
HEALTHY WATERWAYS
Because we're all in the same boat
South East Queensland
Healthy Waterways Partnership
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Healthy Waterways Partnership

Waterways as a barometer for recovery: what can we learn?

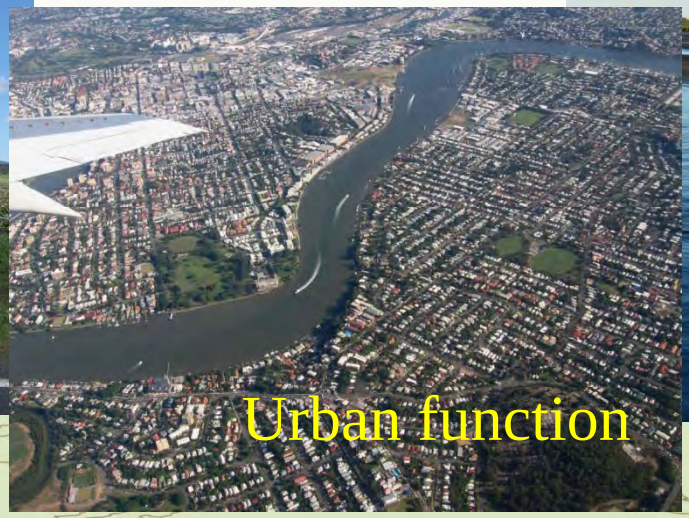
24th February 2011

SEQ- EIANZ Forum

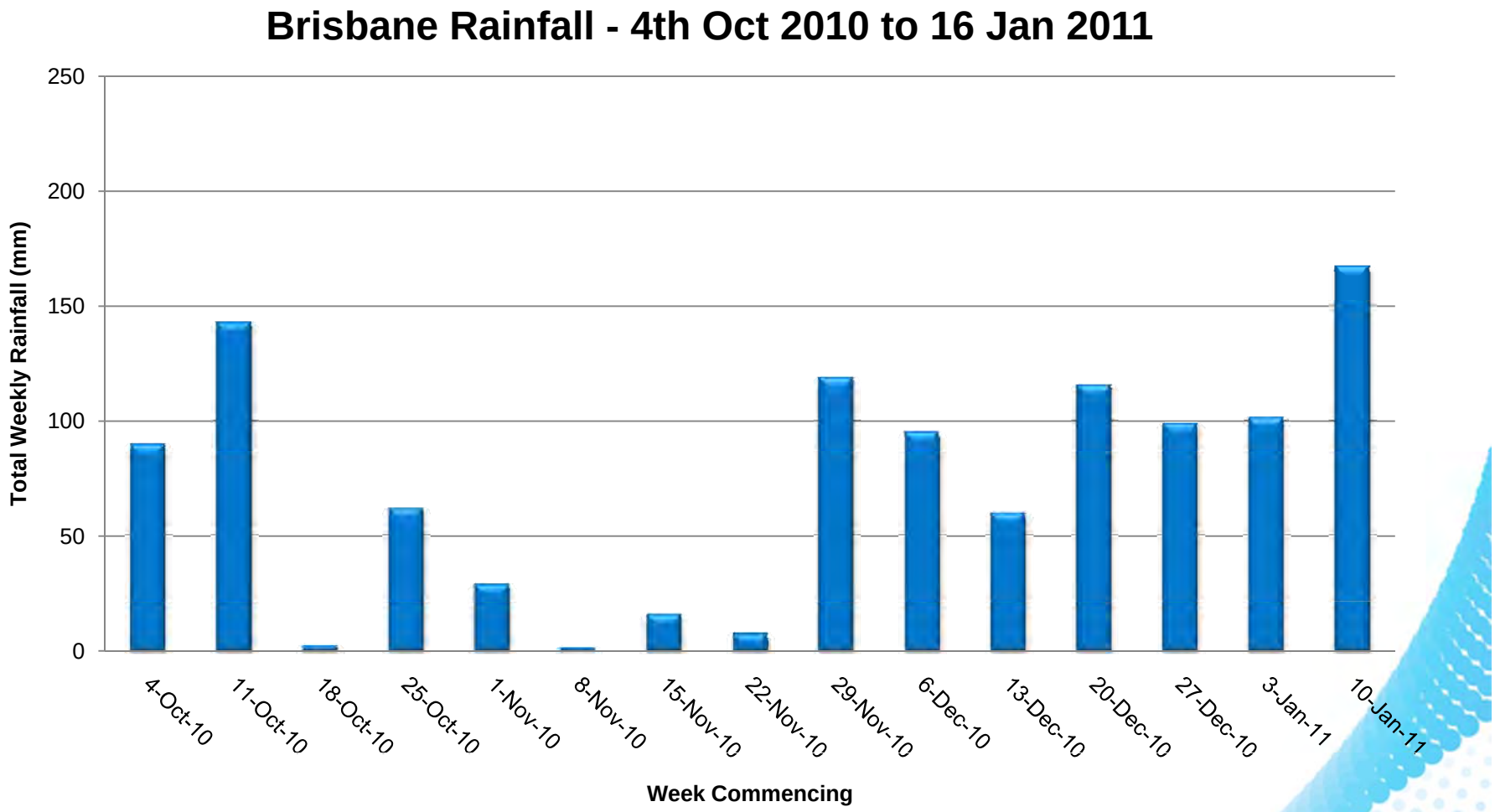
Overview

- **Values at risk**
- **Initial impacts**
- **Ongoing Flood Evaluation Activities**

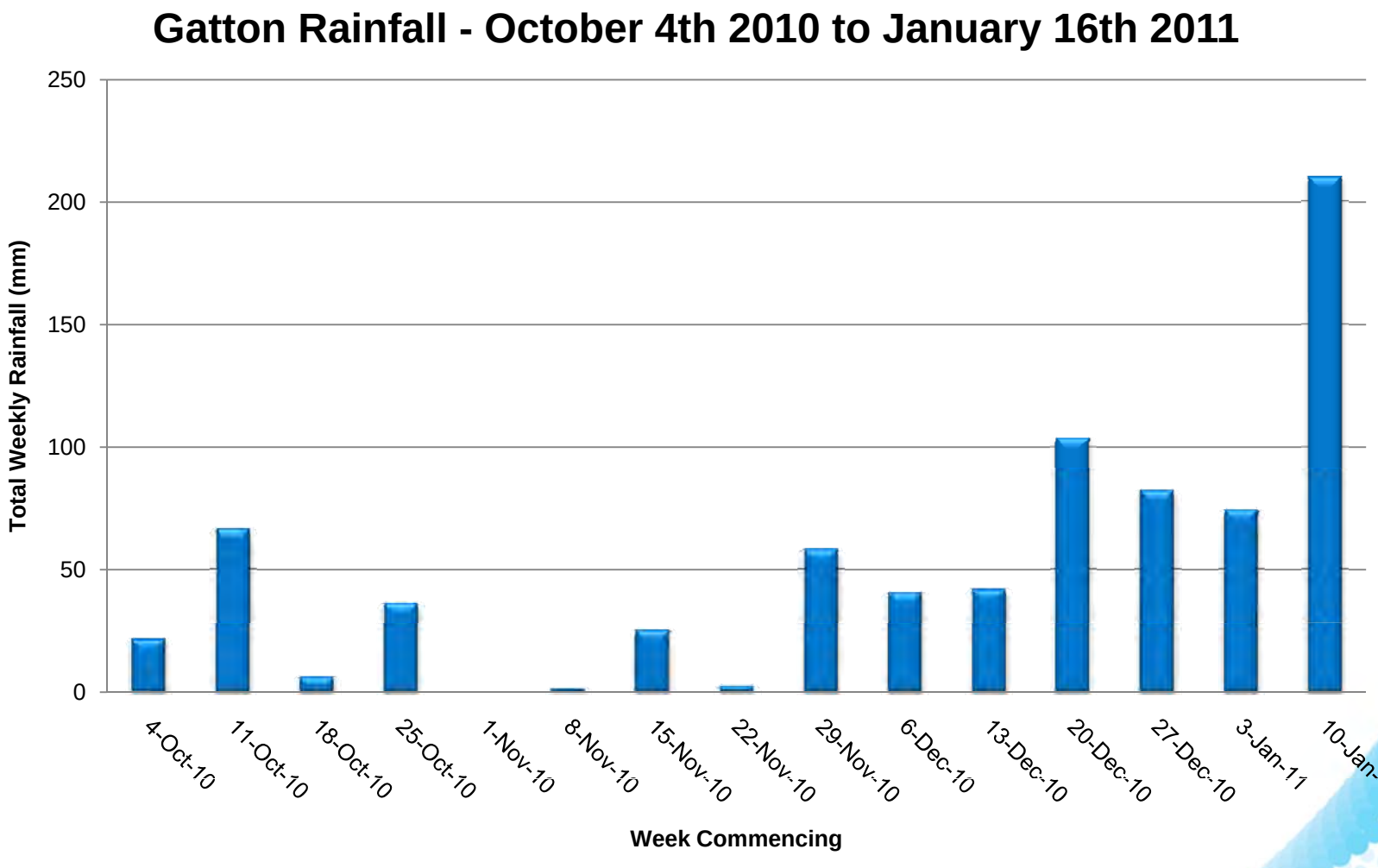
SEQ values and assets at risk



Rainfall - Brisbane



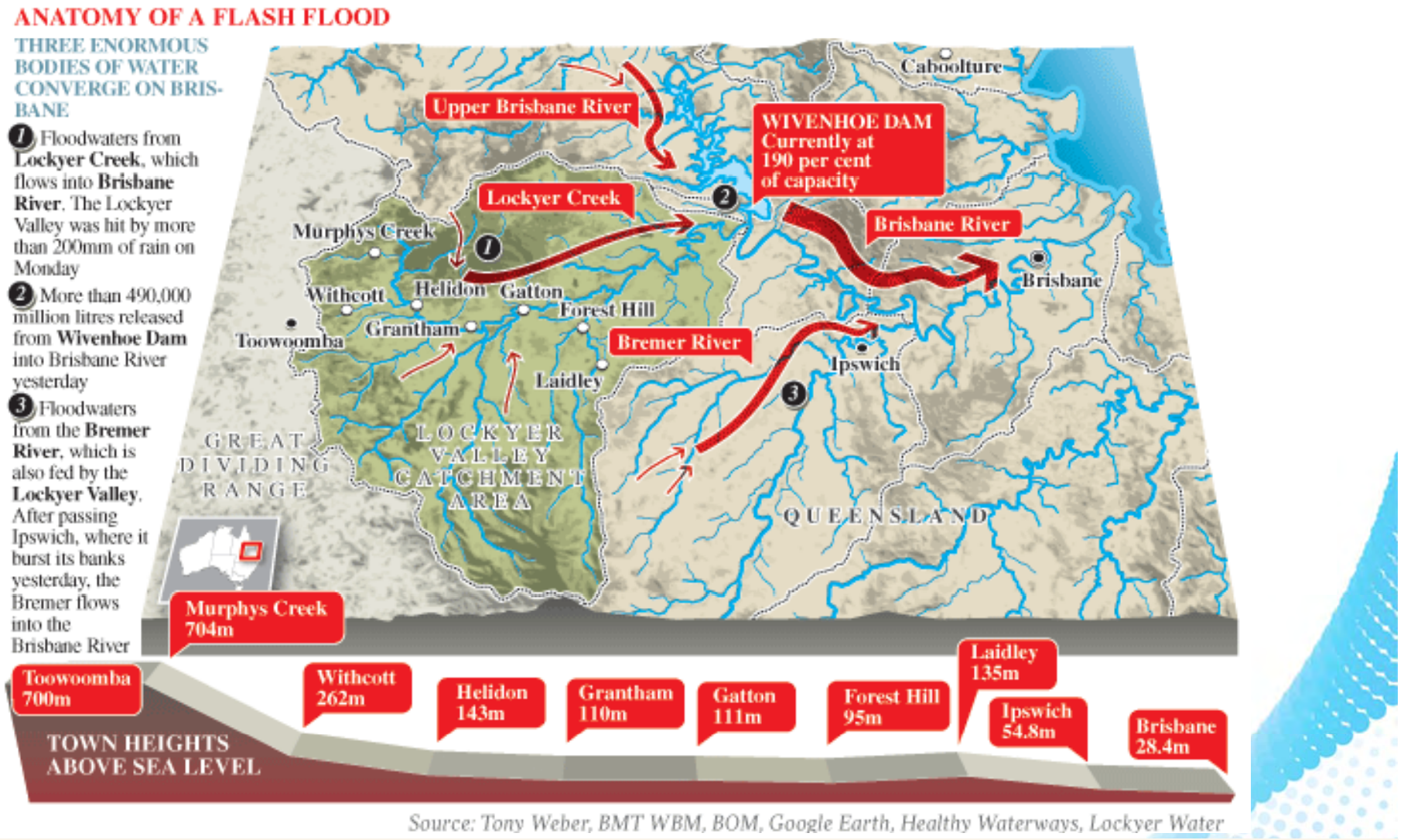
Rainfall - Gatton



Intensity of upper catchment flows?

