

# PRESENTATION BRICS ROUNDTABLE FROM SOUTH AFRICA

# CHALLENGES & OPPORTUNITIES FOR COASTAL COMMUNITIES IN SOUTH AFRICA

## South African Delegation:

Een Patrick Shuping, Deputy Director Disaster Management  
Eastern Cape, and

Richard Edward Haridien, Deputy Director Disaster  
Management, Western Cape

Presentation to BRICS Roundtable on preventing and  
mitigating coastal natural disasters in

St. Petersburg, Russia

25 to 27 August 2016

## List of Focal Areas in presentation:

- Disaster Management Legal & Policy Framework
- Coastal PDMCs Forum
- Coastal Management Lines & protection zones
- Operation Phakisa – harnessing the oceans' economy
- IMS (ICS)
- Flooding Research



## Disaster Management in South Africa:

Before the onset of the new political dispensation in SA (1994), emergency situations were dealt with using various laws and policies, such as the Civil Defence Act of 1977; Civil Protection Act of 1990; Fundraising Act; etc.

Emergency and disaster management initiatives were handled in un-coordinated and in-efficient ways.

The new democratically elected South African government since 1994 instructed numerous task-teams to investigate and review many apartheid-governmental legislation and policies. The whole matter of disaster management, was one of the pieces of legislation that was reviewed.

A new act, viz.: "Disaster Management Act, number 57 of 2002" was developed and promulgated.

## Legal & Policy Framework:

The Constitution of the Republic of South Africa (Act 108 of 1996)

Disaster Management Act, 57 of 2002

National and Provincial Policy Frameworks 2005 and 2010 respectively

Disaster Management Amendment Act, 16 of 2015

## Disaster Management in South Africa:

The Constitution of the Republic of South Africa (Act 108 of 1996) places a legal obligation on the Government of South Africa to ensure the health (personal and environmental) and safety of its citizens.

In terms of Section 41 (1)(b) of the Constitution, all spheres of Government are required to “*secure the well-being of the people of the Republic*”.

Section 152(1)(d) also requires that local government “*ensures a safe and healthy environment*”.

In the light of the above, and the established understanding of disaster management, the primary responsibility for disaster management in South Africa rests with Government.

**Disaster Management Act, 57 of 2002 (as amended) inter alia provides for-**

an integrated and coordinated disaster management policy that focuses on preventing and reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery;

**What is a disaster?**

Disaster means a progressive or sudden, widespread or localized, natural or human-caused occurrence which:

- (a) causes or threatens to cause;
  - (i) death, injury or disease;
  - (ii) damage to property, infrastructure or the environment or
  - (iii) **significant** disruption of the life of a community; and
- (b) is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources.

### **Policy Framework:**

Provides guidelines to implement the Disaster Management Act.

To ensure an integrated and uniform approach to disaster risk management by all organs of state, as well as other key role players in the country.

### **Refers to four Key Performance Areas**

- Institutional Capacity Disaster Management
- Disaster Risk Assessment
- Disaster Risk Reduction
- Disaster Response and Recovery

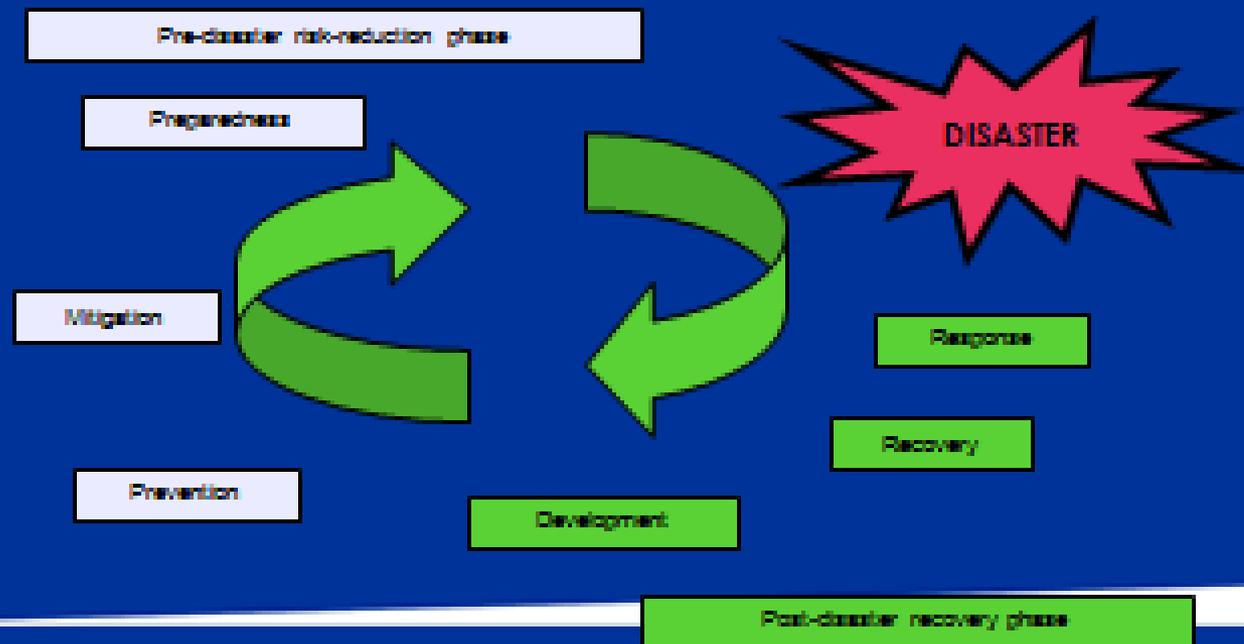
### **Three Enablers**

- Information Management and Information
- Disaster Risk Management Education, Training, Research and Public Awareness
- Funding Arrangements

# Disaster Management in South Africa

Traditional disaster management model – sequence of actions

- Disaster management models



# DISASTER MANAGEMENT RESPONSE

## DISASTER MANAGEMENT IS NOT....

**Re**-active

*A line function*

*First responder*



## DISASTER MANAGEMENT IS ...

**Pro**-active

*Jack of all trades master of some*

*Coordinator*

*Planner*

*Negotiator*



## STANDARDISED RESPONSE

**Role players involved in major incident and disaster response and relief are clustered.**



Mandate:

In terms of section 29(1) and 43(1) of the Disaster Management Act 2002, (no 57 of 2002) it is required that each Province, Metropolitan and each district to establish a disaster management centre.

Purpose of Centre:

Repository of and conduit for information concerning disasters, impending disasters and disaster management in the province.

The venue is ultimately to be utilised for an integrated, coordinated and strategic management for response and recovery.

