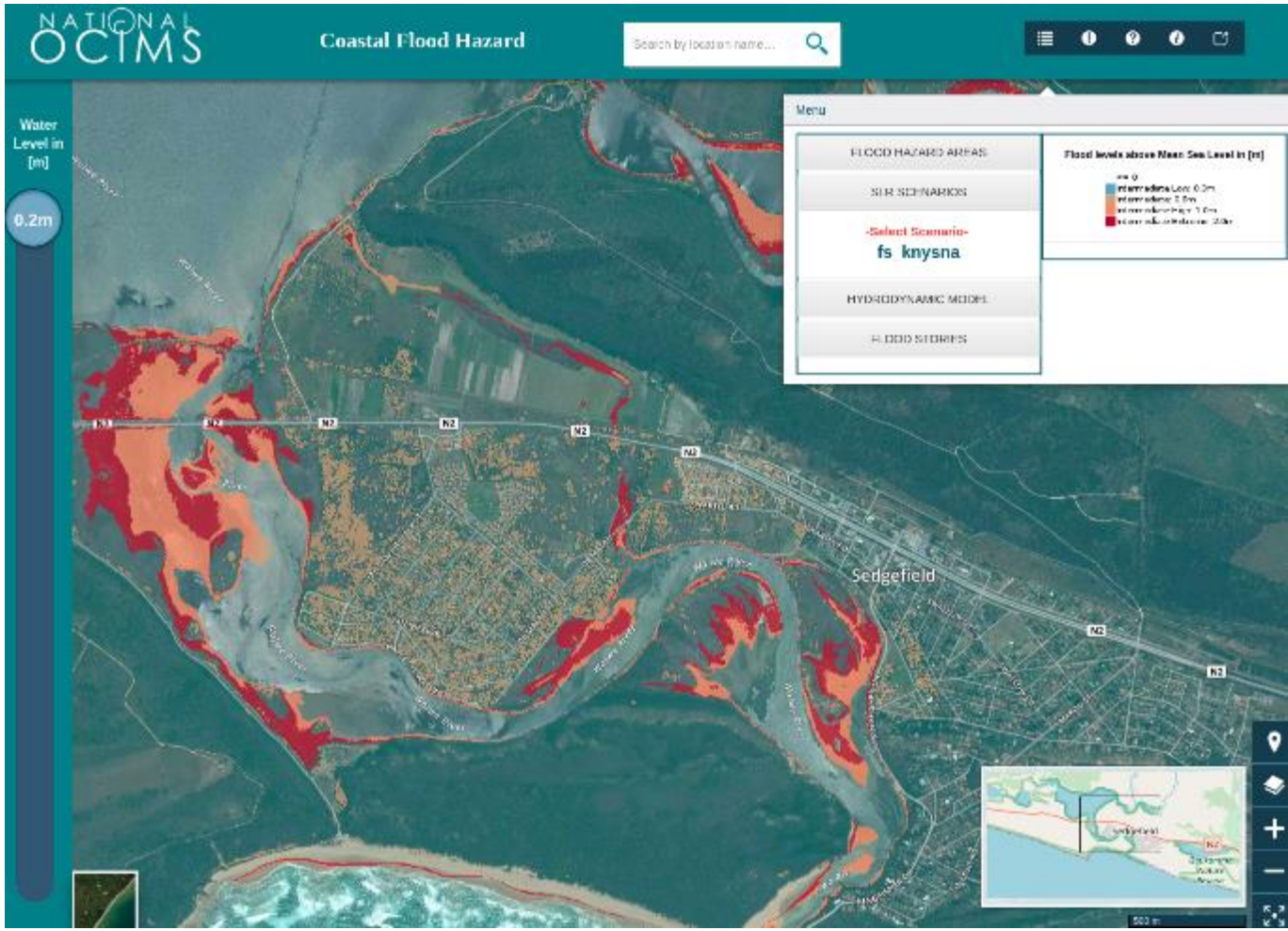
Highlights: Coastal Flood Hazard Tool

- Planning tool using international best practice
  - Dynamic – select your own flooding levels
  - “Drown your town”
  - Inclusion of hydrodynamic modelling
  - Geotagging media files of historical events
- Stakeholders:
  - Coastal Municipalities
  - Coastal Provinces
  - Town planners
  - Disaster managers
  - Environmental practitioners
  - Developers
  - Etc…