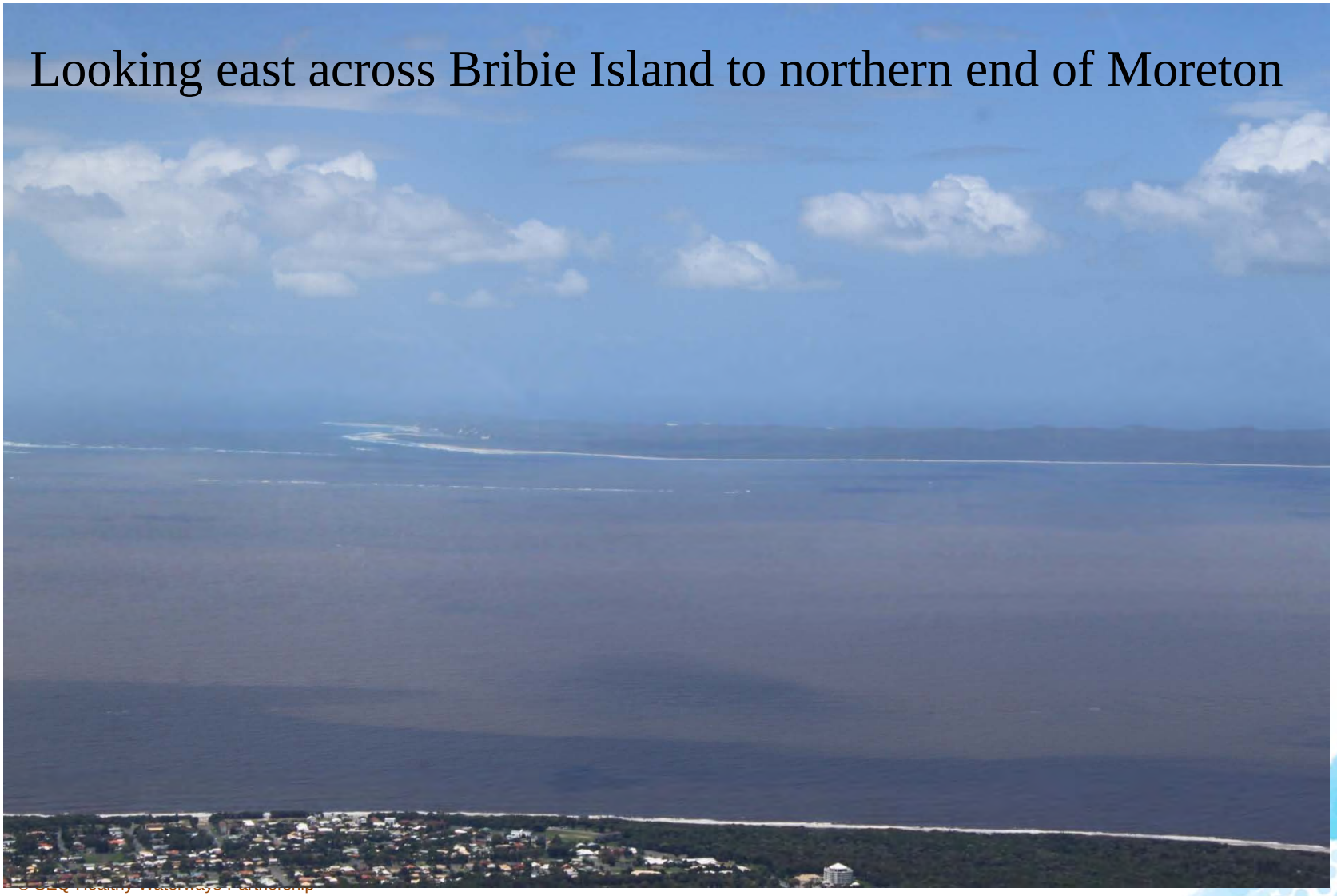
Upper part of Hampton to Esk Road

Flood Components



Source: Tony Weber, BMT WBM, BOM, Google Earth, Healthy Waterways, Lockyer Water

Flood Plume Extent



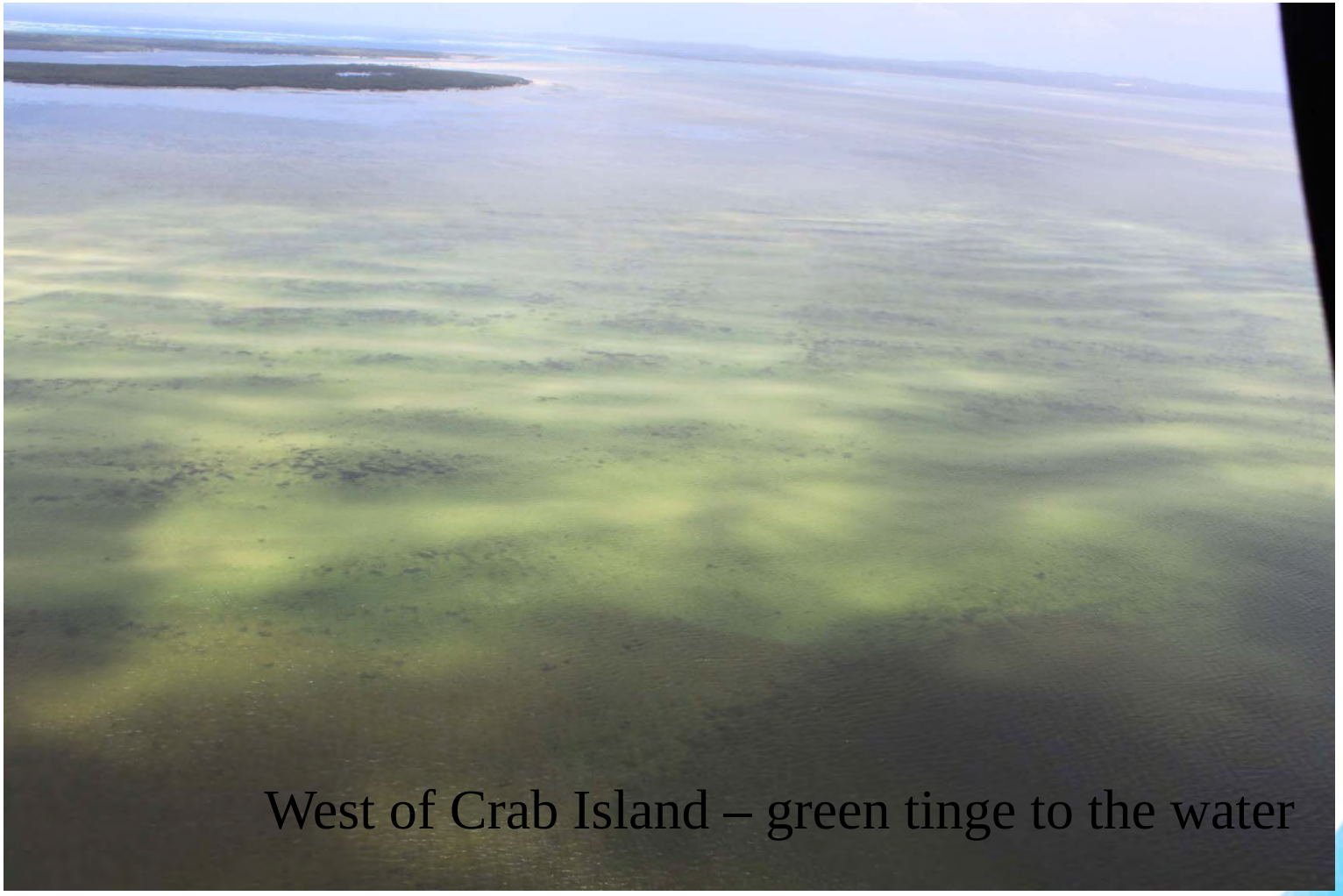
Flood Plume Extent

Flood plume off Tangalooma

Looking north

Looking south

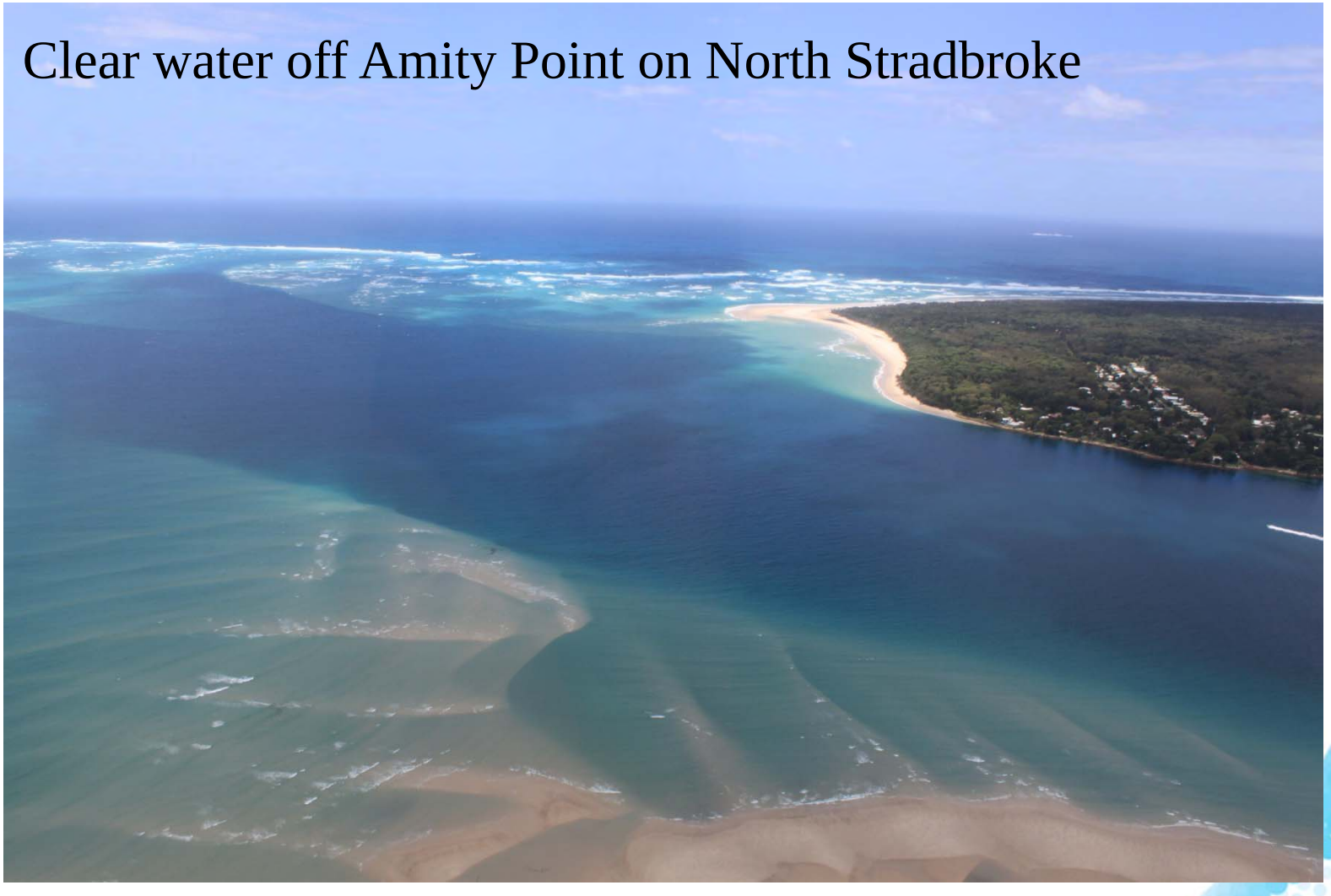
Flood Plume Extent



West of Crab Island – green tinge to the water

Marine activity – 3m hammerhead shark

Flood Plume Extent



Flood Plume Extent

Cleveland Point

Off Manly looking north

River Activity

Manly harbours City Cats

Flyer and tugs

Flood Debris

Mouth of the river

East of the airport

Flood Plume Extent

Sandgate Pier looking south

Redcliffe looking north

This flood is the eight highest since 1984

Historical flooding levels and images as measured at the Brisbane City Gauge

Ecosystem Health Monitoring (EHMP)