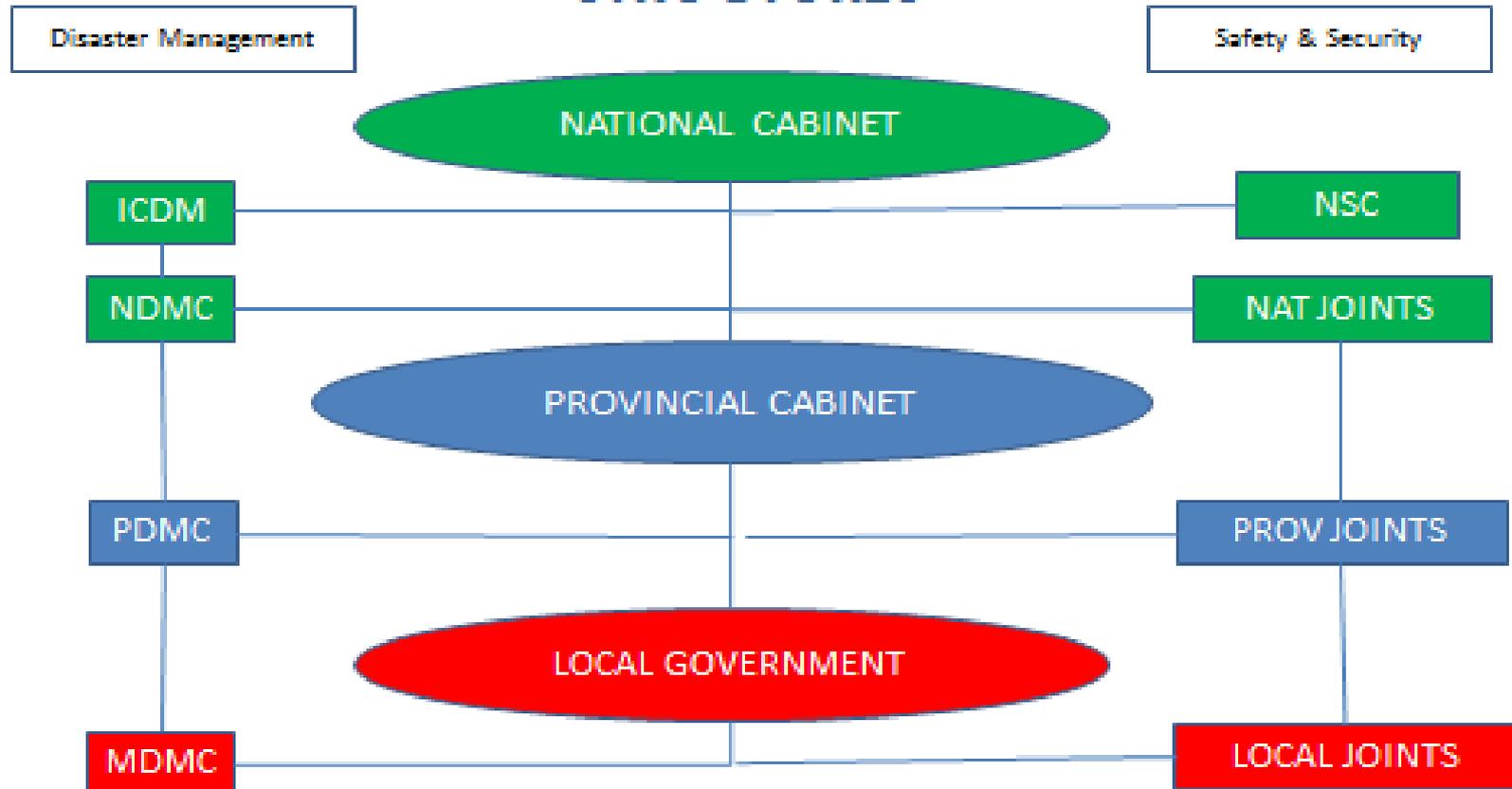
## Provincial Disaster Management Centre



## Video wall



## DISASTER MANAGEMENT COORDINATING STRUCTURES



## COASTAL PDMC's FORUM

### Background:

- Towards the end of 2012 Richard Haridien and Jacqueline Pandaram from the Western Cape Disaster Management Centre discussed the need to establish a closer working relationship with officials from sister coastal Provincial Disaster Management Centres in order to share expertise; experience; knowledge; information on the one hand, but also on the other-hand to provide practical support to each other as the need would arise.
- No previous agreement existed to give effect to the above vision.

## Liaison with sister PDMCs:

- Richard Haridien & Jacqueline Pandaram started to liaise with officials from the sister PDMCs in an effort to share the vision of establishing a closer working agreement amongst ourselves.
- No previous agreement existed to give effect to the above vision.
- The outreach and liaison were warmly accepted by the other coastal PDMCs, especially Dodo Shuping who gave energetic support throughout & became the first secretary.
- We agreed to have our first meeting in the PDMC of Kwa-Zulu Natal (KZN). This historic meeting took place in March 2013.

## Talks about an agreement:

- The first meeting in KZN was well received by all attendees.
- Only three Provinces were in attendance, viz.: Western Cape; Eastern Cape; KZN.
- It was later established that the Northern Cape also needed to be drawn into these discussions.
- The Northern Cape decided to come on-board with the other three PDMCs.

## Collaborative Protocol:

- After numerous engagements between the coastal PDMCs, a draft collaborative protocol was developed and checked for accuracy by various legal experts.
- The final agreement was signed by the Heads of Departments of the Local Government and Traditional Affairs of the departments wherein the PDMCs were situated in May 2014.
- Although the National Disaster Management Centre (NDMC) is not a signatory to the agreement, they never-the-less endorsed this particular Collaborative Protocol, and also remain an active party to the Coastal PDMCs Forum.
- The Forum is growing from strength to strength, so much so that all the in-land PDMCs also requested support from the Forum.



Picture

# Update on Coastal Management Lines & Coastal Vulnerability Study

## Coastal Disaster Management Forum

22 June 2016



Oceans and Coasts



**environmental affairs**

Department  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

## Coastal Management Lines:

In terms of the Integrated Coastal Management Act (No. 24 of 2008), Section 25, an MEC must establish coastal management lines to:

To protect coastal public property, private property and public safety;  
To protect the coastal protection zone;  
To preserve the aesthetic values of the coastal zone; or  
For any other reason consistent with the objectives of this Act.