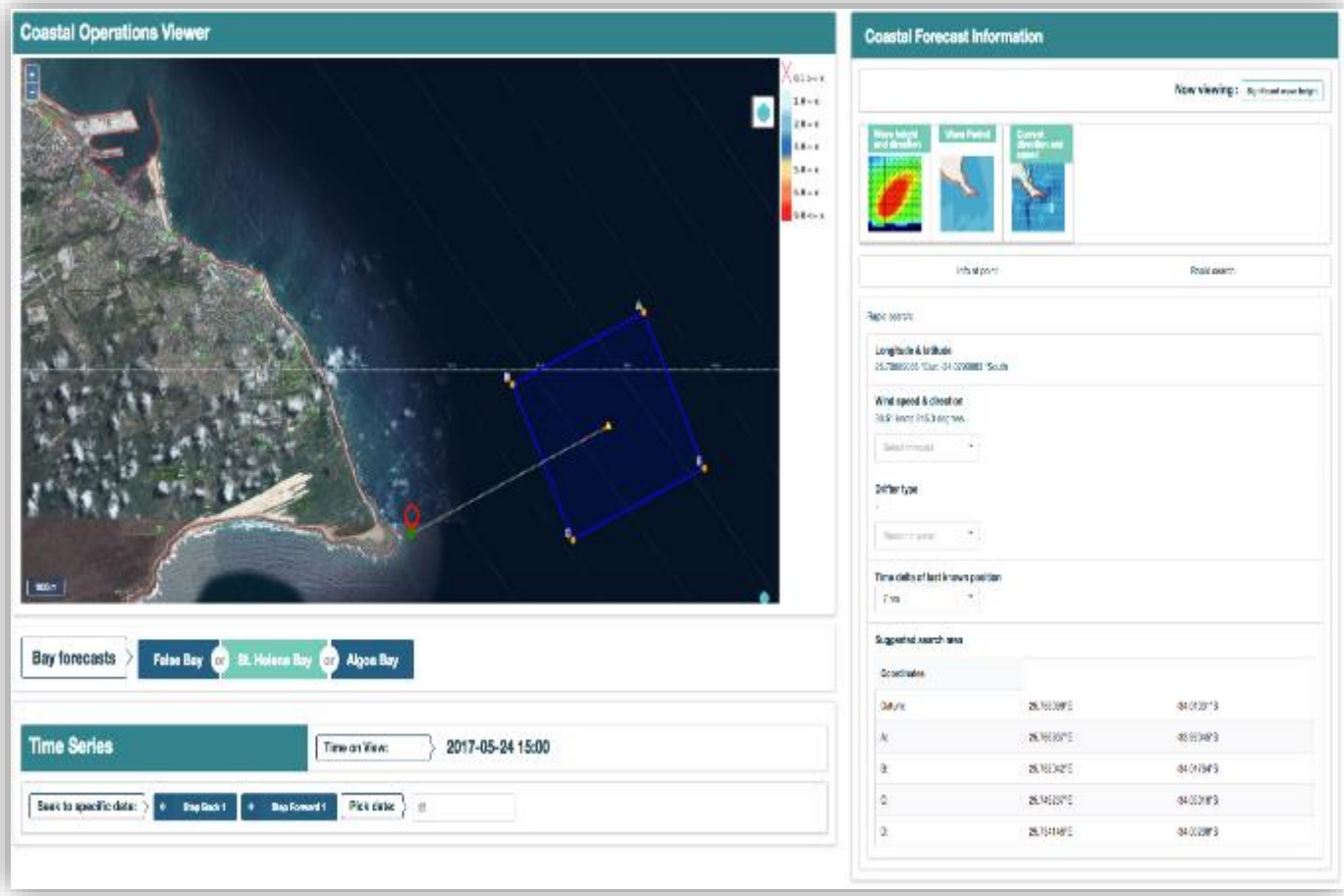
Highlights: Coastal Flood Hazard Tool

- FEWS (Flood Early Warning System) training:
  - Facilitated by eThekwini Municipality;
  - Limited experience and skills on near shore model development;
  - First step towards the creation of a shared knowledge base;
  - Implementation of oceanographic models in an operational environment for daily use.
- Other work:
  - SAWS operational storm surge modelling