Freshwater

- 19 major catchments
- 135 representative sites
- 5 ecological indicators

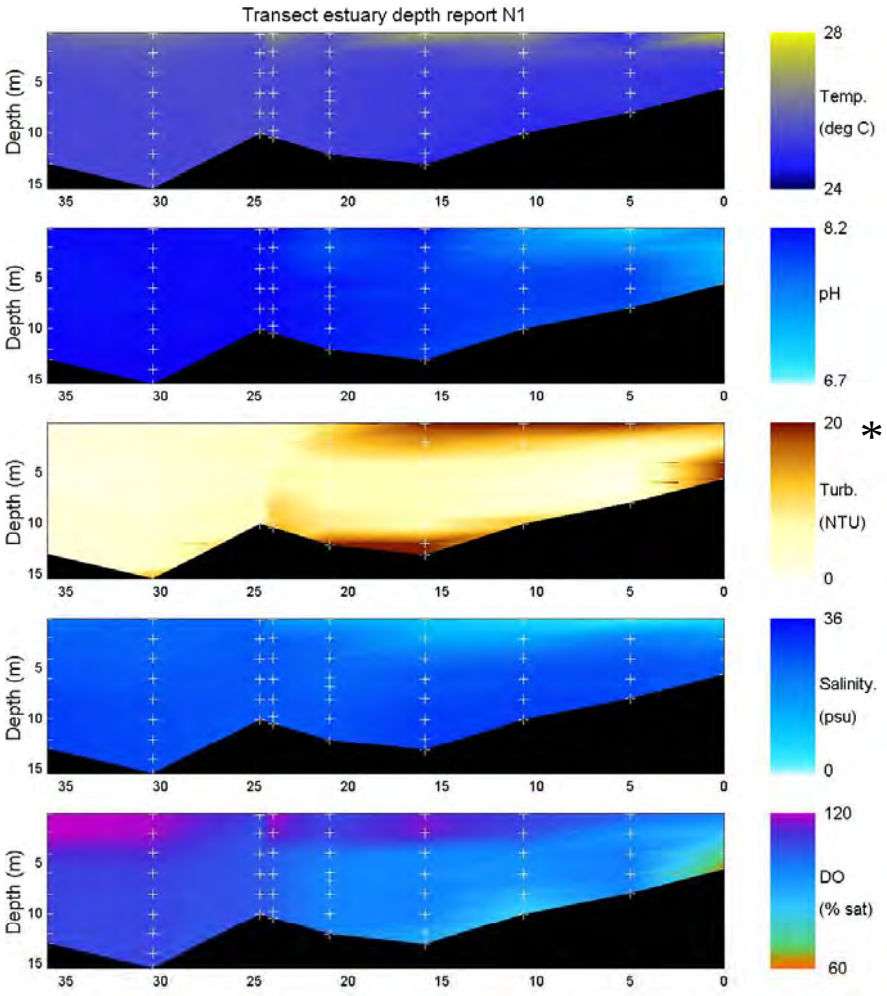
Estuarine Marine

- 18 river estuaries
- 9 zones in Moreton Bay
- 254 representative sites
- 9 and 8 Ecological indicators

EHMP plus additional analysis

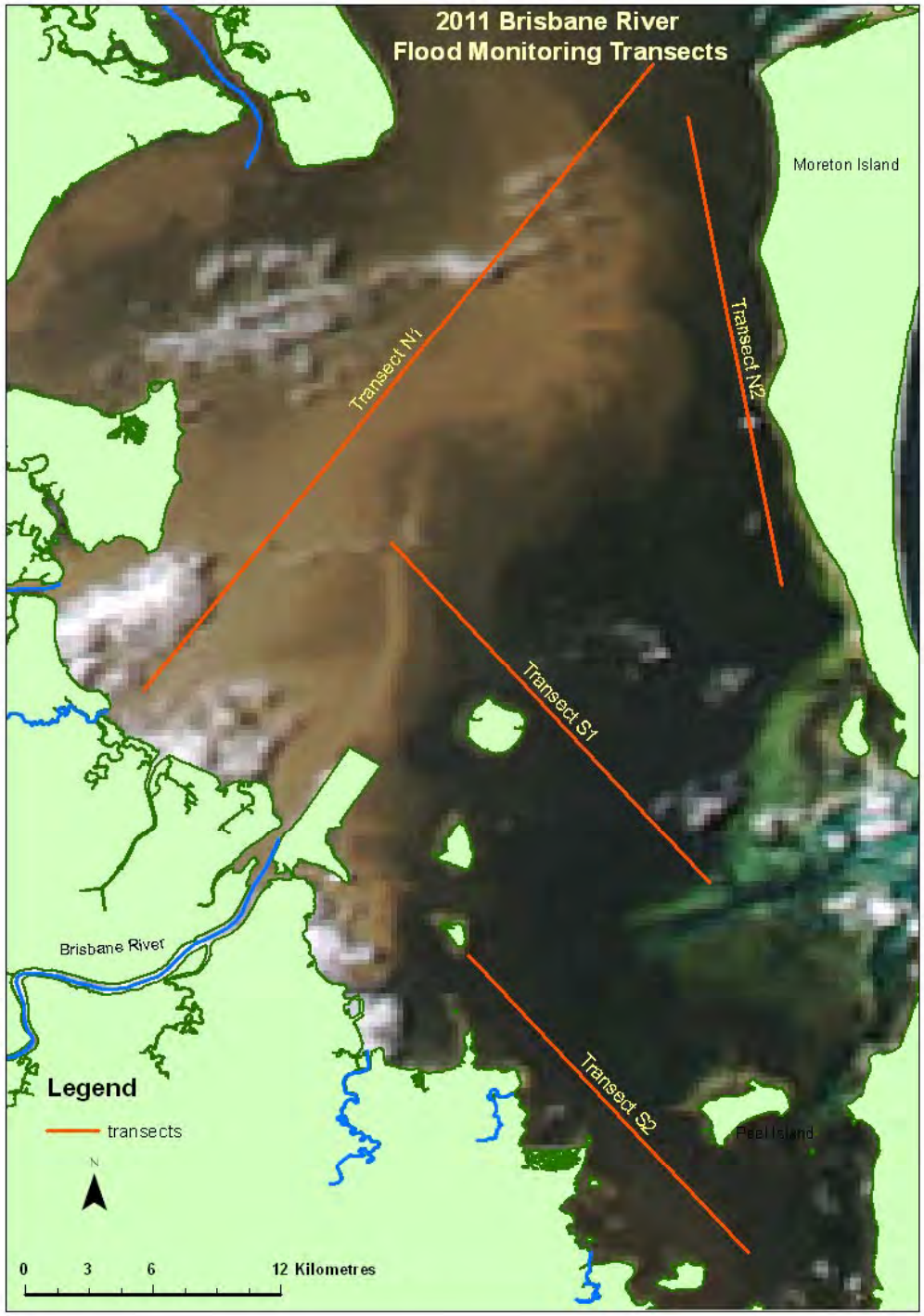
Focus	Parameters	Number of Sites
Make up of plume	Sediment, colour and bottom nutrients	All 81 bay sites and near bottom at 34 sites
Track any industrial contaminants	Heavy Metals	Mouth of Brisbane, Logan, Pine, Caboolture, Pumiscestone Passage and Broadwater
Impact on high value habitats	Mix of pesticides, PAHS and BTEX	
Risks to primary contact by humans	*Enterococci*	8 bay sites off popular areas