In 2009 provinces expressed a need for guidance in the delineation of the Coastal Management Lines

Coastal management lines present a distinct overlap between Coastal Management and Disaster Management (coastal erosion, storm surges, sea level rise, risk etc.), identifying the need for collaboration into risk management

Risk needs to take socio-economics into account

## Emphasised Approach

Legal	<ul style="list-style-type: none"><li>• National Legislation, Provincial Legislation, Municipality By-laws</li></ul>
Physical	<ul style="list-style-type: none"><li>• Coastal hazards such as erosion, flooding, storm surge etc.</li></ul>
Environmental	<ul style="list-style-type: none"><li>• Biodiversity and conservation requirements</li></ul>
Heritage	<ul style="list-style-type: none"><li>• Sites and areas of preservation / cultural significance e.g caves, baptism areas, hiking trails</li></ul>
Social	<ul style="list-style-type: none"><li>• Considerations such as development rights, coastal access, existence of rural or cultural dwellings</li></ul>
Economic	<ul style="list-style-type: none"><li>• Activities which are reliant on proximity to the sea e.g. ecotourism</li></ul>



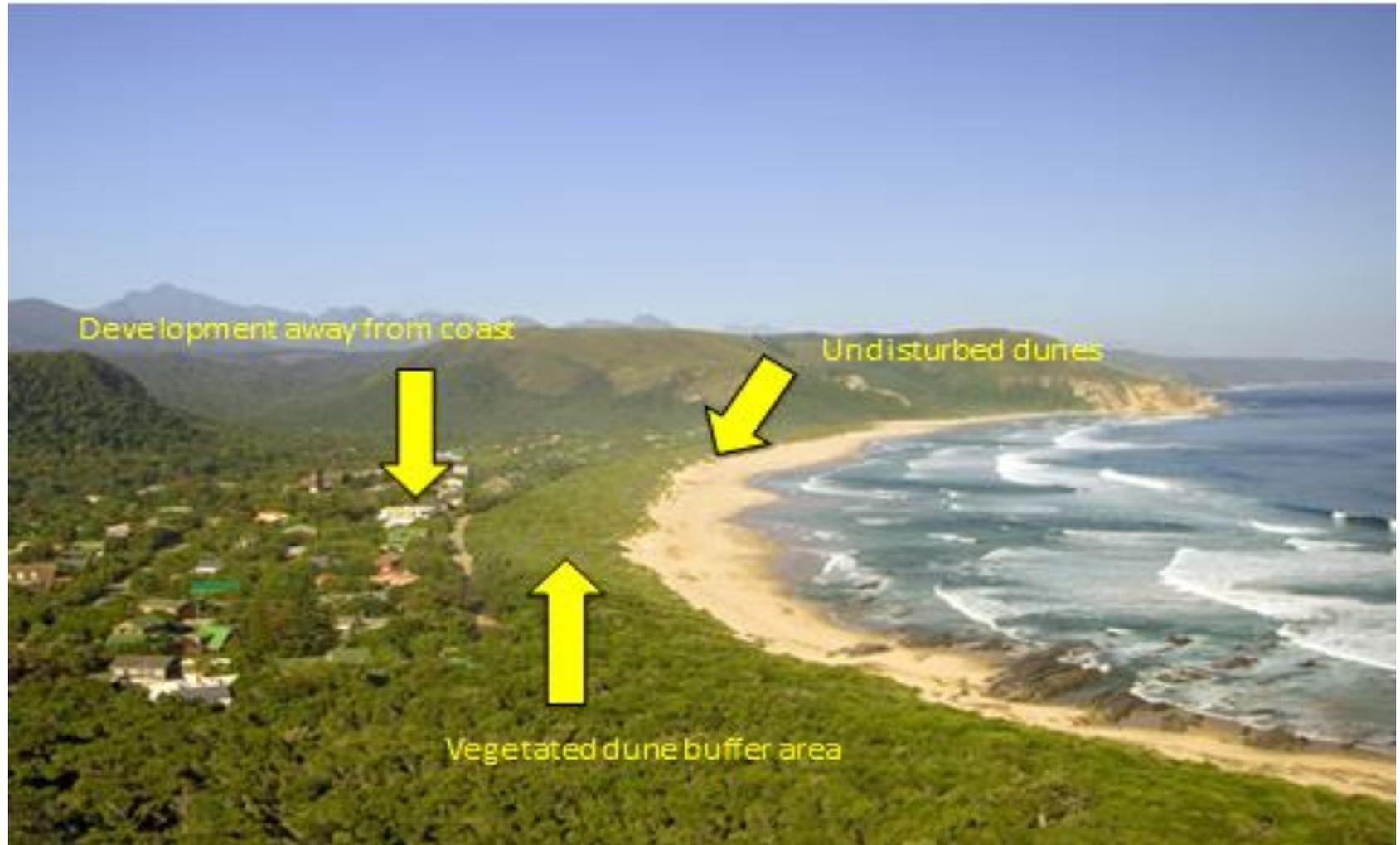
**environmental affairs**

Department  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

## Why?



## Example of Good Planning: Nature's Valley



## Wave run-up models

- Data has been received as numerical models
- Data has been converted to GIS point files (shapefiles)
- Approximately 2000km of SA's coastline (methodology applicable to **sandy shores**) modeled at 500m intervals (yellow areas on map)
- Selected sites modelled at 100m includes False Bay, Algoa Bay, Richards Bay, Saldanha Bay, Port Nolloth



# Wave run-up models (500m resolution)

- The data comprises of 6 scenarios:

	Run-up height	Spring tide level	Residual	Sea-level rise
Scenario 1	1-in-10 year	Spring tide level	1-in-10 year	0.35m (2050 low scenario)
Scenario 2	1-in-30 year	Spring tide level	1-in-10 year	0.35m (2050 low scenario)
Scenario 3	1-in-50 year	Spring tide level	1-in-10 year	0.35m (2050 low scenario)
Scenario 4	1-in-10 year	Spring tide level	1-in-10 year	1m (2100 scenario)
Scenario 5	1-in-30 year	Spring tide level	1-in-10 year	1m (2100 scenario)
Scenario 6	1-in-50 year	Spring tide level	1-in-10 year	1m (2100 scenario)