Highlights: Planning Operations at Sea

- Technical Advisory Group formally established
- Tool had its first field test on 5th August with NSRI:
  - Researchers and developers got to experience first hand all the planning that goes into these operations
  - End user guiding the development
- Lessons learnt:
  - Real world vs. models
- Collaboration with SAWS



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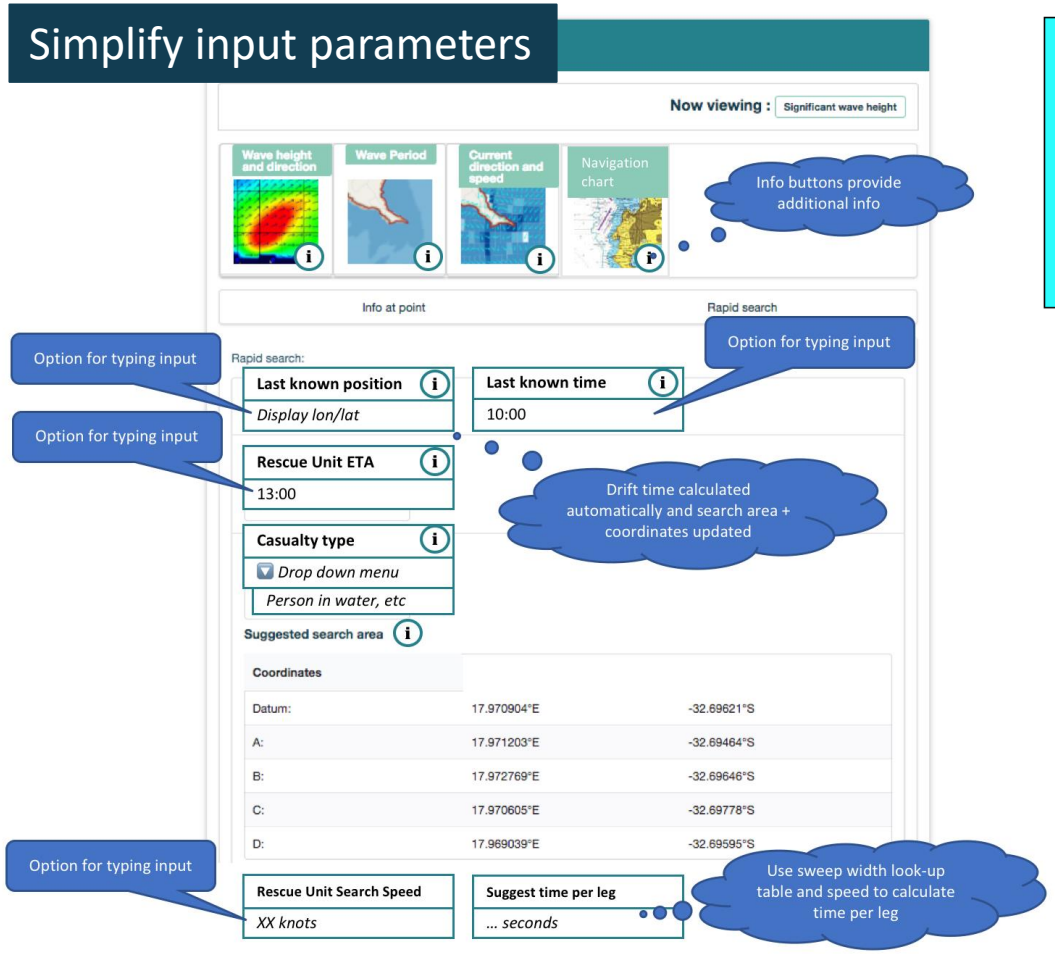
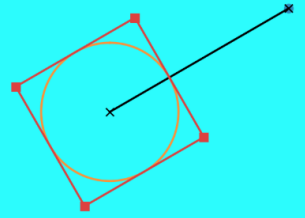
Highlights: Planning Operations at Sea