Transect N1: 18 Jan 2011



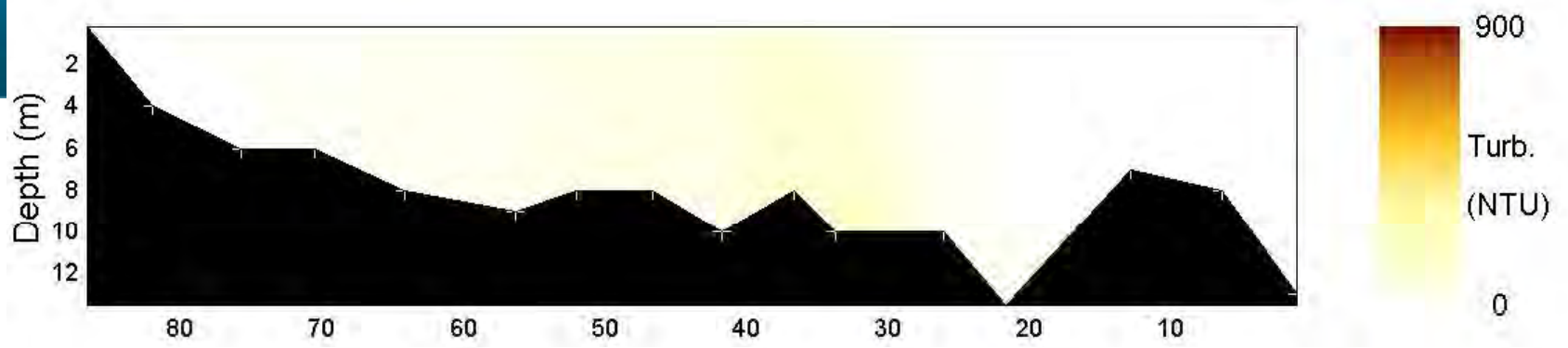
*Scale: 20 = 20 or greater NTU

Information Courtesy of DERM

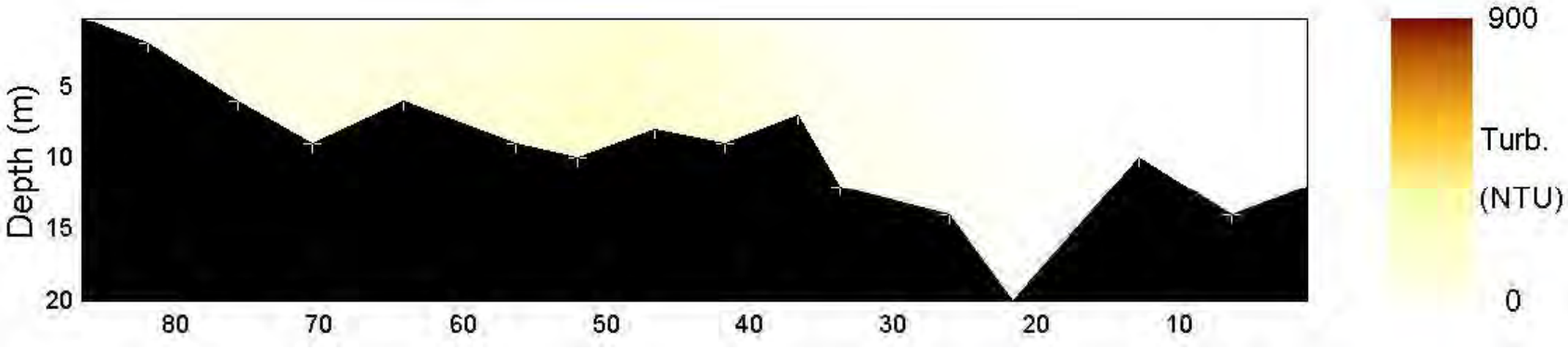


Turbidity contrast between Nov 2010 and Jan 2011

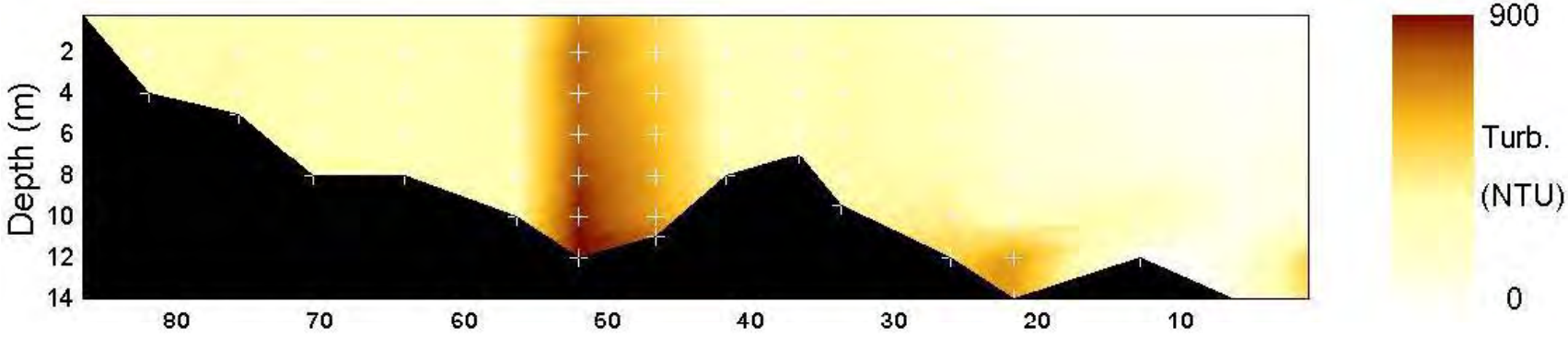
Nov



Dec

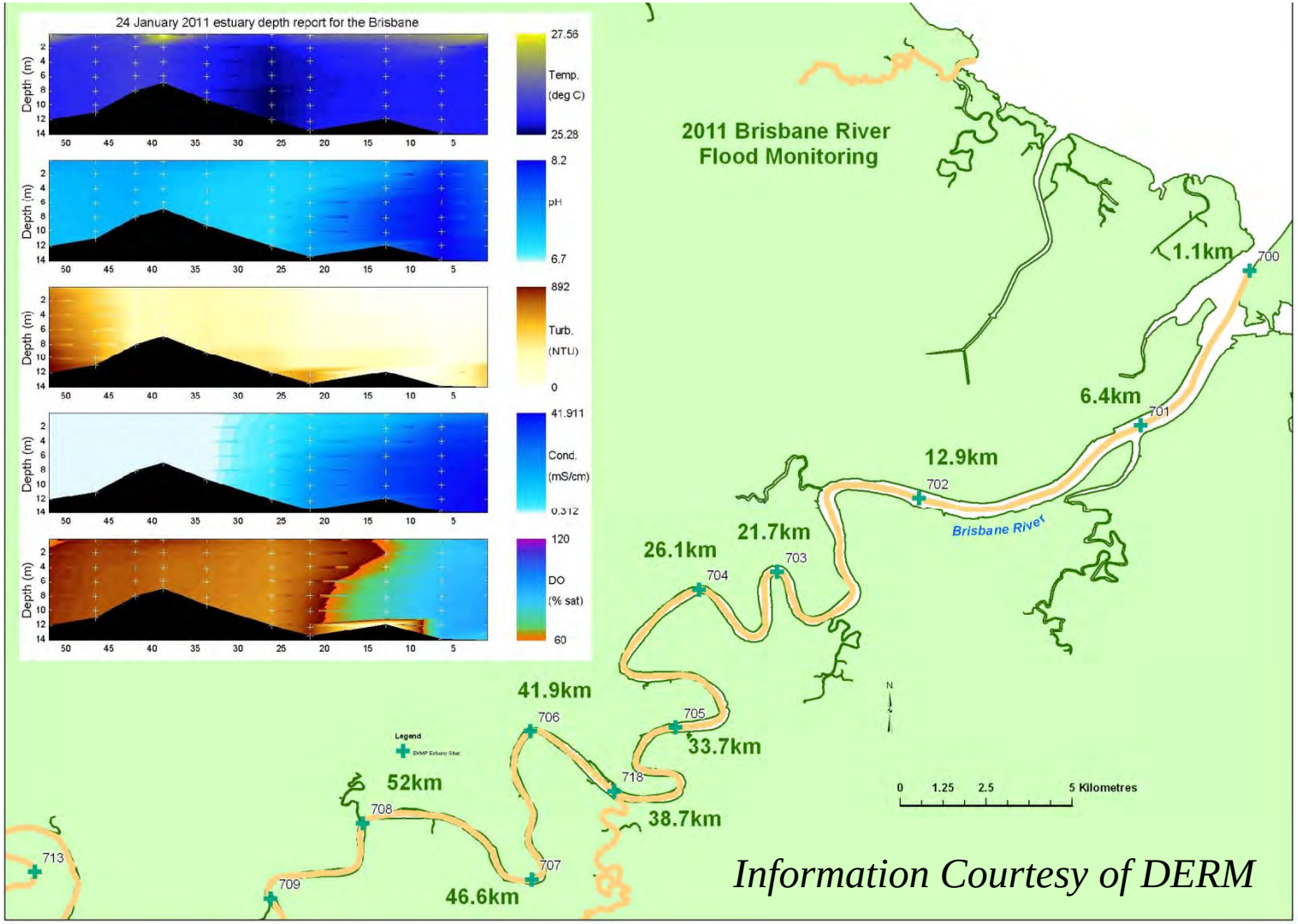


Jan
(24 & 26)



Information Courtesy of DERM

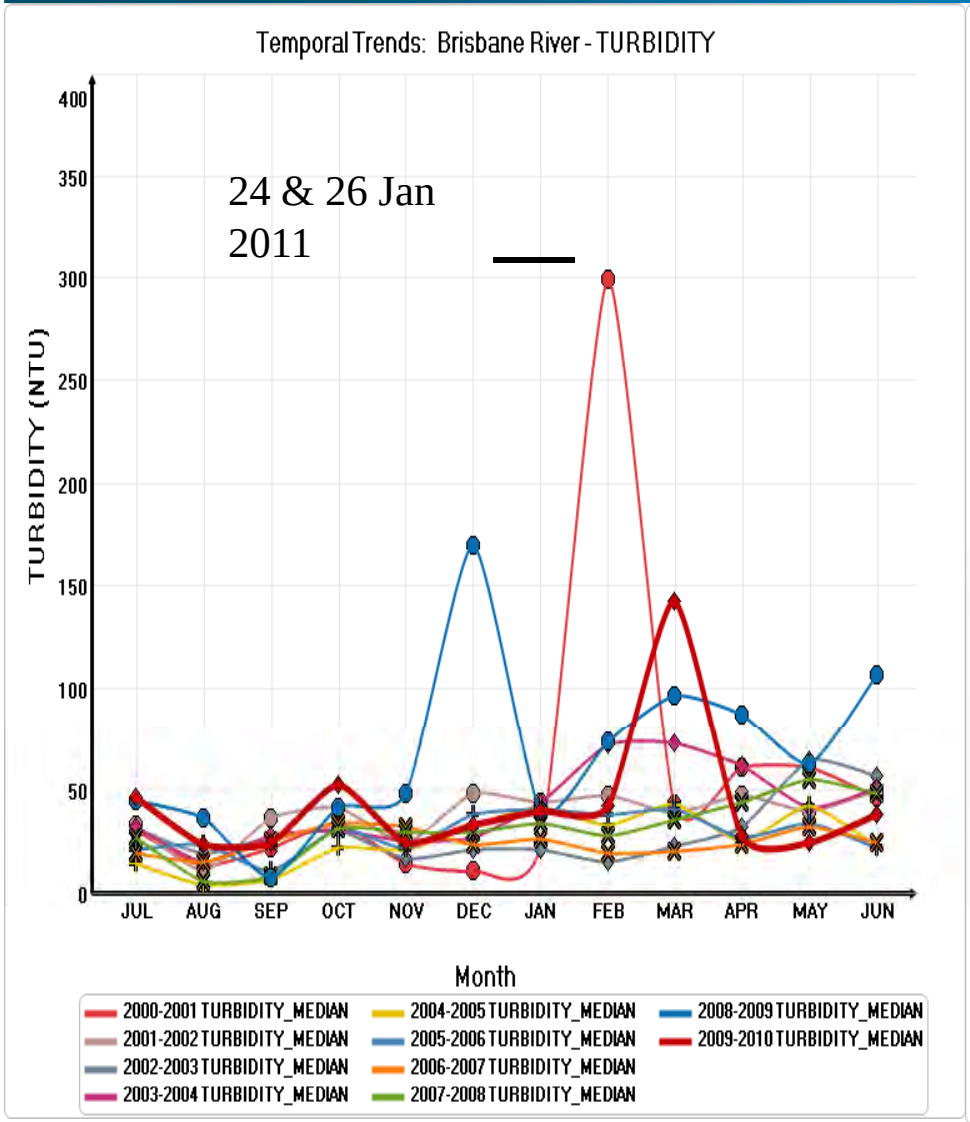
Flood Response Activities

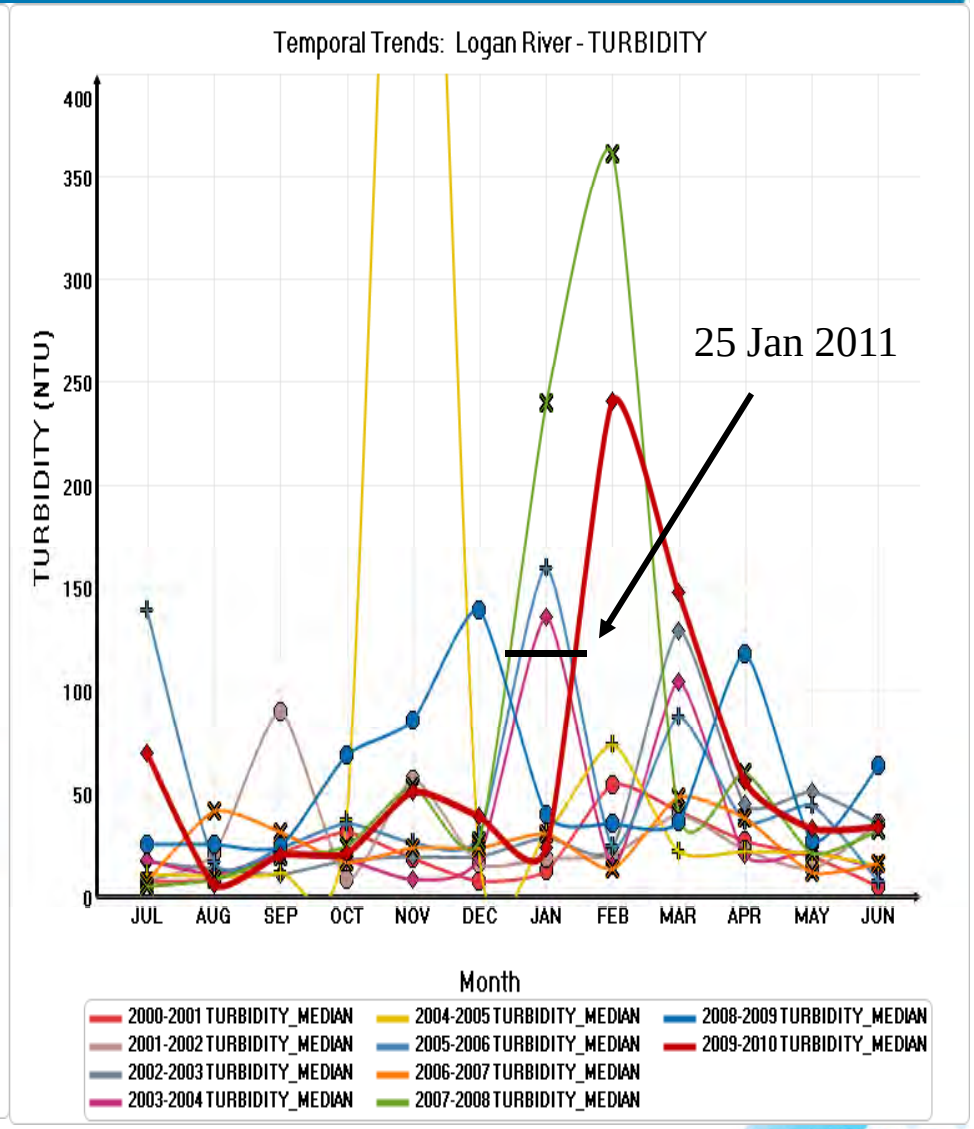


Physical Parameters Tuesday 24 January

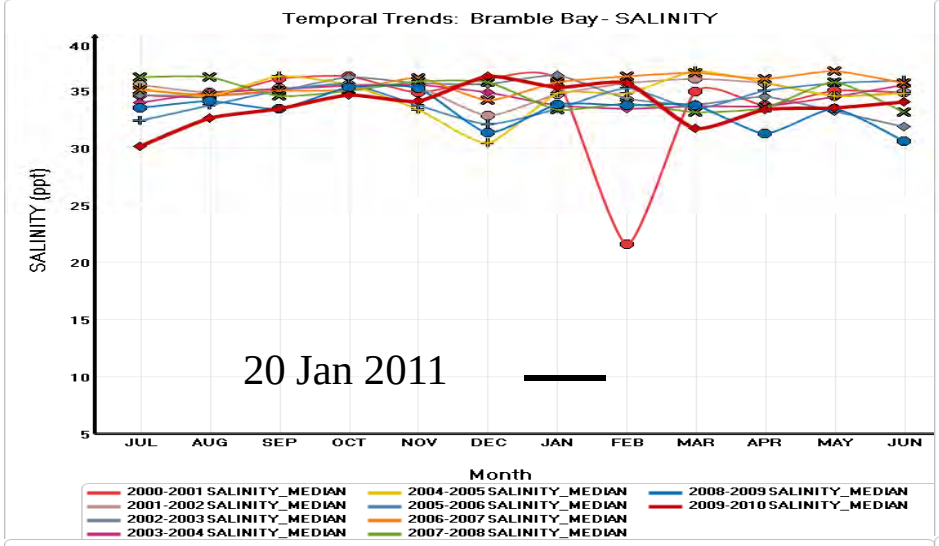
Information Courtesy of DERM

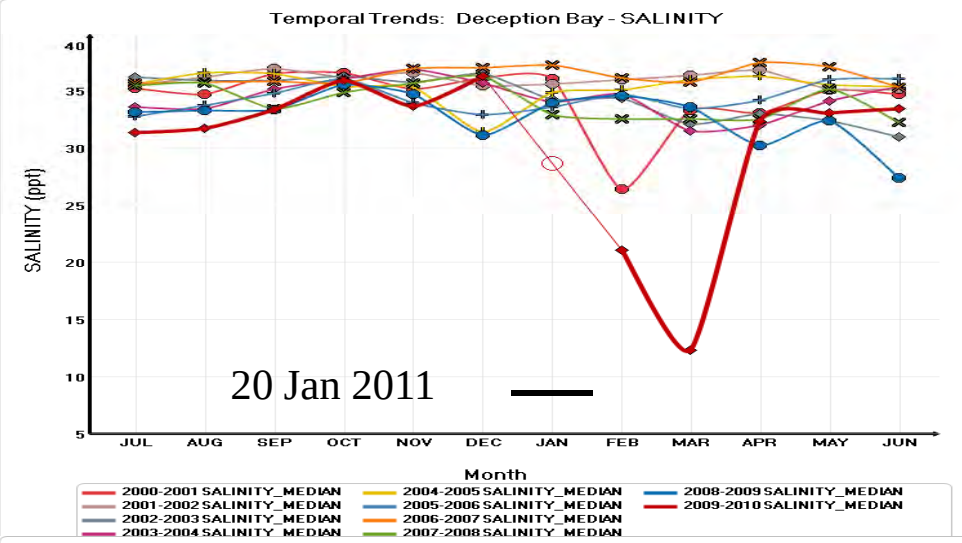
Turbidity in the Brisbane and Logan Rivers