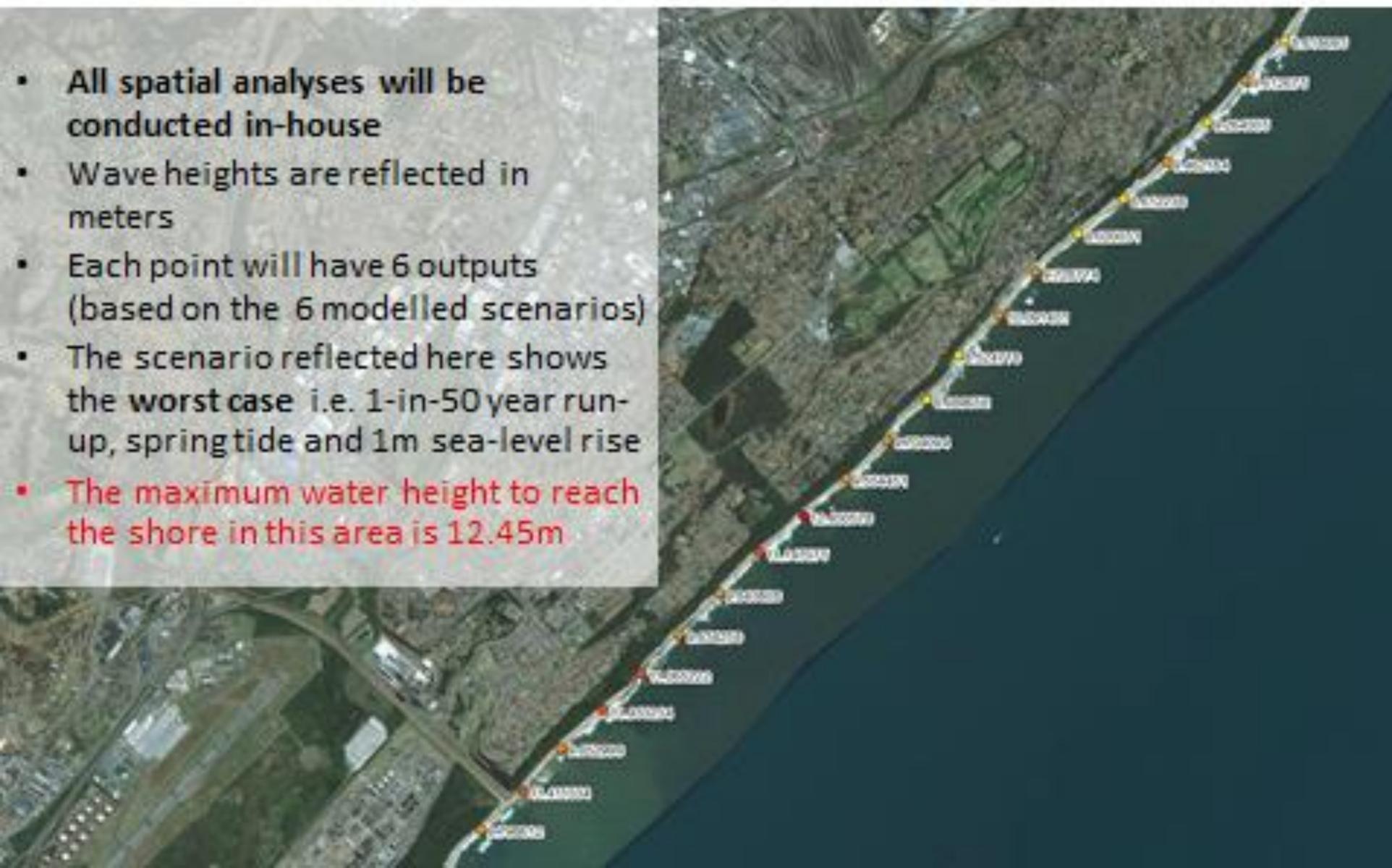


**environmental affairs**

Department:  
Environmental Affairs  
**REPUBLIC OF SOUTH AFRICA**

## Example of the Coastal Vulnerability results shown spatially

- All spatial analyses will be conducted in-house
- Wave heights are reflected in meters
- Each point will have 6 outputs (based on the 6 modelled scenarios)
- The scenario reflected here shows the **worst case** i.e. 1-in-50 year run-up, spring tide and 1m sea-level rise
- The maximum water height to reach the shore in this area is 12.45m



- National Coastal Assessment (Service providers being appointed)
  - Hazards, vulnerability and risk are key components
  - Phased approach
- Infrastructure vulnerability (investigation into methods)
- GIS inundation modelling
  - Methodology being investigated
  - Coarse scale (using existing data)
  - Fine scale (investigation into improved methods)

## Long Term Focus:

### **Adaptation:**

- Managed retreat
- Coastal defense (hard and soft engineering approach)

### **Awareness:**

- Coastal Management Lines to be included in spatial planning tools (SDFs, Land Use Planning Schemes) – extend to reflect in DRA
- Insurance industry & financial institutions recognizing lines – potential implication for property in 'high risk' zones

## Operation Phakisa:

**The oil & gas market was expected to generate total revenue of \$23.9bn in 2014 (market Line, 2014)**

Unfortunately the process involved with the offshore exploration and production of oil & gas in SA takes a long time. In order to speed up the process, the government has identified the offshore oil & gas industry as a sector requiring support under “Operation Phakisa”.

This initiative is critical as the country seeks to invest in the exploration of 30 wells in the next 10 years.

Government also realizes the risks in such exploration, and mandated Operation Phakisa to investigate such.



REPUBLIC OF SOUTH AFRICA



# Offshore Oil and Gas Exploration Initiative B1

Working Group Progress and Update

- Phakisa means “hurry up” in Sesotho
- Ocean Economy Lab ran for 8 weeks in July and August of 2014
- **Focus Areas:**
  - Marine Transport
  - Offshore Oil and Gas
  - Aquaculture
  - Ocean Governance
  - Small Harbours
  - Tourism

# The lab aspires to determine the extent of South African offshore oil and gas reserves through exploration

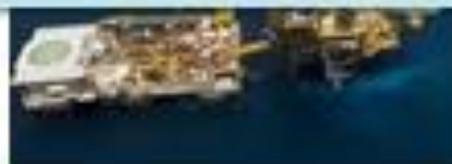
## OIL AND GAS LAB VISION

*South Africa should ...*

... create an environment that *promotes exploration* ...

... in order to *drill 30 exploration wells* in the next 10 years ...

... while simultaneously *maximising the benefits for South Africa*



- Was established 21 November 2014
- Tasked with implementing and delivering on the Initiative B1 3-foot plan
- Chaired by Department of Environmental Affairs
- Members consist of representatives from:
  - Department of Transport
  - South African Maritime Safety Authority
  - National Disaster Management
  - Department of Environmental Affairs
  - Department of Minerals
  - Petroleum Agency of South Africa
  - Strategic Fuel Fund
  - SANCCOB
  - Transnet National Ports Authority
  - Department of Agriculture, Forestry and Fisheries
  - Oil industry representatives – South African Oil and Gas Alliance
    - OPASA
    - SAPIA

## 3-Foot Plan

	Milestones	
1	Formalise IOC Participation	√
2	Gap Analysis of Existing Capacity, Stakeholders and Entities	√
3	Setting Oil Spill Response Team Purpose & Scope	√
4	Ensure institutionalisation, operationability and evolution of IMO through implementation of IMS Action Plan	
5	Pre-Emergency Planning	√
6	Emergency Response	√
7	Emergency Response Training & Drills	

