RISK ASSESSMENT TO DETERMINE SOURCES OF IMPACT ON COASTAL STORM WATER: THE CASE OF JEFFREYS BAY (SOUTH AFRICA)

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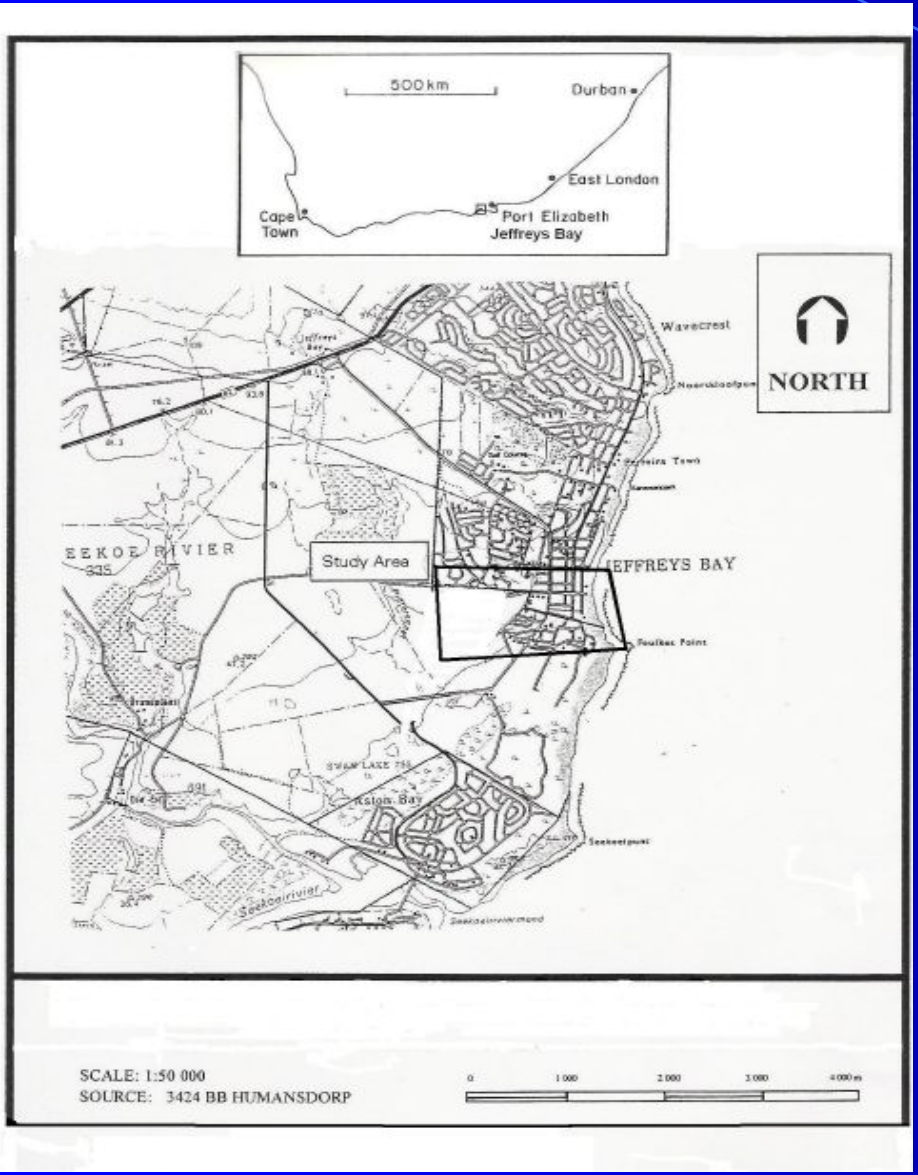
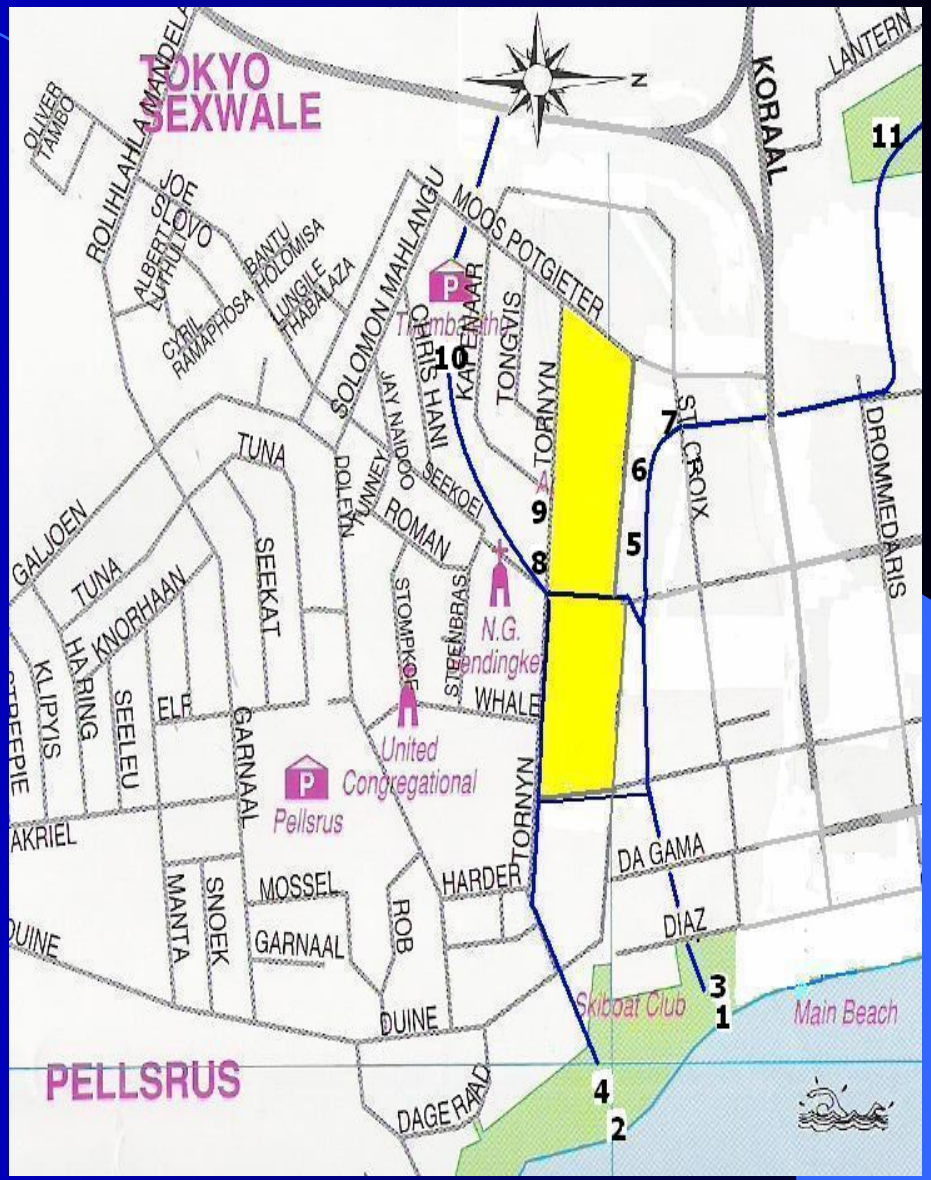
Introduction