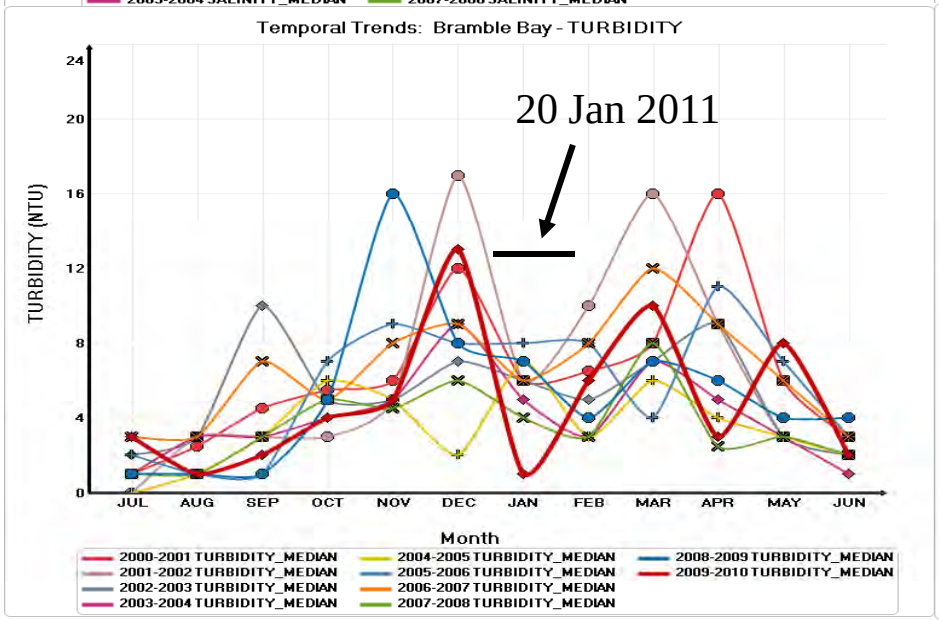


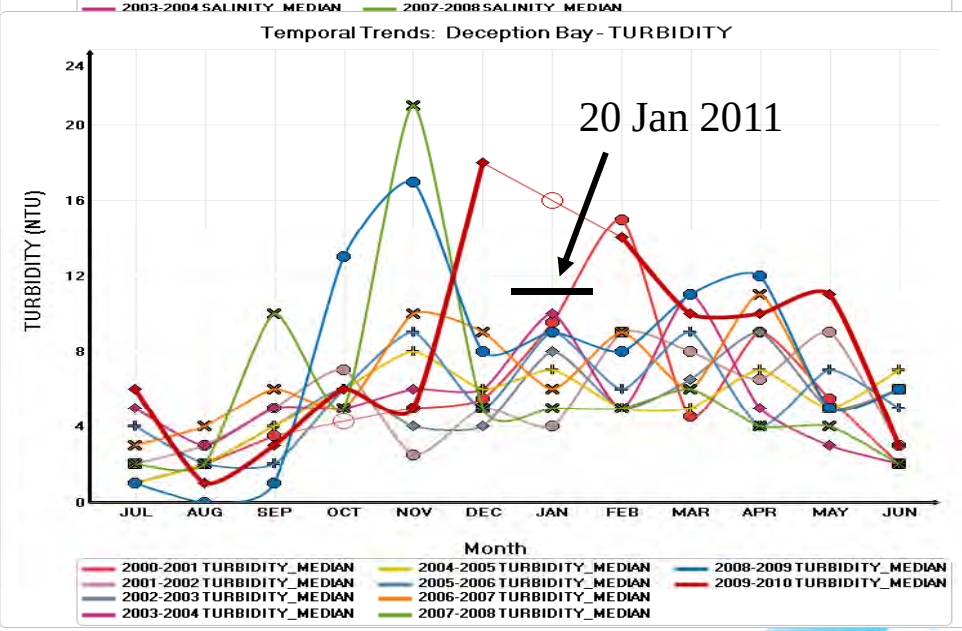


Bramble and Deception Bays

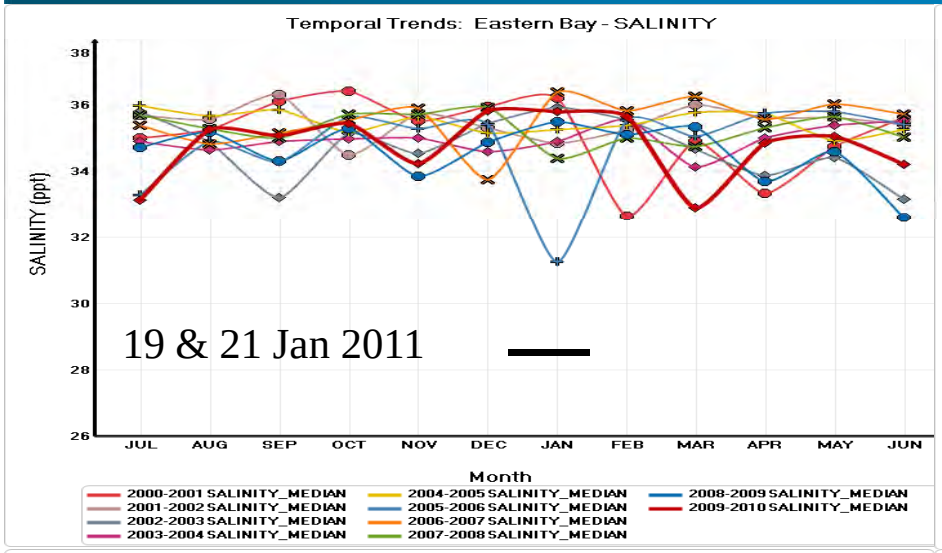


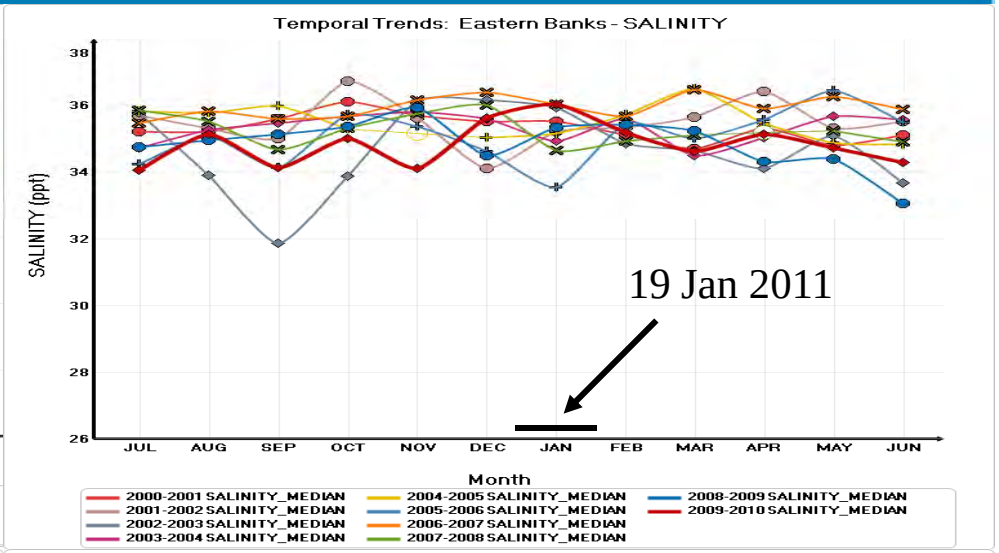


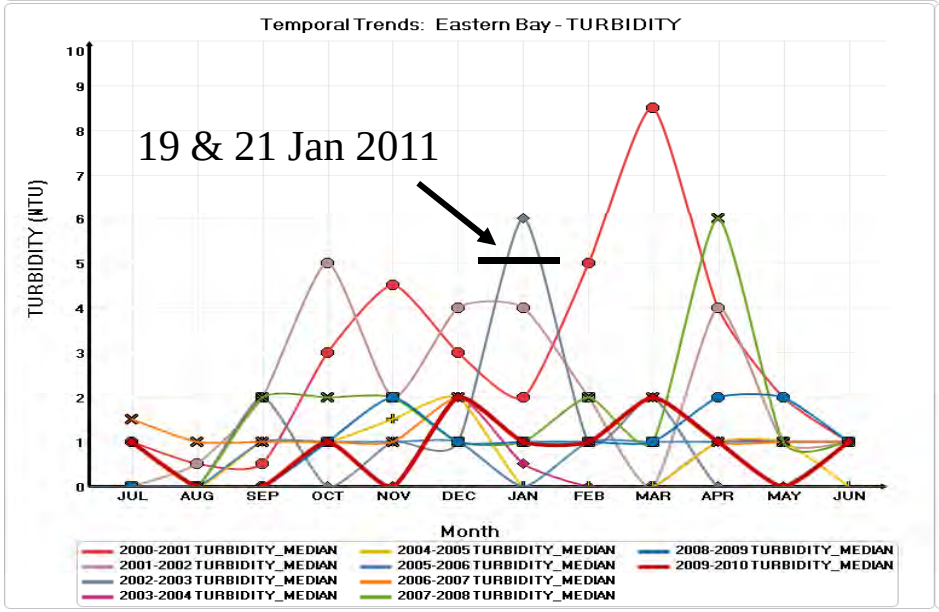


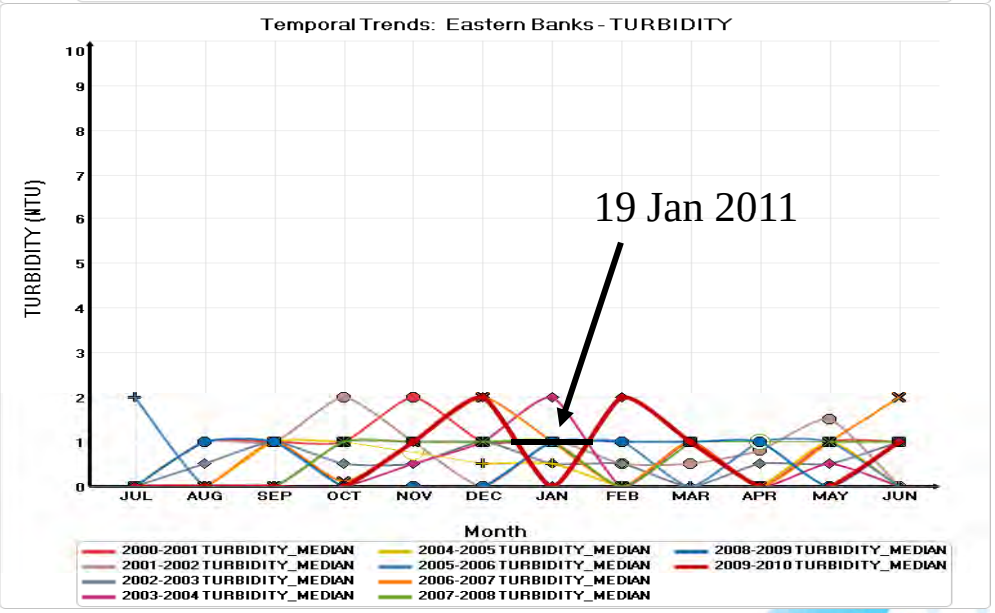


Eastern Banks and Eastern Bay

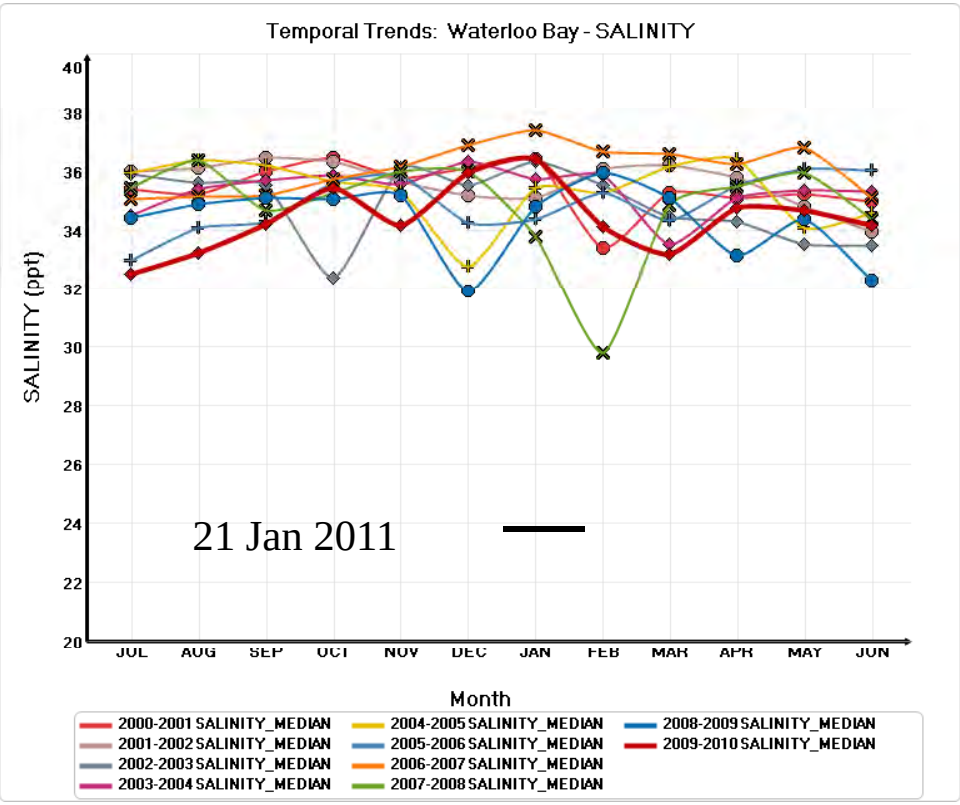


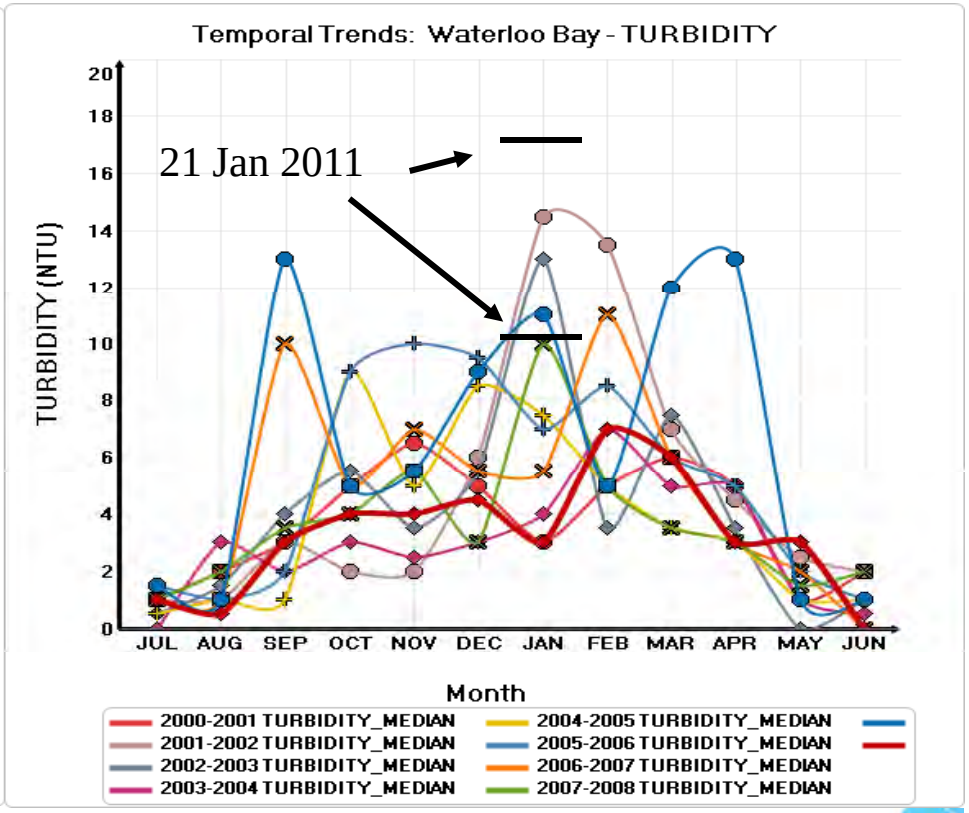




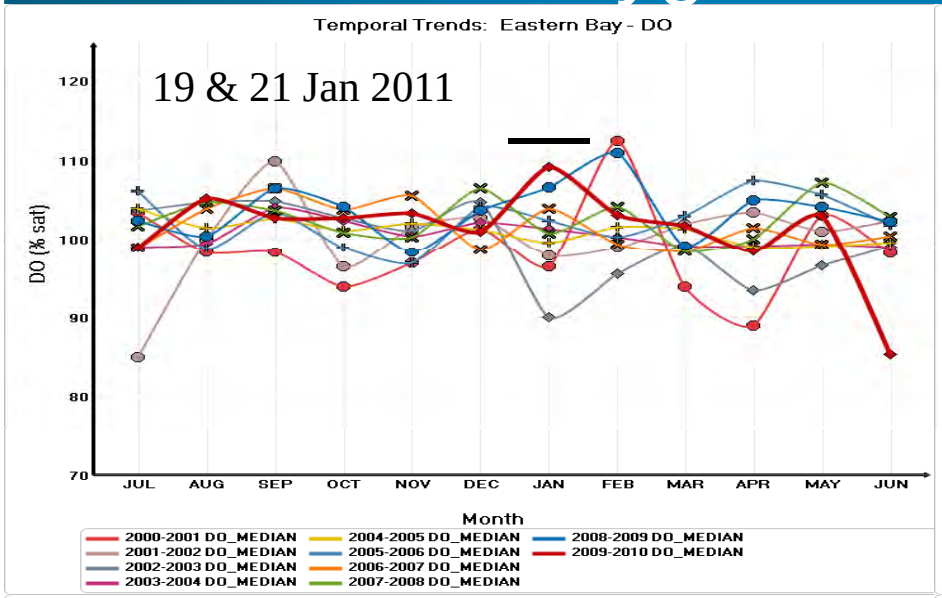


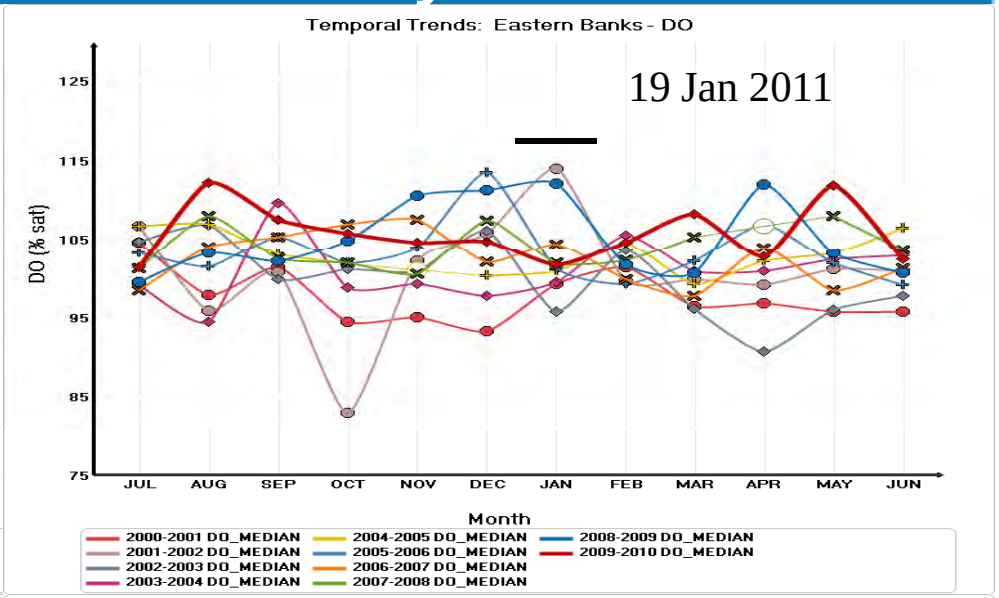
Waterloo Bay

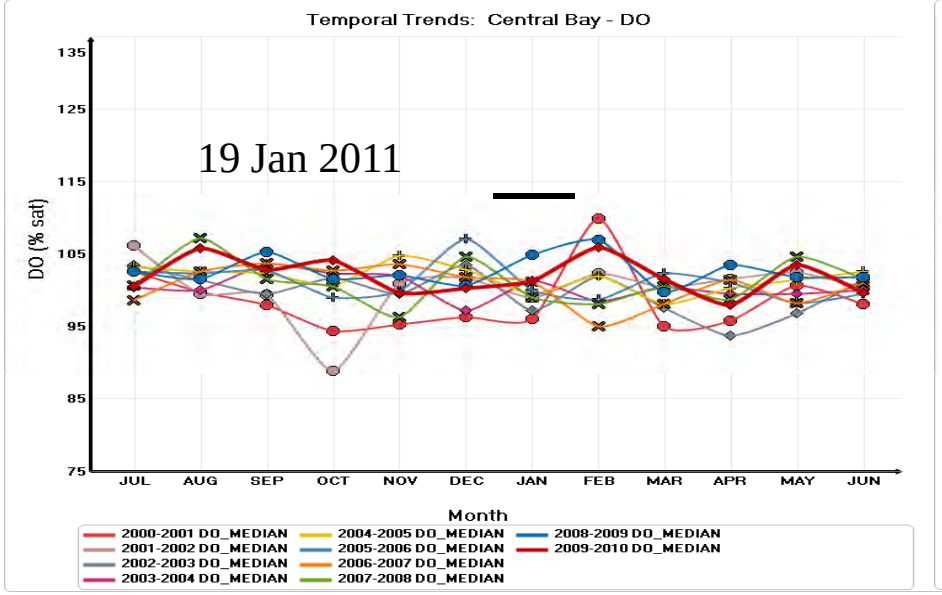


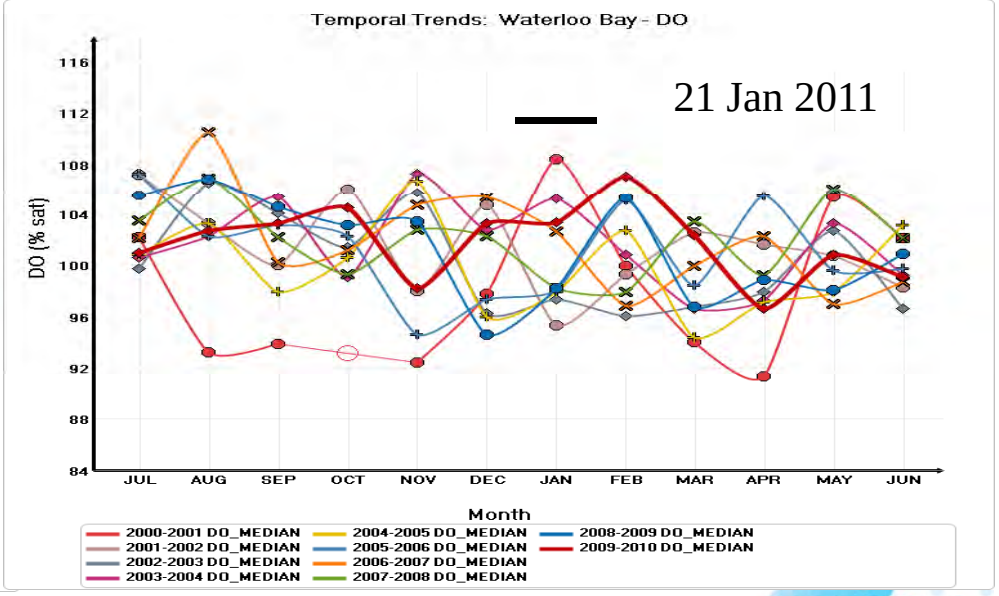


Dissolved Oxygen across the Bay









Total metal concentration (mg/L) summary

Element	Greater than Aus Trigger Values	Greater than pre-flood (2010) concs in Brisbane Port
aluminium	**Y**	**Y**
arsenic	50% Y	Y
cadmium	N	N
chromium	25% Y	Y
copper	Y	Y
iron	80% Y	Y
lead	50% Y	75% N