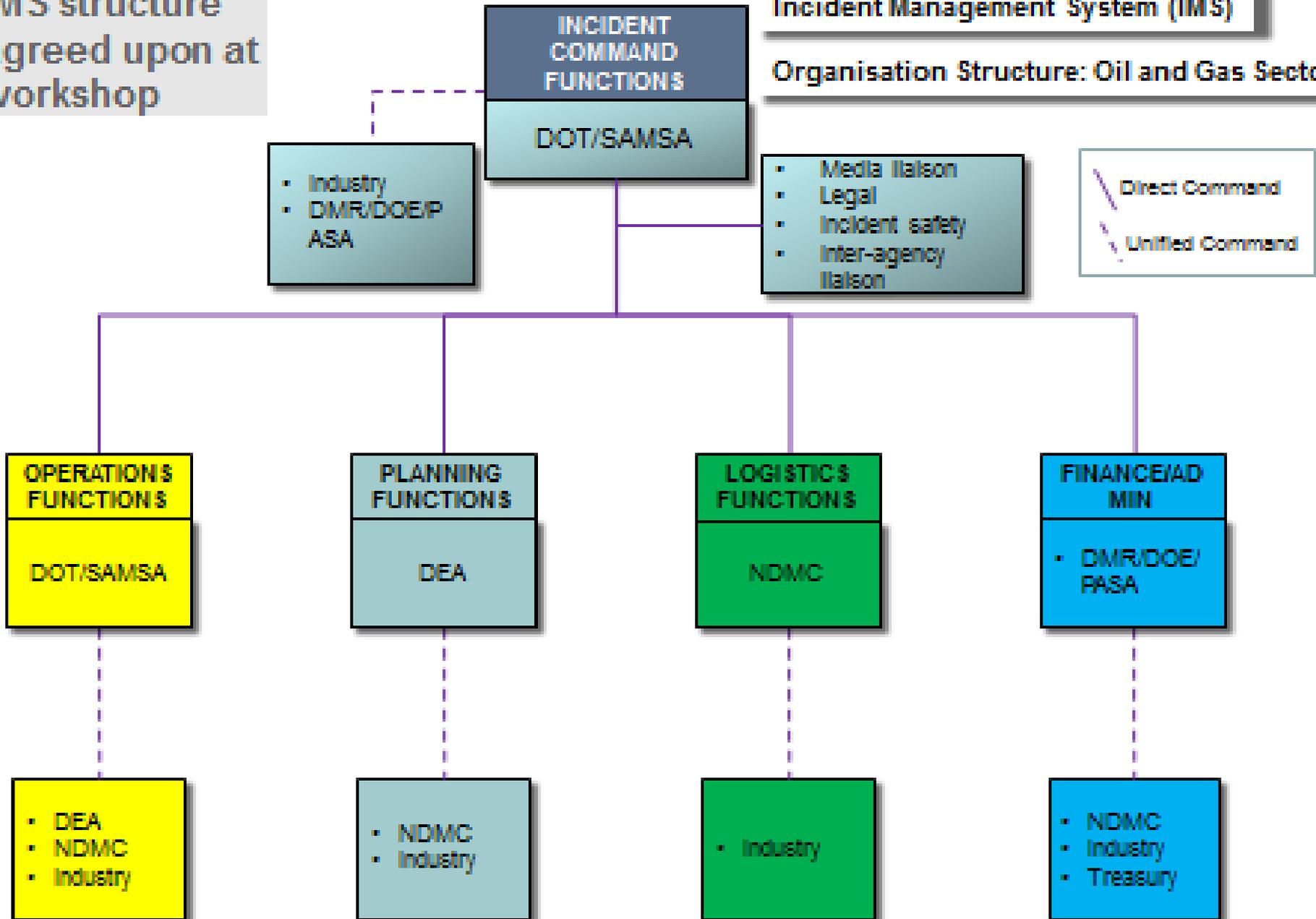
# National Workshop on Incident Management Systems (IMS)

- As part of delivery of Task 3 Setting Oil Spill Response Team Purpose & Scope, an Incident Management Organisation has to be established
- A National Workshop on IMS was held on 9-11 June 2015
- Stakeholders from Government, Industry and NGOs were invited and present
- It was jointly hosted by Global Initiative for West, Central and Southern Africa (GI WACAF ) and the Department of Environmental Affairs
- The workshop aims were to:
  - Identify an Incident Management Command structure for offshore oil spill response in South Africa;
  - Initiate and identify roles and responsibilities for different organisations that have a responsibility for responding to offshore oil and gas incidents;
  - Initiate and identify actions that need to be prepared for formalisation of the incident management organisation
- An Incident Management Task Team was established in order to implement the proposed actions from the workshop

IMS structure agreed upon at workshop

Incident Management System (IMS)

Organisation Structure: Oil and Gas Sector



## Unified Command IMO:

A Unified Command was adopted for the South African IMS model.

The need for a Unified Command is brought about when an incident impacts the boundaries of authority, or functional responsibility of more than one agency, or organisation.

The Unified Command is a structure that brings together the “Incident Commanders” of all major organisations that have authority and responsibility for the incident to co-ordinate an effective response, while carrying out their own agencies responsibilities.

Unified Command links the responding organisations to the incident and provides a forum for these agencies to make consensus decisions. Under a Unified Command, the various agencies with authority and/or organisations and non-government responders may blend together throughout the organisation to create an integrated response team.

## **Incident Command Function:**

The Incident Command function has the overall responsibility of the incident, whereby the main task is to set objectives and priorities of the response efforts. It is the Incident Command's responsibility to determine the size of the IMS (scalable), monitor all the on-going incident management activities and consider the best response practices, evaluates prior decisions, priorities and task assignments.

## **Institutions Forming The Incident Command:**

Department of Transport/South African Maritime Safety Authority (SAMSA) will lead the Incident Command function and the deputy will be selected from the list below as deemed appropriate.