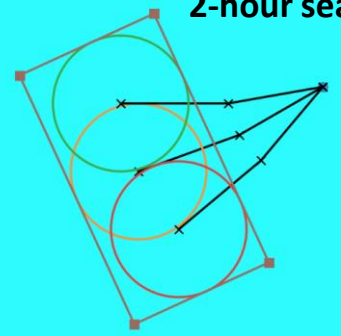
Simplify input parameters



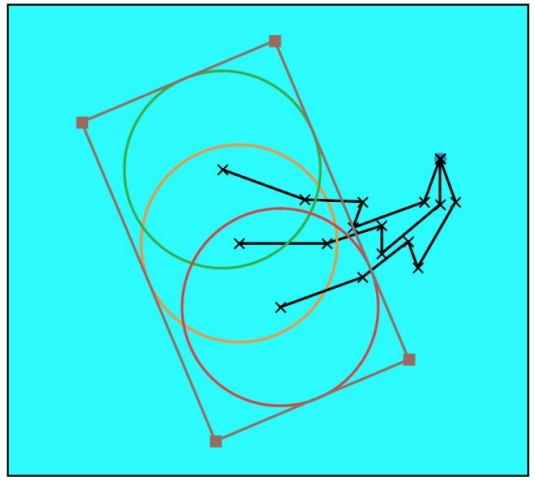
1-hour search area



2-hour search area



Multi-hour search area



Implement more dynamic search area calculation:

- Pull wind forecast at successive point
- Add divergence

Highlights: Water Quality

- Water quality monitoring from various datasets, including:
  - Processing of remote sensed satellite imagery e.g. turbidity using Sentinel 2 imagery
  - Point source monitoring: National Outfalls Monitoring Programme (DEA)
  - Water Quality of Blue Flag Beaches (WESSA)
  - Water quality reporting from tertiary institutions and marine monitors

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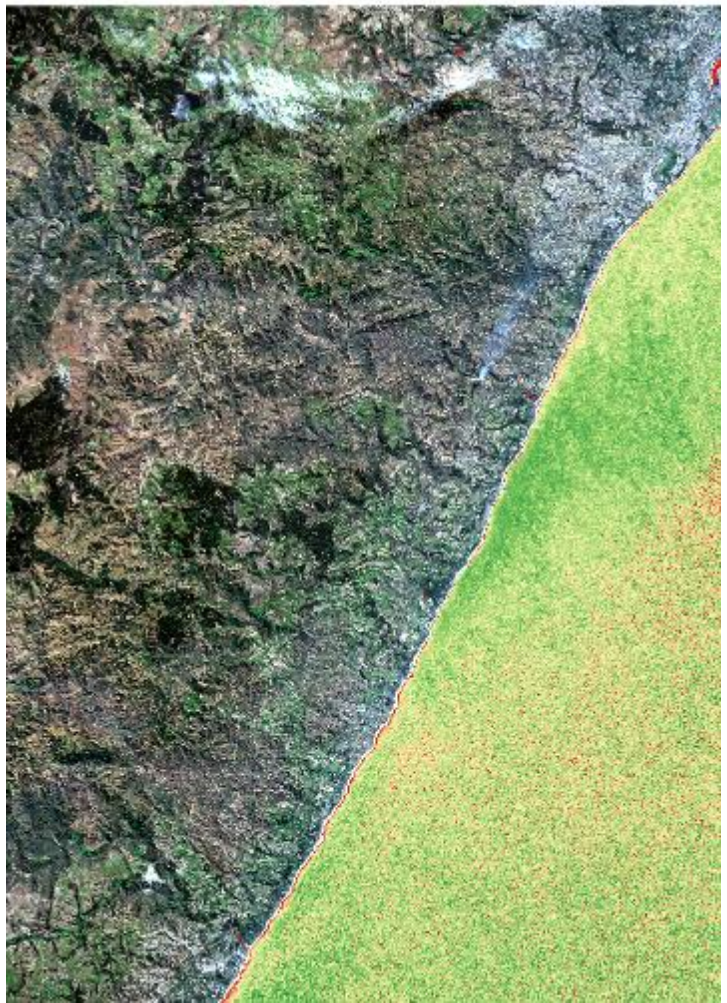
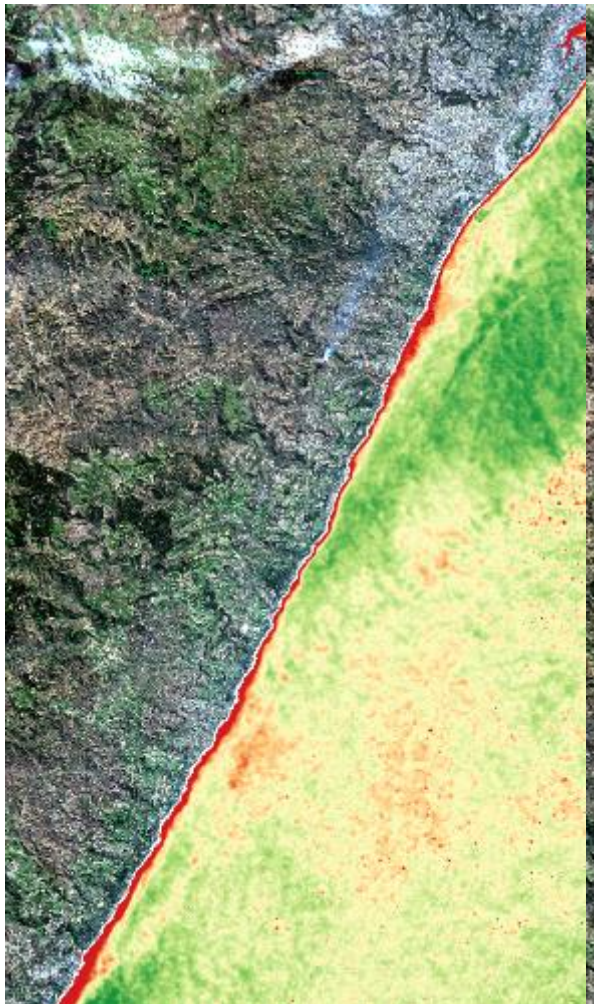
Highlights: Water Quality