manganese	50% Y	Y
nickel	N	50% Y
selenium	N	N
zinc	33% Y	N

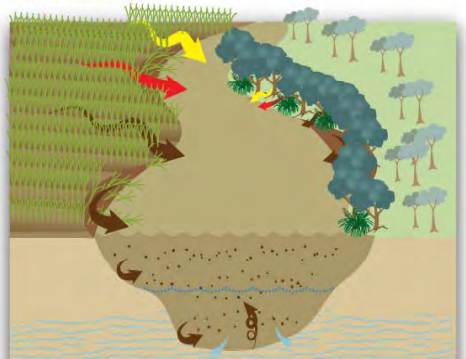
Information Courtesy of DERM

Flood impact assessment

	Issues to be evaluated			
Catchments	Loads	Changes in hydrology and geomorphology	Load Modelling	Restoration and Mitigation
Estuarine and marine areas	Water Quality – EHMP	Marine Park Monitoring	Sediment geochemistry	Modelling to predict impacts and direct sampling
	Pesticides and toxins	Remote Sensing	Seagrass ecology	Dugong and other macrofauna

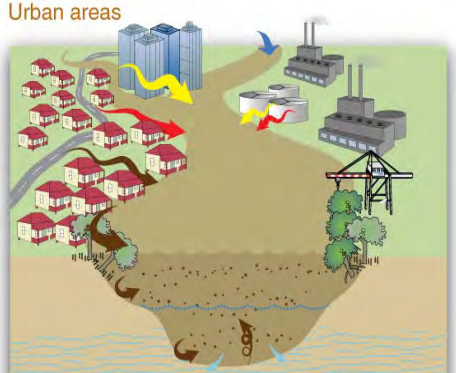
Conceptual models to guide tracking recovery

Rural areas



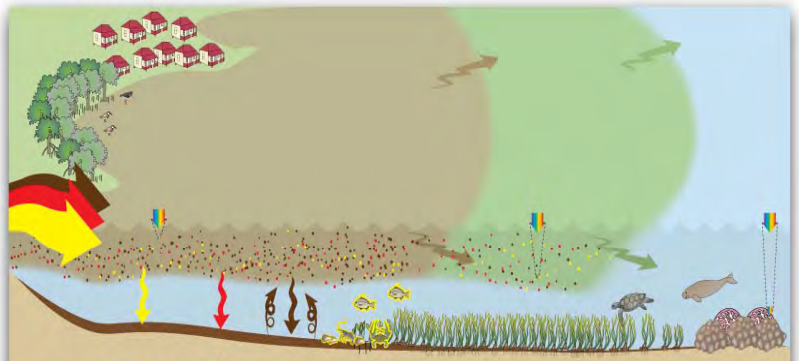
- Runoff of sediments, nutrients and toxicants from agricultural lands and vegetated areas
- Severe bed and bank scouring and gully erosion increases sediment load
- Resuspension of sediments
- Groundwater recharge