- The marine environment is of great natural and economic value.
- By 2025 three-quarters of the world's population will live in the coastal zone.
- Storm water from developing communities has been identified as a major marine pollution source.
- Little is being done in developing countries to understand and reduce anthropogenic land-based marine pollution.

Study Area (Jeffreys Bay)





Hypothesis

Waste management and sanitation in the storm water catchment at Jeffreys Bay, South Africa are inadequate and therefore poses a pollution threat to storm water and subsequently, the local marine environment.

Research questions

- Which aspects (activities and services) in the catchment pose the most significant risk to storm water quality, marine ecology, human health and the socio-economic status of the community?
- To what extent did rainfall influence the probability of aspects having a negative impact on receptors?
- What was the current quality of storm water within the catchment?
- Is there evidence that direct discharge of storm water has a negative impact on the water quality of the near shore marine environment at Jeffreys Bay?

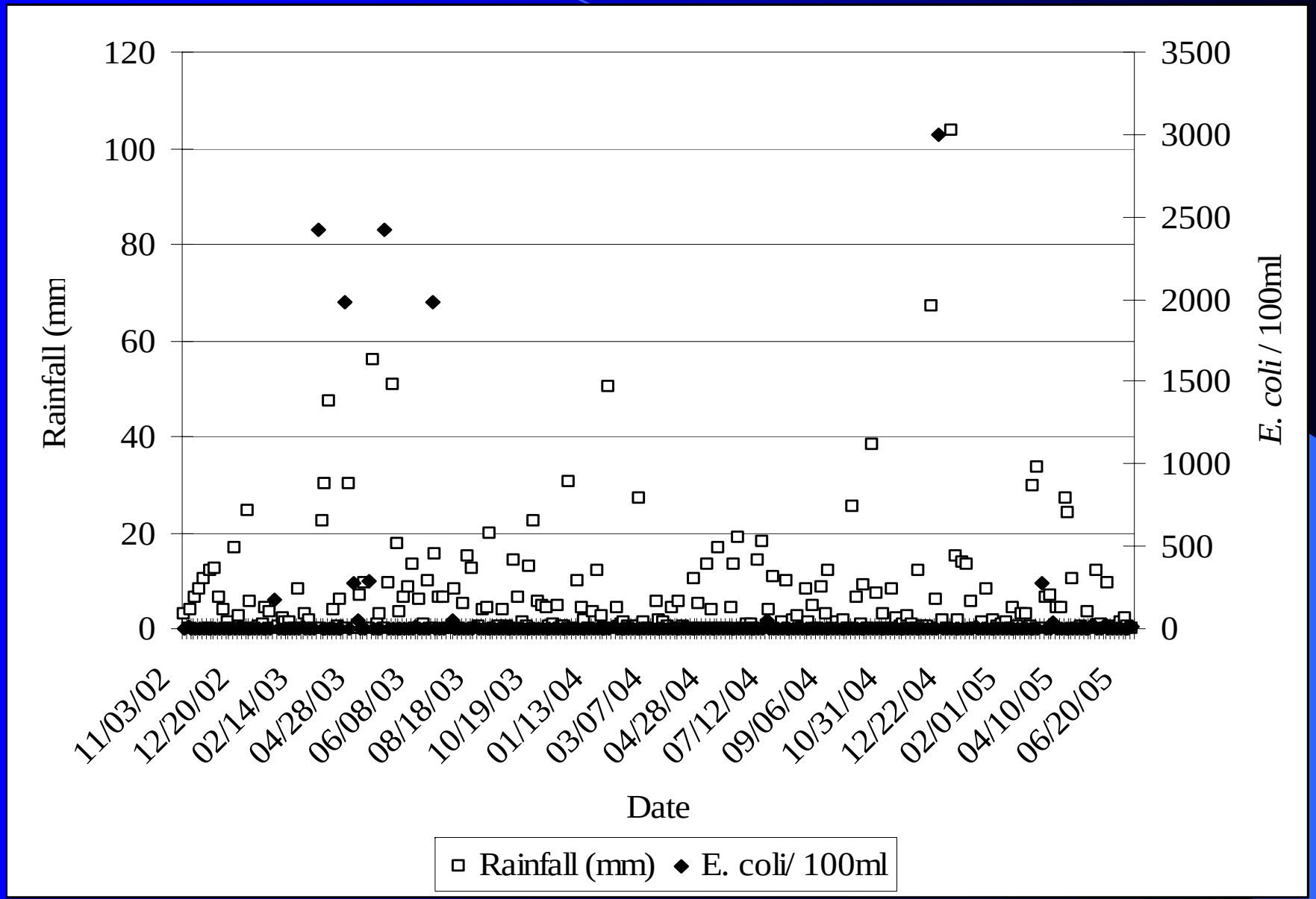
Risk Assessment

- Risk assessment was conducted to identify and prioritize pollution sources.
- Risk = (likelihood of occurrence + detection) x consequence
- Significant aspects identified were; solid waste disposal, grey water disposal and informal ablution.

Snap-shot Storm Water Analyses

	Monitoring Stations					
Water Quality Constituent	**Northern storm water outlet**	**YWAM**	**Wetland**	**Industrial**	**C-Place**	**SA Water Quality Guidelines**
Suspended solids	**120**	**116**	**100**	96	84	<100 (DWAF, 1996a)
COD	**1160**	**765**	<100	<100	<100	12.77 Variance: 80%-120% (DWAF, 1996a)
Phosphorous	0.3	**6.3**	0.23	0.09	0.12	<5 (DWAF, 1996a).
Ammonium	<0.05	<0.05	<0.05	<0.05	<0.05	0.007 (DWAF, 1996a).
Nitrate	**4.5**	**5.2**	**1.6**	**1.5**	**2.3**	<0.5 (DWAF, 1996a).
PH	7.85	7.86	7.71	8.46	8.44	6.5-8.5 (DWAF, 1996b)
E. Coli	0 cfu/ml	**18 000 cfu/ml**	0 cfu/ml	0 cfu/ml	0 cfu/ml	0-130 cfu/ml (DWAF, 1996b)
Faecal Coliforms	0 cfu/ml	**105 000 cfu/ml**	0 cfu/ml	0 cfu/ml	0 cfu/ml	0-150 cfu/ml (DWAF, 1996b)

Marine Water Quality and Rainfall



Sanitation Management Study

Solid Waste Management Study

Conclusion

- Coastal water pollution from contaminated storm water is of growing concern.
- Source based solutions more effective long-term compared to end-of-pipe solutions.
- Recommended to integrate various technologies for example ecological sanitation and one-man contract solid waste removal.
- Strong emphasis need to be placed on community participation and education.

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