Industry

Department of Mineral Resources (DMR)

Department of Energy (DOE)

Petroleum Agency South Africa (PASA)



ICS in the Oil & Gas Industry

## Core Features

---

- ▶ Common Terminology
- ▶ Modular Organisation
- ▶ Span-of-Control
- ▶ Managed by Objectives
- ▶ Incident Action Plan
- ▶ Resource Management
- ▶ Unified Command



## **RESEARCH OF MAJOR FLOODING EVENTS IN WC:**

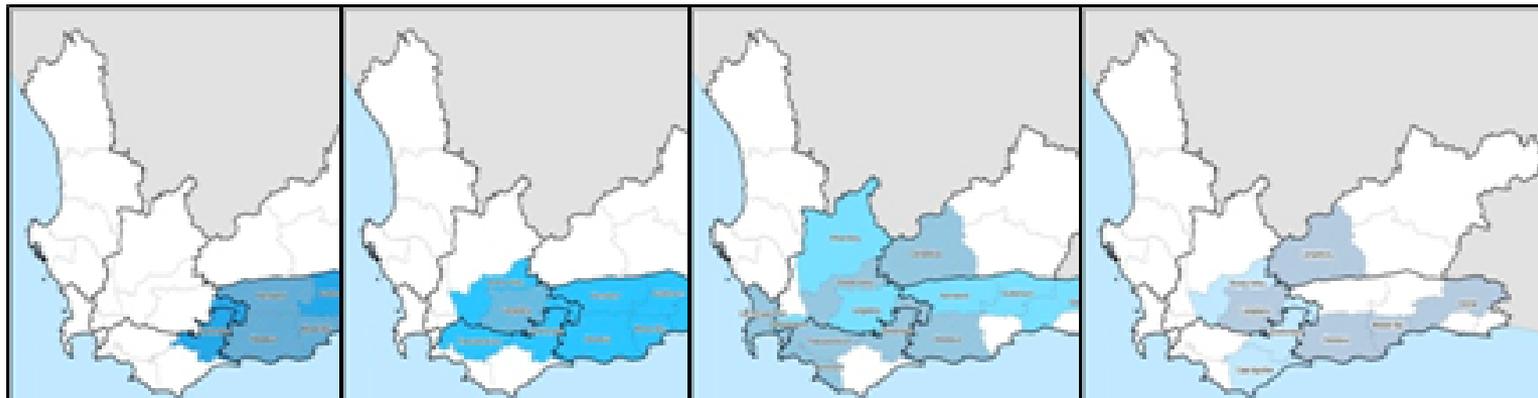
- PDMC in the WC contracted Stellenbosch University to conduct in-depth research of major flooding events that took place during 2011; 2012; 2013; & 2014.
- The research included a documentary study; interviews of over 100 officials across the three spheres of government; other data.
- This study is the first of its kind on the African continent.
- The research report were signed off by the Director responsible for the research team, as well as the Heads of Departments of Local Government; Agriculture and Transport (PW&T) in February 2016.

## PURPOSE OF THE STUDY:

- Weather systems & hydrological effects.
- Our capacity to anticipate & manage the weather systems' effects.
- Impacts including social consequences, infrastructural & agricultural damage.
- Financial losses.
- High risk areas & infrastructure.

## Four severe weather events

Research carried out from April 2014 – March 2015



Research Streams	Data collected /analysed
Meteorological & hydrological	<ul style="list-style-type: none"><li>• Synoptic, rainfall &amp; hail data</li><li>• Historical data and dam levels</li></ul>
Response timelines, impacts & mediating factors	<ul style="list-style-type: none"><li>• Interviews, focus groups, fieldwork</li><li>• Document collection.</li></ul>
Financial losses & disruptions	<ul style="list-style-type: none"><li>• Recorded losses (un)verified</li><li>• PSP reports &amp; road closures</li><li>• Financial losses normalised to 2010 inflation (2003-2014)</li></ul>
Land-use change in Lourens River Catchment	<ul style="list-style-type: none"><li>• Aerial photographs (1938 - 2010)</li><li>• Rainfall data &amp; river gauge readings</li></ul>
Social media analysis	<ul style="list-style-type: none"><li>• 70 480 georeferenced tweets</li><li>• 80 000 unreferenced tweets</li></ul>

## Serious flood-risks in the Western Cape

	2011	2012	2013	2014	Total
Municipal	75.5	16.9	46.8	97.4	236.6
Provincial	164.9	34.5	71.6	178.0	449.0
National	2.3	0	0	0	2.3
<b>Total</b>	<b>242.7</b>	<b>51.4</b>	<b>118.4</b>	<b>247.5</b>	<b>687.9</b>

65%

But, farming losses:

2011 = 128.4mill

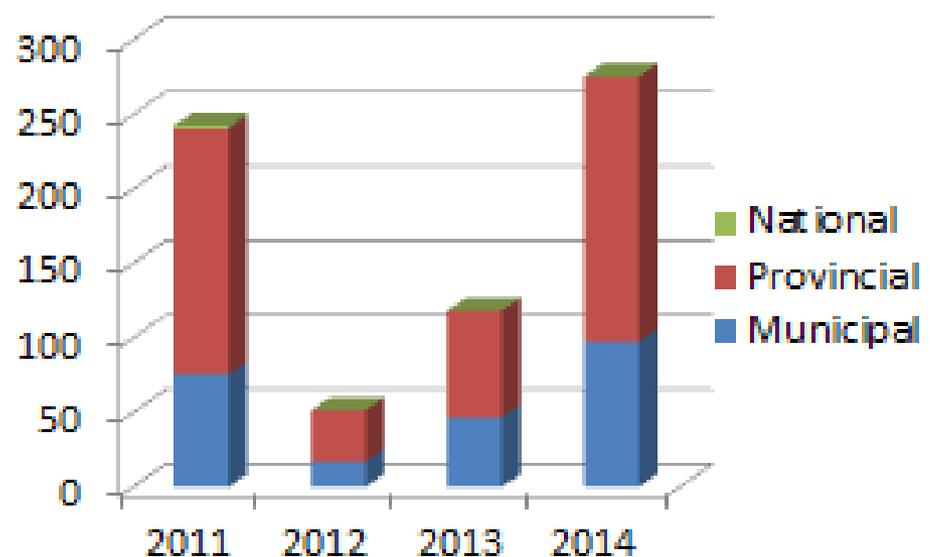
2012 = 373.5mill

2013 = 86.6mill

2014 = 310.0mill

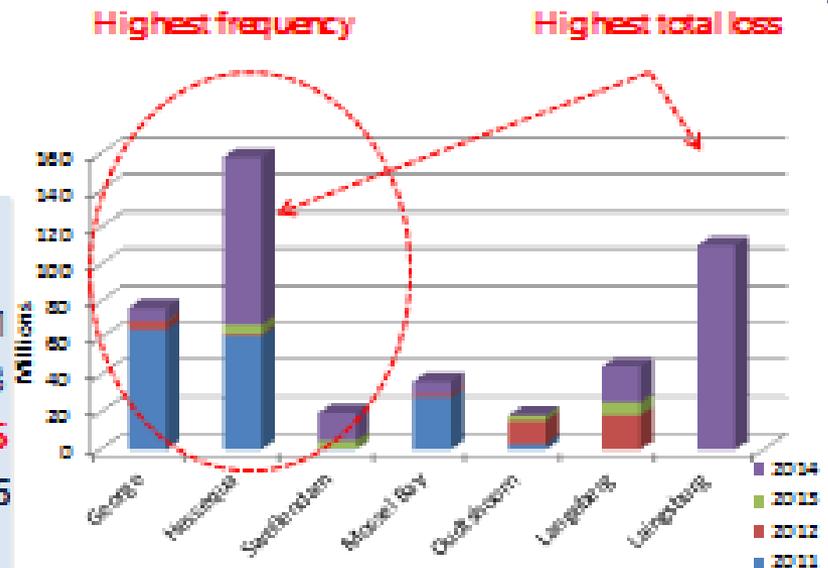
**Total = 898.5 million**

**R 1.58 billion reported  
financial losses**



## Recurrent impacts in municipalities (non-adjusted)

	2011	2012	2013	2014	Total
Bitou	X	X			20.1
Knysna	X				13.3
<b>George</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>76.6</b>
Mossel Bay	X	X		X	36.6
<b>Hessequa</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>158.0</b>
Oudtshoorn	X	X	X		18.3
Kannaland	X		X		73.8
<b>Swellendam</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>19.8</b>
Cape Agulhas				X	20.2
Overstrand			X		8.2
Theewaterskloof			X		22.0
Langeberg		X	X	X	44.8
Breede Valley			X	X	29.1



Municipal impacts linked to disruptions in other services. People trapped when roads fail (lives at risk). Severe knock-on effects to livelihoods when roads are closed.

## Our severe weather & flood risks are extremely complex & dynamic

A troubling convergence of risk drivers directly affect lives and public safety

- Climate variability/change (more extreme, intense rainfall).
- Increasing river flow peaks.
- Poor river management.
- Rapid catchment changes that increase run-off & impede flow.

## Risk drivers: River management & changing catchement conditions



Landuse & fire



Chris Jacobs - ©2008



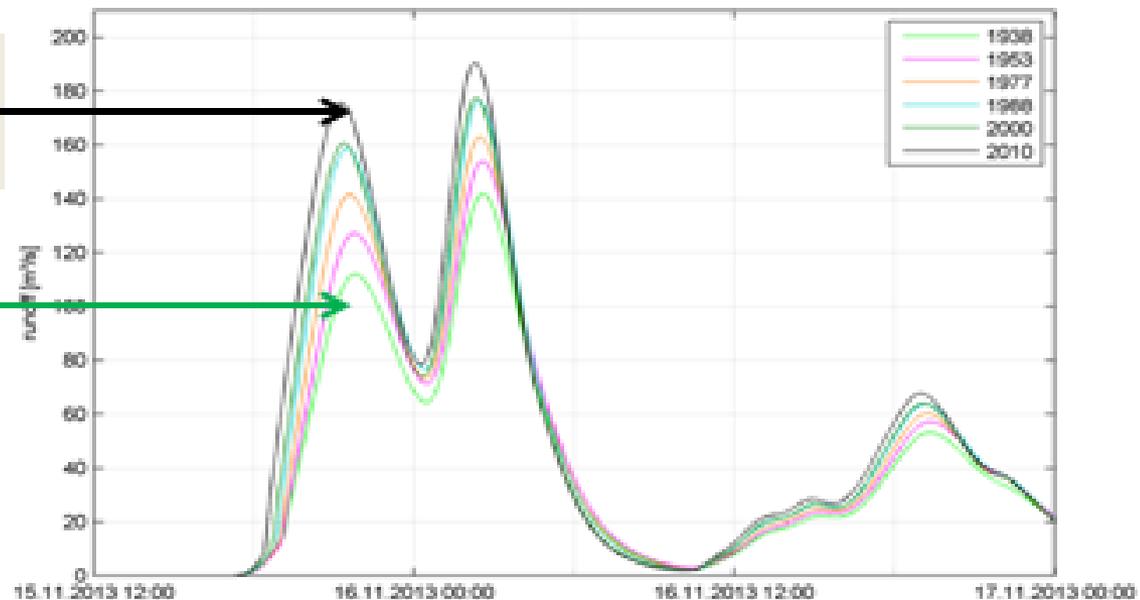
Sedimentation & alien vegetation



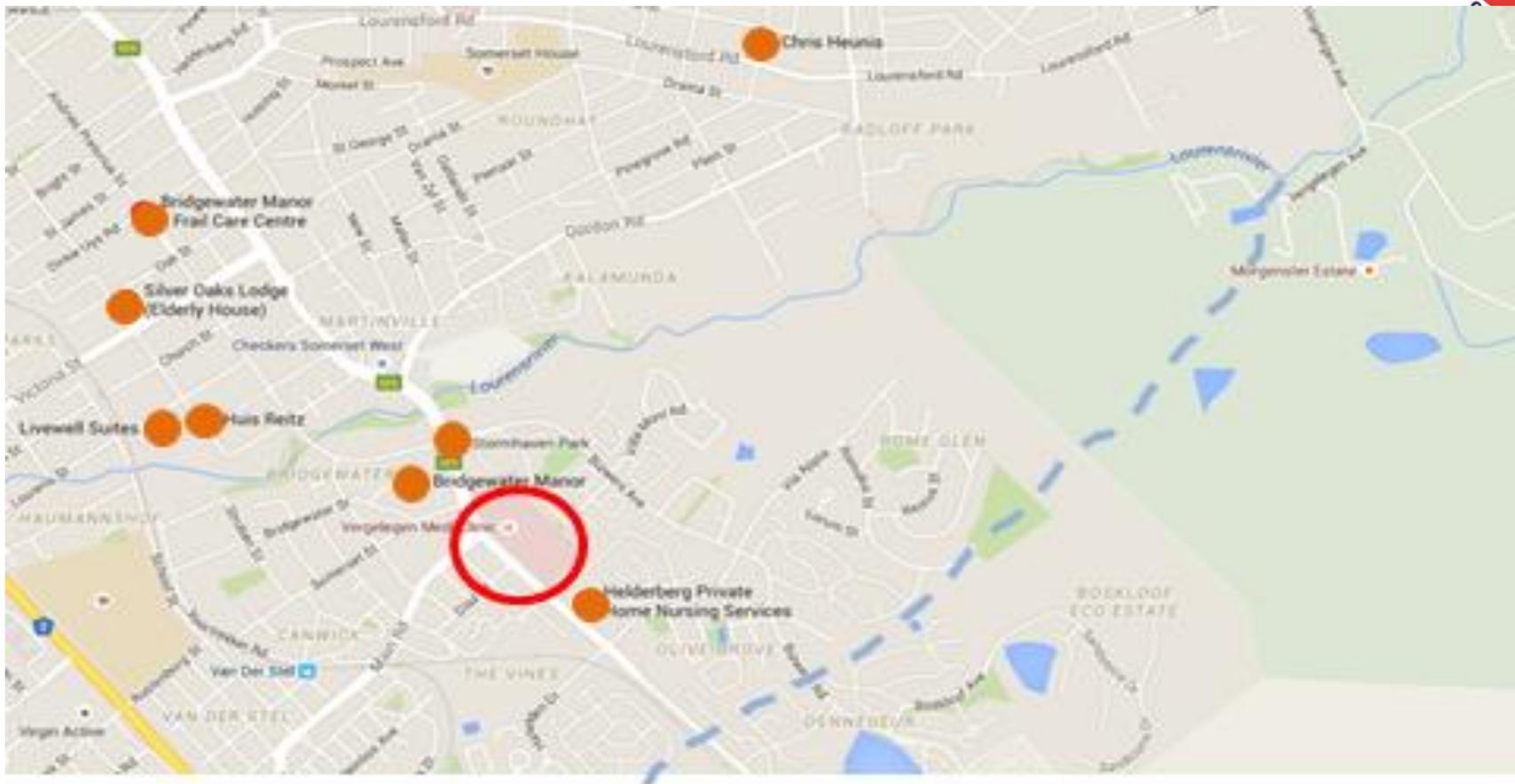
## Illustrative effect of land-use change on flood hydrographs for Lourens River Catchment 15 November, 2013 E Schaber (2015)