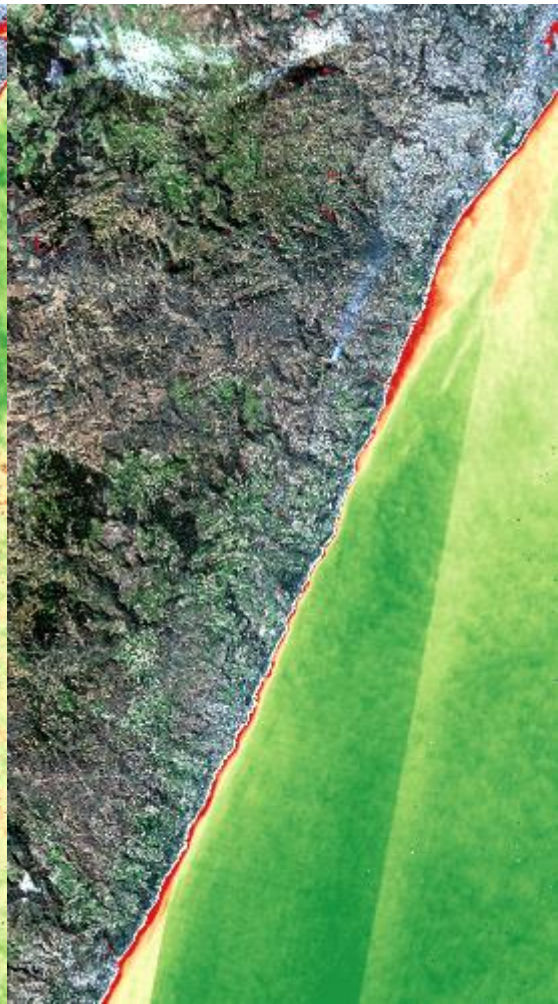
Sentinel-2 tile 36JTM of date 2017-07-03.