Urban areas

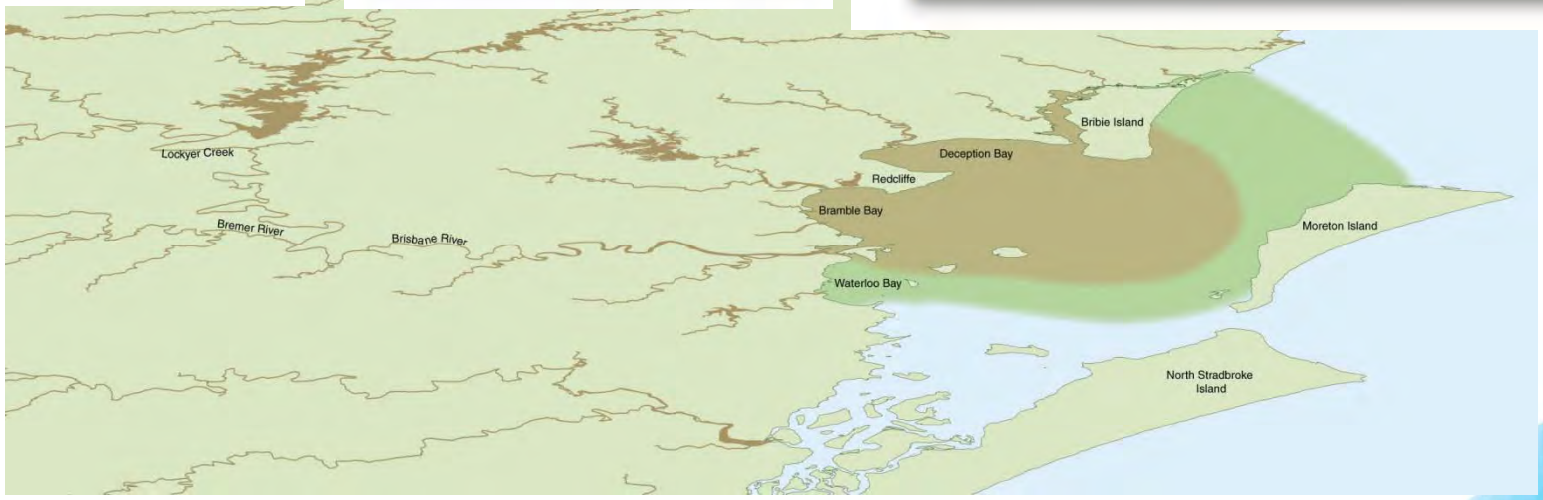


- Runoff from upper catchment
- Runoff of sediments, nutrients and toxicants
- Bank and bed scouring leads to collapse of banks and damage to mangroves
- Resuspension of sediments
- Groundwater recharge
- STPs release high nutrient and pathogen loads

Moreton Bay



- Flood waters enter the Bay with high levels of sediments, nutrients and toxicants
- Freshwater flood plume sits on top of the saltier water with distinct inner brown and outer green plumes which move slowly across the Bay
- Sediments block light in the water column
- Seafood may become contaminated with toxicants
- Deposition and resuspension of sediments



Nature of upper catchment damage

Gatton Creek bank erosion

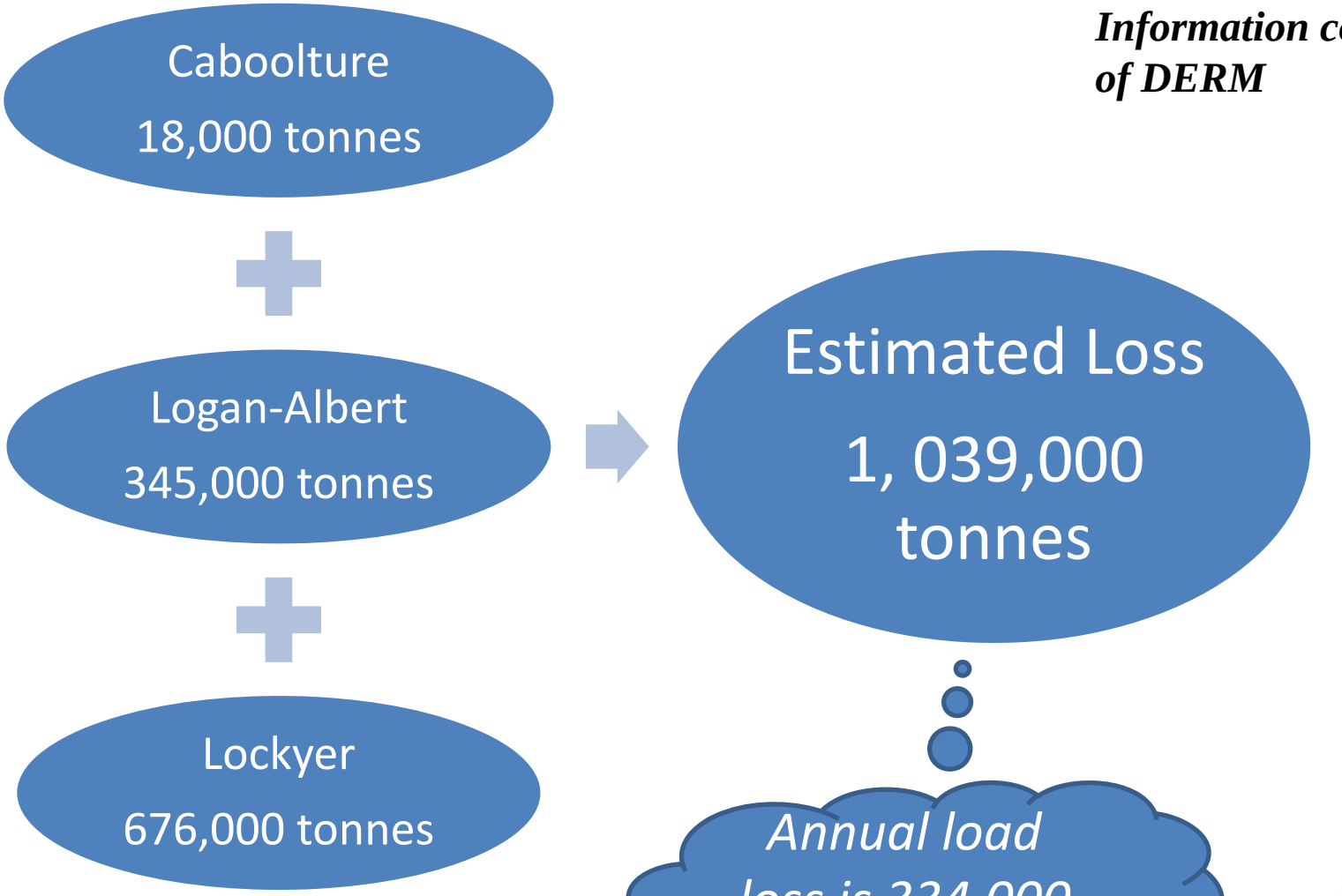
Lower Lockyer gully loss

Landslip in the upper Brisbane near Mt Stanley

Photos courtesy of SEQ Catchments

Sediment load movement over a week

Information courtesy of DERM



Catchment damage analysis

Map

- Commission post-flood LiDAR
- Utilise pre flood LiDAR to compare with post flood and calculate channel and vegetation change

Calculate

- Field assessment of riparian and watercourse condition
- Using flood heights build a hydraulic model and estimate stream power

Explain

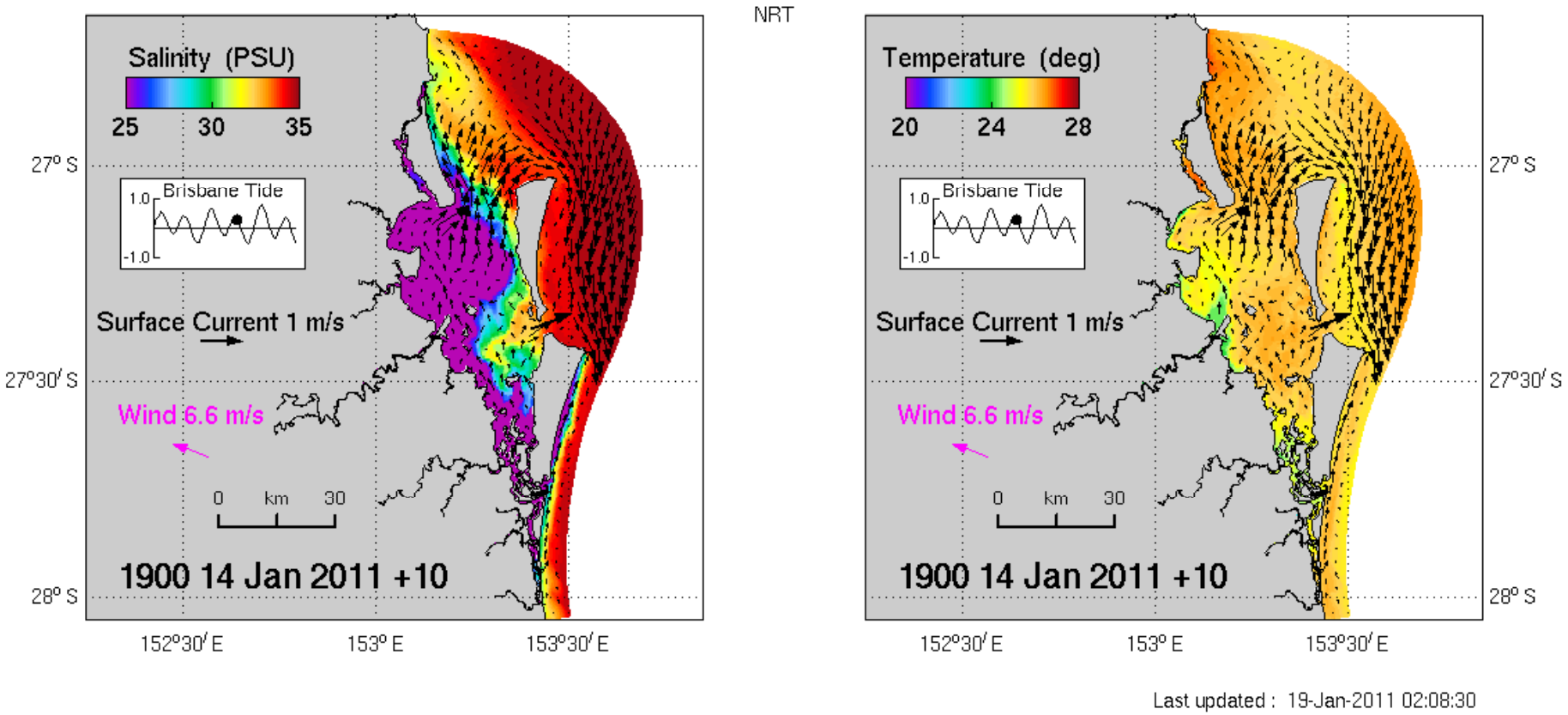
- Build a story of post-flood channel change
- Utilise experienced observations and local memories

Information courtesy SEQ Catchments

Flood Response Activities

S.E. QUEENSLAND NEAR REAL-TIME HYDRODYNAMIC MODELLING

MB Salinity & Temperature



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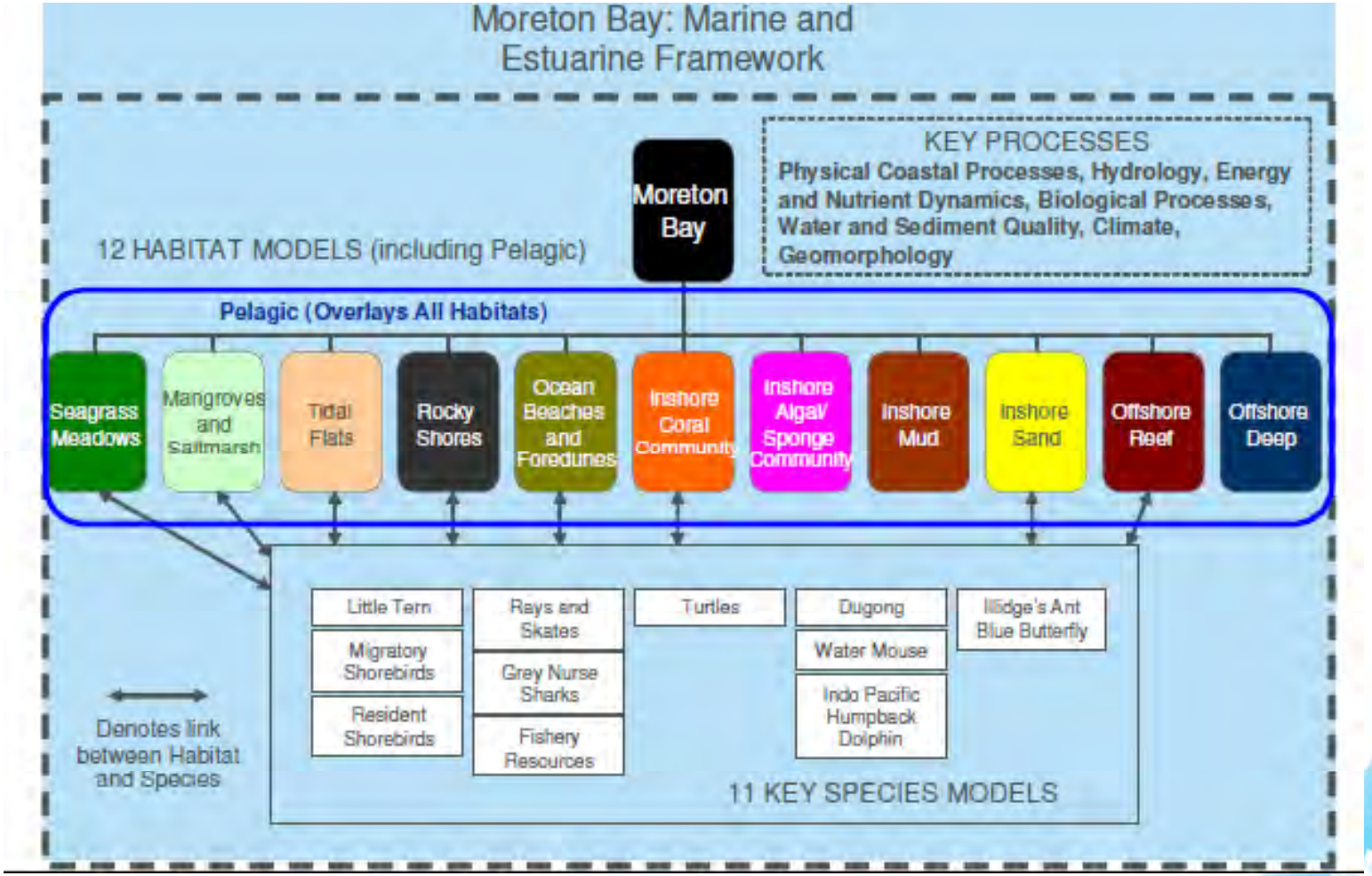
Flood Response Activities