2010 land-use  
(black line)

1938 land-use  
(green line)



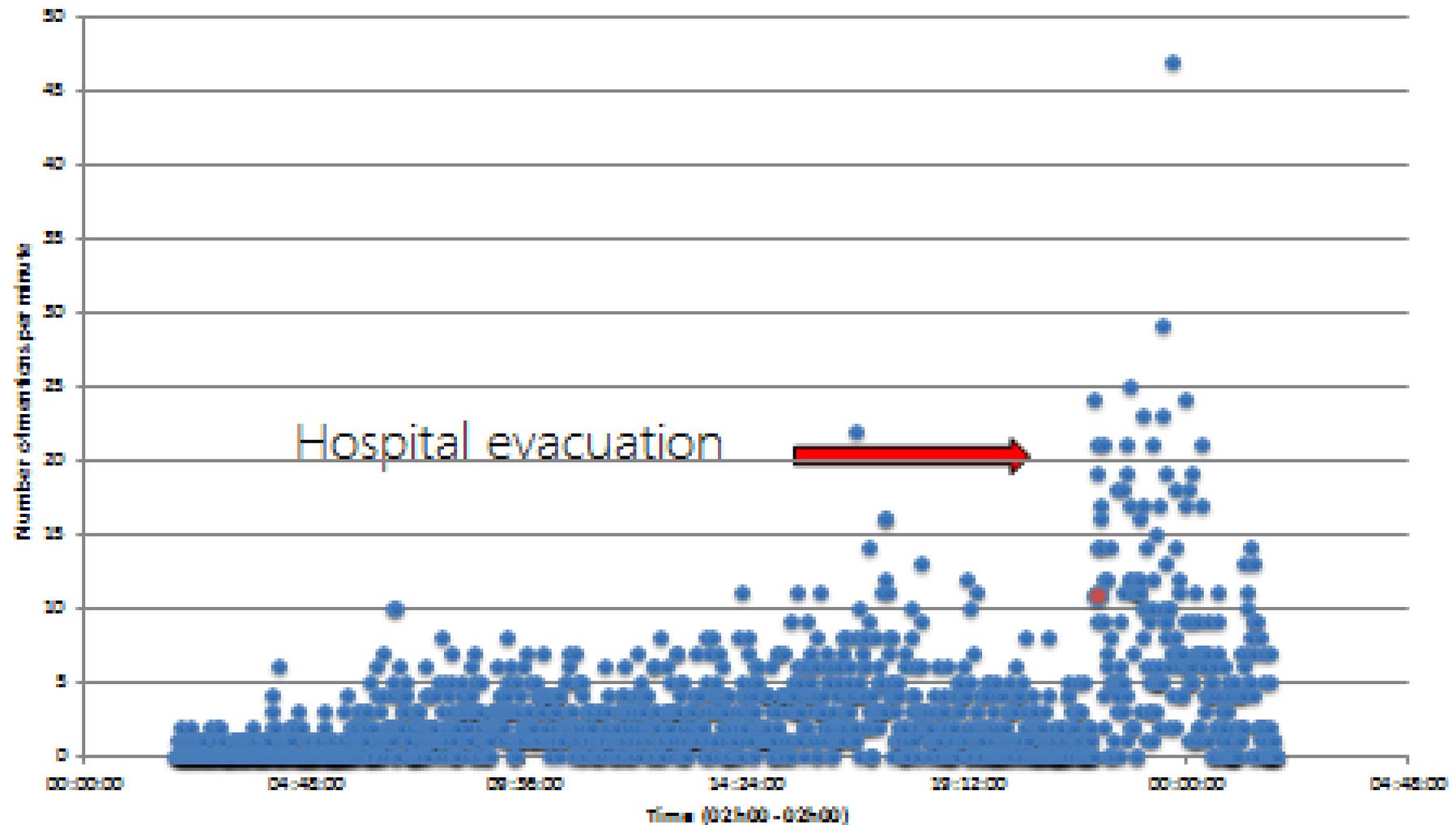
Run-off increases from  $110 \text{ m}^3/\text{s}$  to  $180+ \text{ m}^3/\text{s}$  (64%)



## Development can escalate flood risk...

- hardens catchments & drains natural water courses,
- buildings, bridges, walls impede flow
- places critical facilities directly in harm's way

# Social Media is a Crucial Factor



No. keywords per minute on 15<sup>th</sup> November

## CONCLUSIONS:

Our high-impact weather/flood risks are serious, complex and dynamic

Severe flood occurrence **occur almost annually**. Floods are a development consideration.

Intense rainfall conditions partly drive floods (**especially summer weather systems**)

Floods are also **due to development** that is changing catchments, increasing run-off & placing people/services in harm's way.

**Sedimentation and alien clearing** are contributory risk factor.

## **RECOMMENDATIONS:**

- A range of pointed recommendations were made through the research for considerations by administrative and political leadership
- WC PDMC will champion and advocate the mainstreaming of the recommendations by relevant spheres of Government to be included into their IDPs and APPs

## **ACKNOWLEDGEMENTS:**

- Disaster Management Fraternity, South Africa
- Ms. L. Williams, GIS & Environmental Scientist, DEA
- Dr. Y. Peterson, Director DEA
- Prof. A. Halloway, Stellenbosch University

THANK YOU