Turbidity

Chlorophyll – Same Day







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Water Quality Decision Support Tool

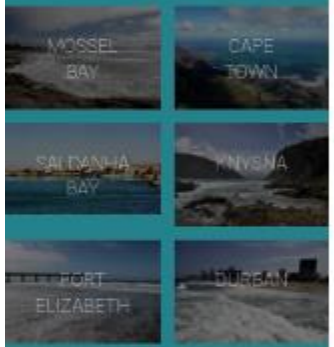
Data

SELECT A LOCATION

SELECT A DATASET

SELECT A RASTER DATASET

Featured Areas



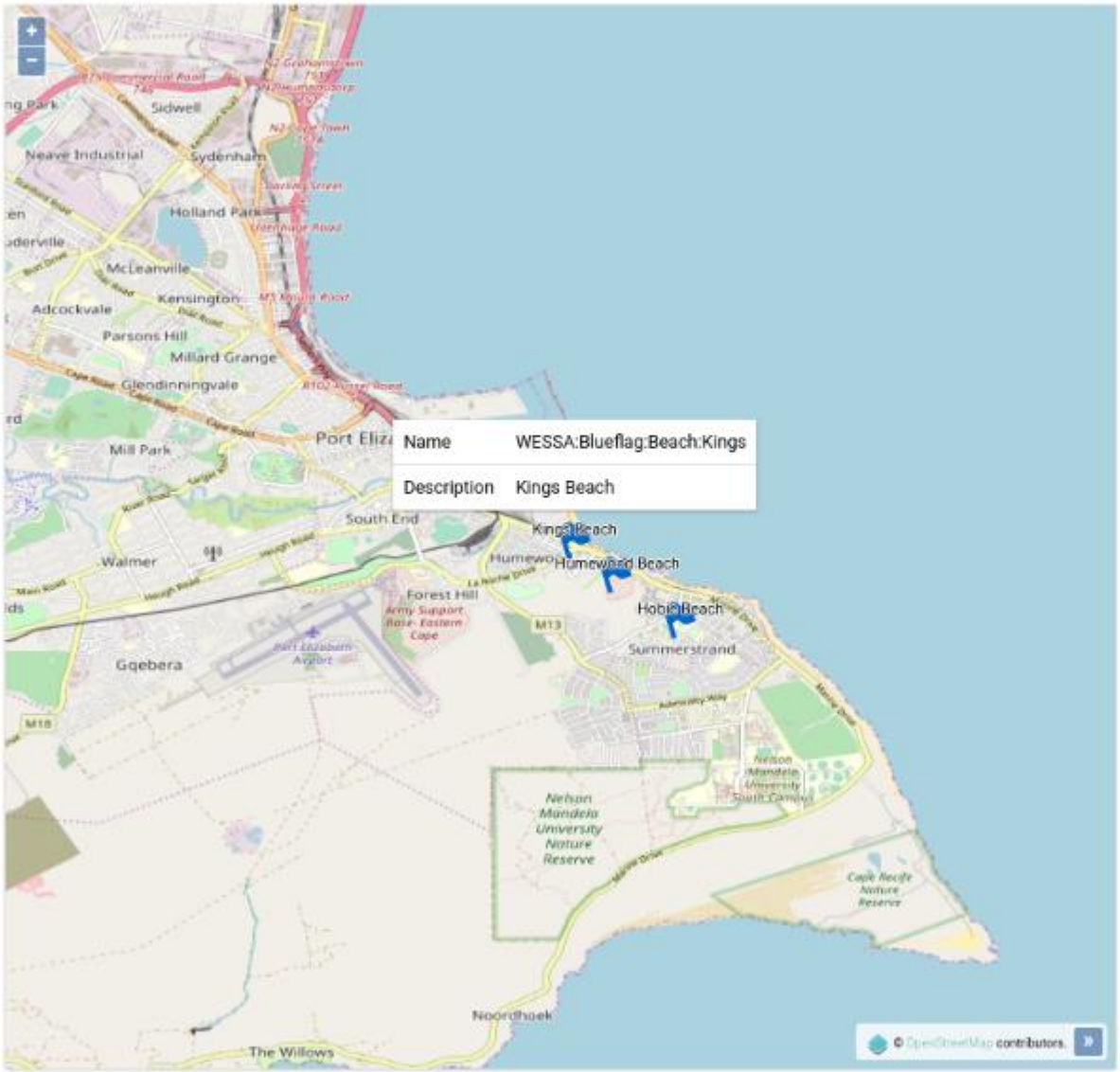
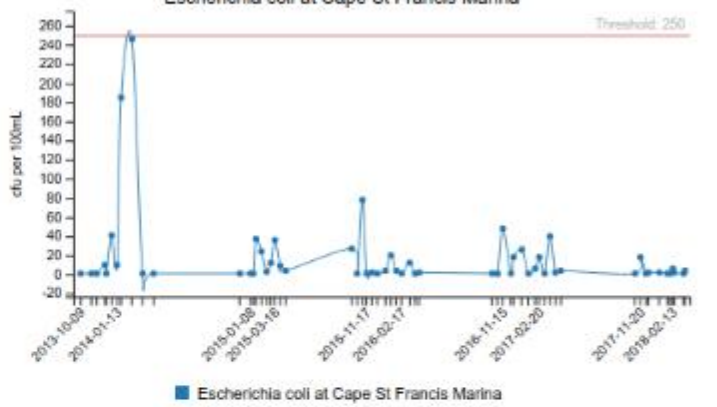