Additional Monitoring

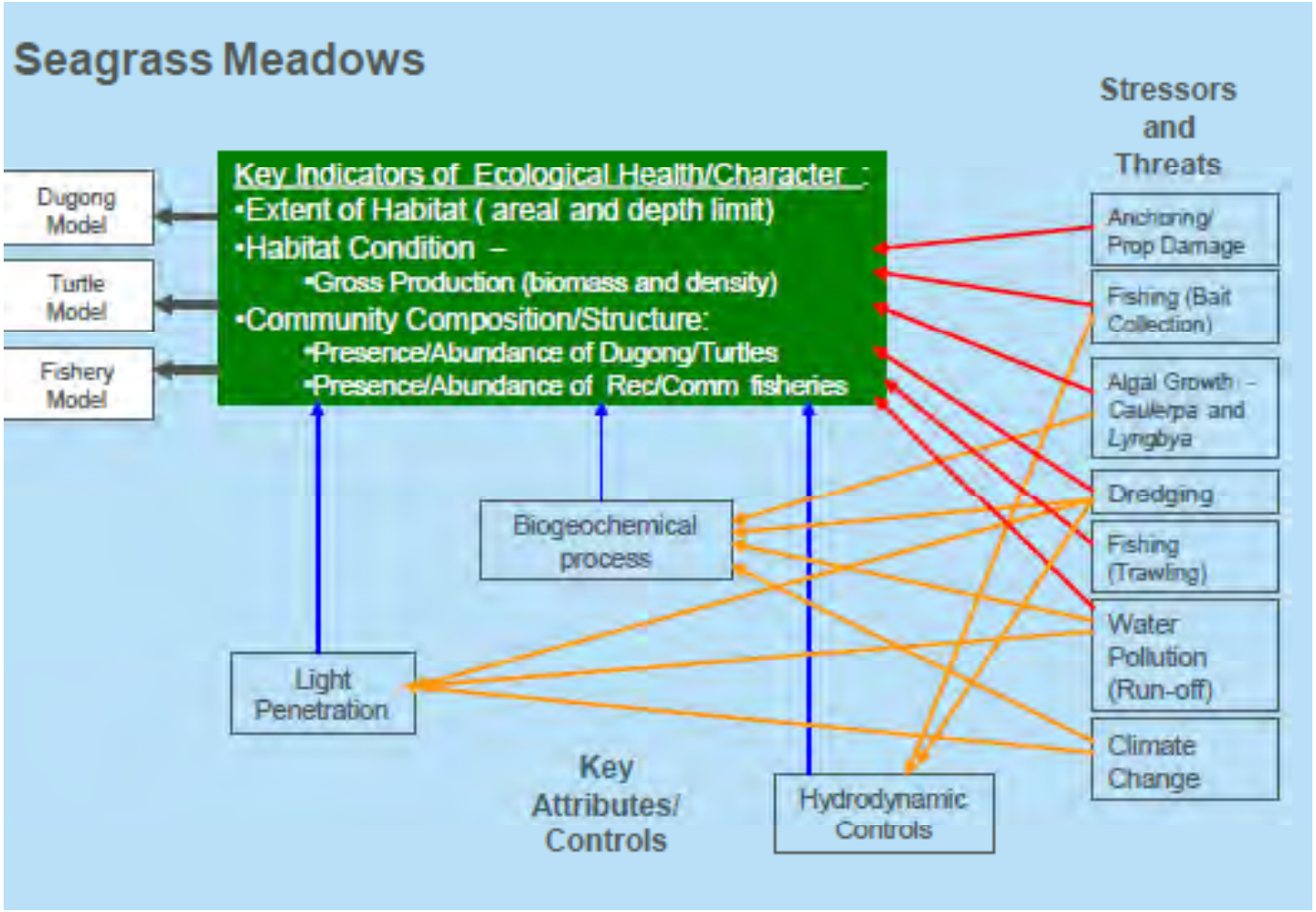
Flood impact assessment

	Issues to be evaluated			
Catchments	Loads	Changes in hydrology and geomorphology	Load Modelling	Restoration and Mitigation
Estuarine and marine areas	Water Quality – EHMP	Marine Park Monitoring	**Sediment geochemistry**	**Modelling to predict impacts and direct sampling**
	Pesticides and toxins	**Remote Sensing**	Seagrass ecology	Dugong and other macrofauna

Habitat and Species Models

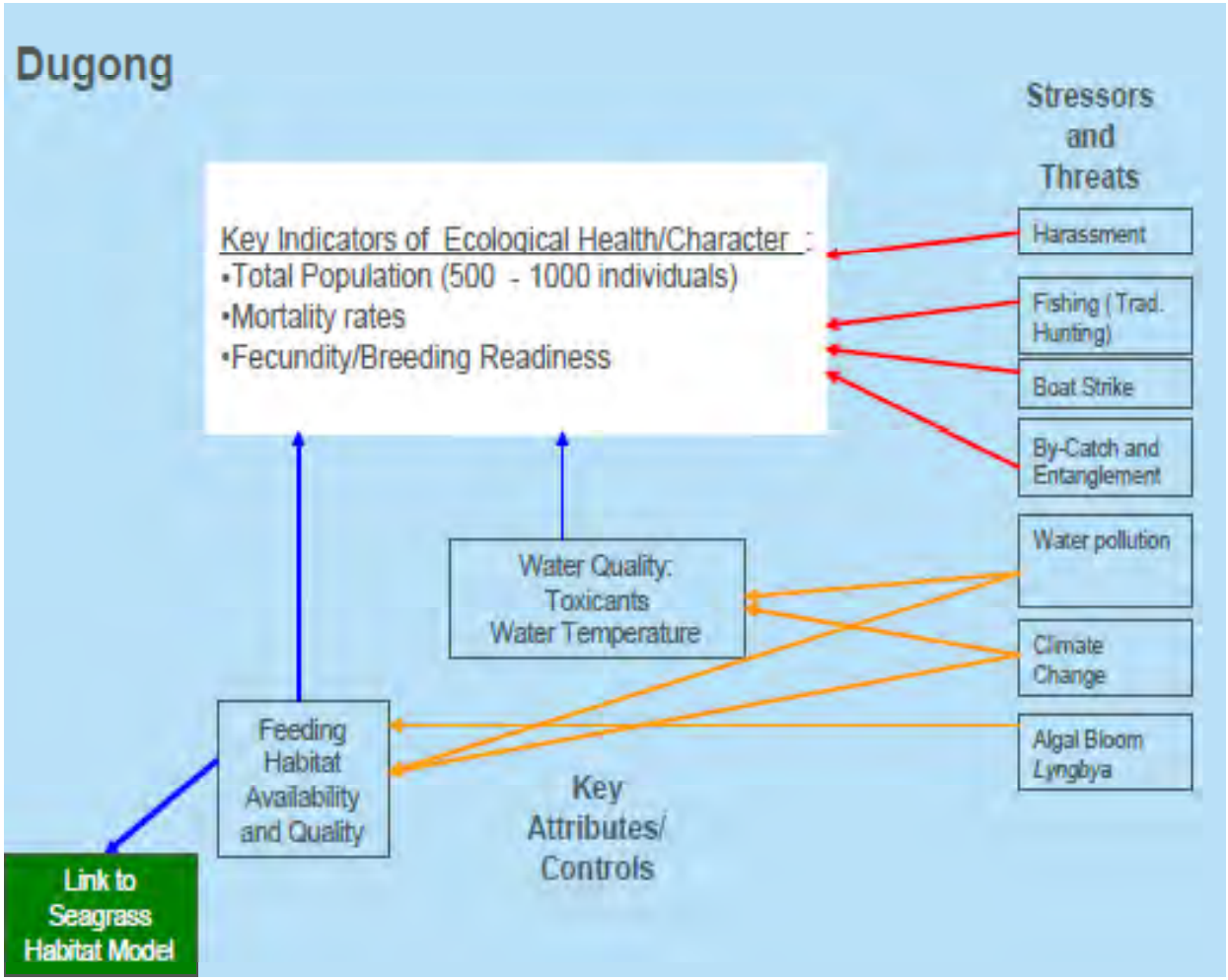


Seagrass Dynamics



Seagrass Beds

Dugong dynamics



Impact possibility

•Loss of seagrass supply
•Increased risk of diseases as animals become weaker
•Die from starvation

•Standings commence within 4 months of flood

Dugongs of Moreton Bay

Photo Courtesy of Tangalooma Wild Dolphin Resort

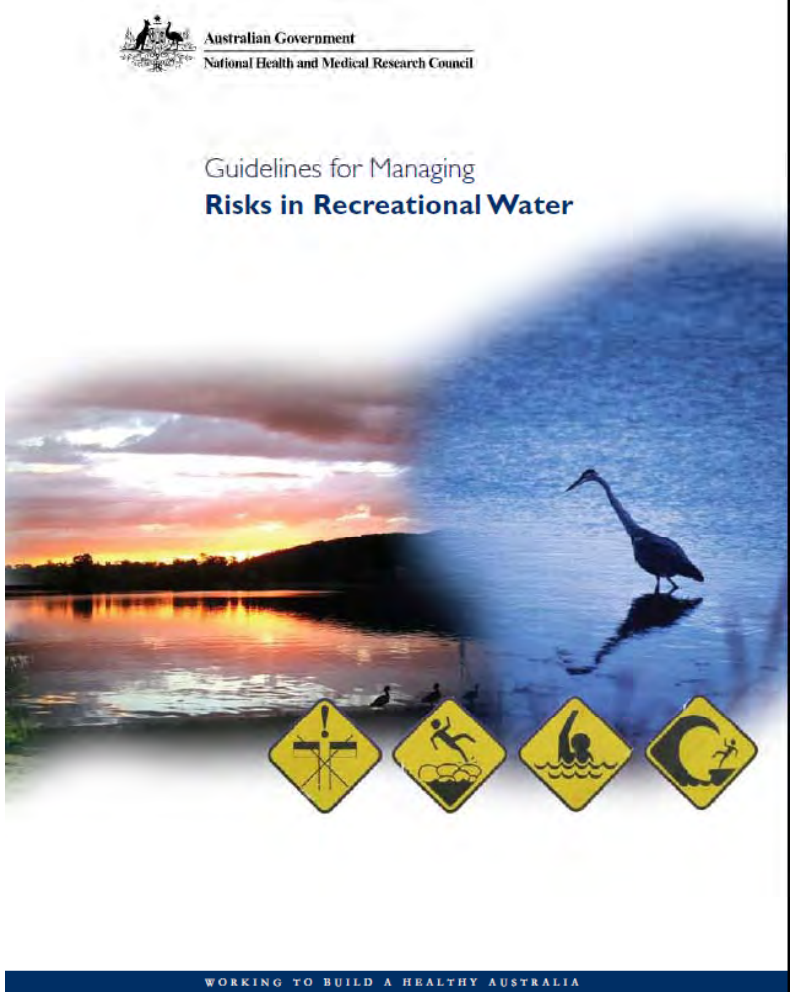
Flood Response Activities

Aquatic Ecosystem Assessments

Flood Response Activities

Debris Clean up – Major community focus on Clean up Australia Day on Sunday 6 March

Recreational risk assessment and reporting



Consortium of SEQ Councils, Water Utilities, State Govt and Healthy Waterways

Monitor, assess and report

Annual classification of recreational areas

Community awareness and solutions to safe guard well being

Who can benefit from lessons learnt?

Organisations	Sub Groups	Area of interest
Queensland Reconstruction Authority	Environment Committee	State wide
BCC	Recovery taskforce	Brisbane
SEQ Catchments	Rural support and restoration	SEQ – focus on Lockyer – Upper Brisbane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