TABLE | CHART



Unit of Measurement

Observed Property

Dataset Name: Escherichia coli

Dataset Description: Coliform bacterium of the genus Escherichia that is commonly found in the lower intestine of warm-blooded organisms

Dataset Definition: https://en.wikipedia.org/wiki/Escherichia_coli

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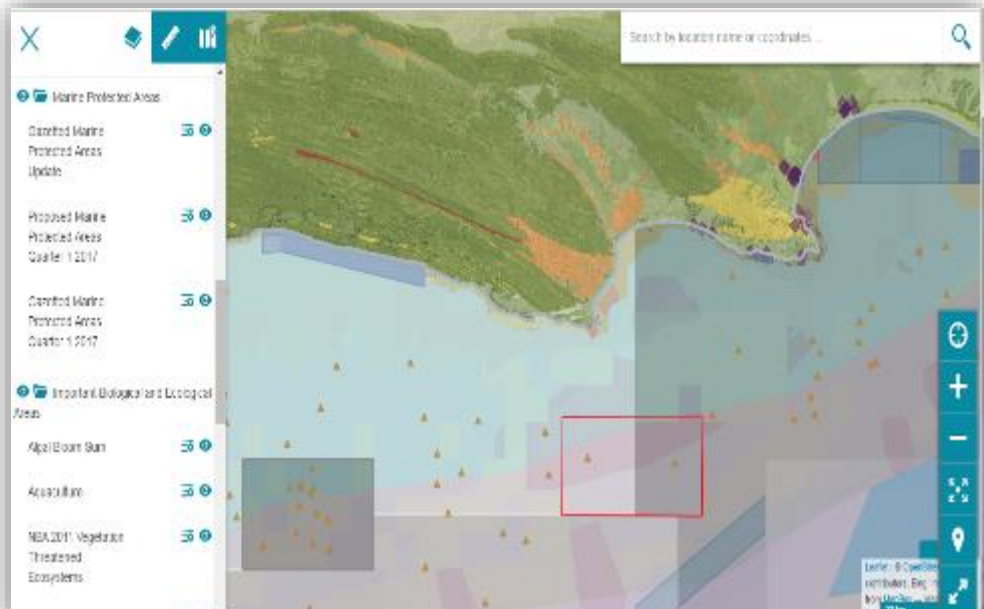
Highlights: Marine Spatial Planning

- Support to Initiative 10: Marine Spatial Planning
- Interactive viewer with tools developed to support the MSP process
- National Working Group Meeting held in September 2018
- Relevant sector datasets are being provided
- MSP DeST front end developed
- Tool was developed to interrogate layers at a certain point
- Pressure mapping tool which incorporates different layer weightings



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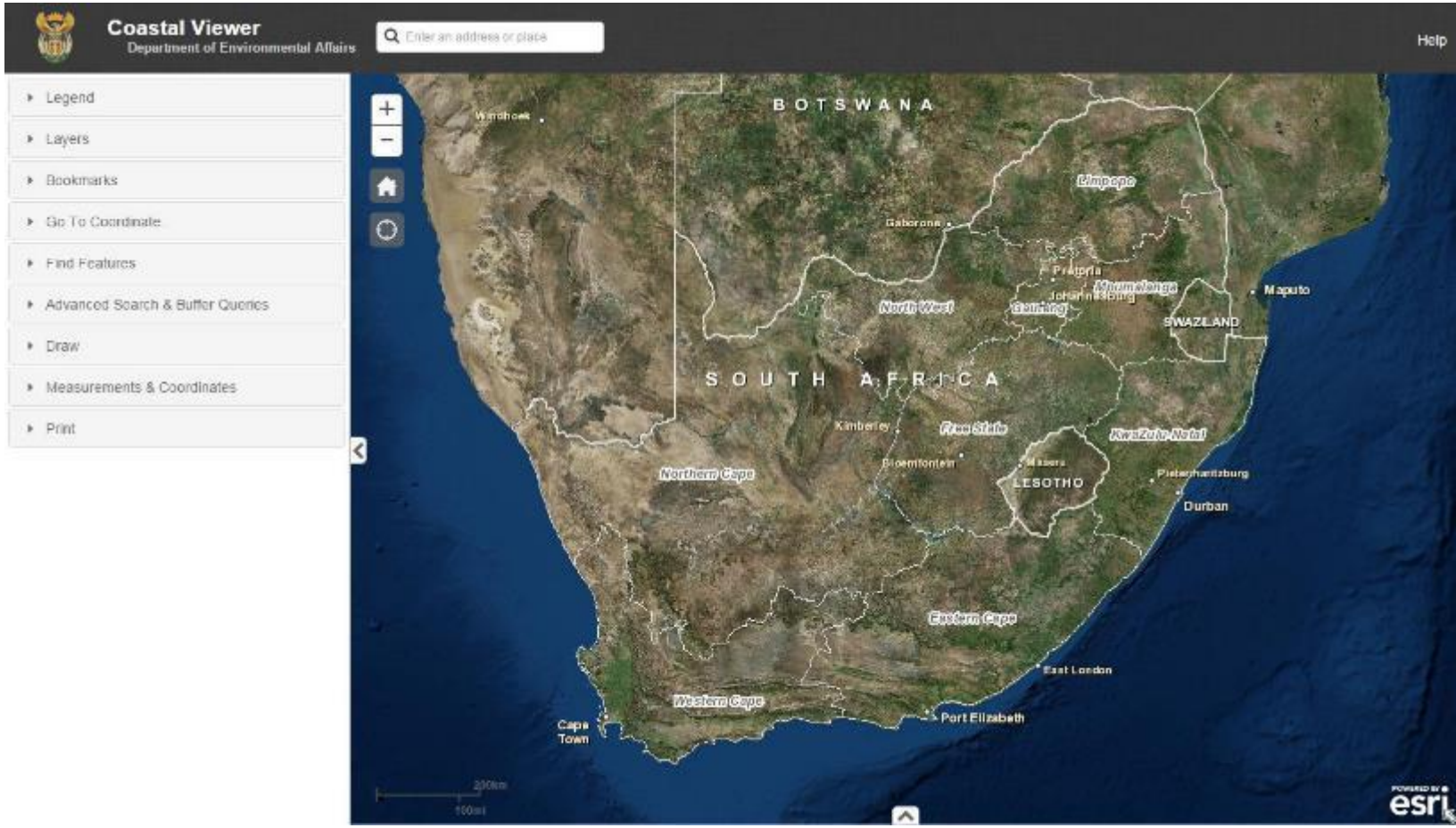
Highlights: Coastal Viewer

- Developed and maintained in-house at DEA
- Makes GIS data available to non-specialists
- Basic functionality, allows for basic spatial analyses e.g. buffering
- User driven system
- Hosting of spatial data



Highlights: Bilge Dumping

- Detection of oil spills and bilge dumping using SAR imagery

Bilge Dump ALERT REPORT

Report by: BD_DeST
Report Date: 2018-09-17

DETECTION	ATTRIBUTES
	Date : 2015/05/16
	Location : -17.3842, 20.6192
	Length : 9.9 km
	Size : 5 km sq.
	Wind : 5.4 m/s
	Alert Level: High
	Confidence Level: High

NOTES

- Bilge dump not verified.
- Possible source identified from SAR.

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Partners

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