



DISASTER RISK REDUCTION CONFERENCE:

26-27 MAY 2009 – DiMTEC

THE APPLICATION OF FLOOD LINES IN LAND USE CONTROL

*Mzamani Khoza: Involved with Disaster Management Capacity
Building and Research in the SA National Disaster Management
Centre*

(Based on a case study of Moreleta Spruit in Tshwane)

**Acknowledgements: Prof. MF Viljoen (Supervisor),
Chris Swiegers (Mentor)**



Outline of the presentation

- SOME KEY DEFINITIONS
- AIM OF THE STUDY
- BACKGROUND
- METHODOLOGY
- POLICY REQUIREMENTS
- WHY FLOOD LINES?
- LAND USES IN FLOOD HAZARD AREAS
- SYNOPTIC REMARKS
- CONCLUDING STATEMENT



SOME KEY DEFINITIONS

Flood: “a discharge that causes damage, or overtops the river banks, or exceeds a specified value” (Alexander, 2000). The term may also be used to alert the public of non-life threatening inundations of small streams, streets, storm drains, and low lying urban areas.

Flood line: Hydrologically, the risks of flooding in rivers and flood plains are expressed as flood lines, with specific flooding likelihoods, computed on *average qualification*.

Land-use: any developmental activity or human modification of either terrestrial or aquatic environment, or both, and has a potential of influencing the nature of flooding.

Spruit: Afrikaans word for stream.



AIM OF THE STUDY

To analyze the policies, principles and practices regarding the establishment and application of flood lines with respect to development in flood-prone areas in the CTMM.



BACKGROUND

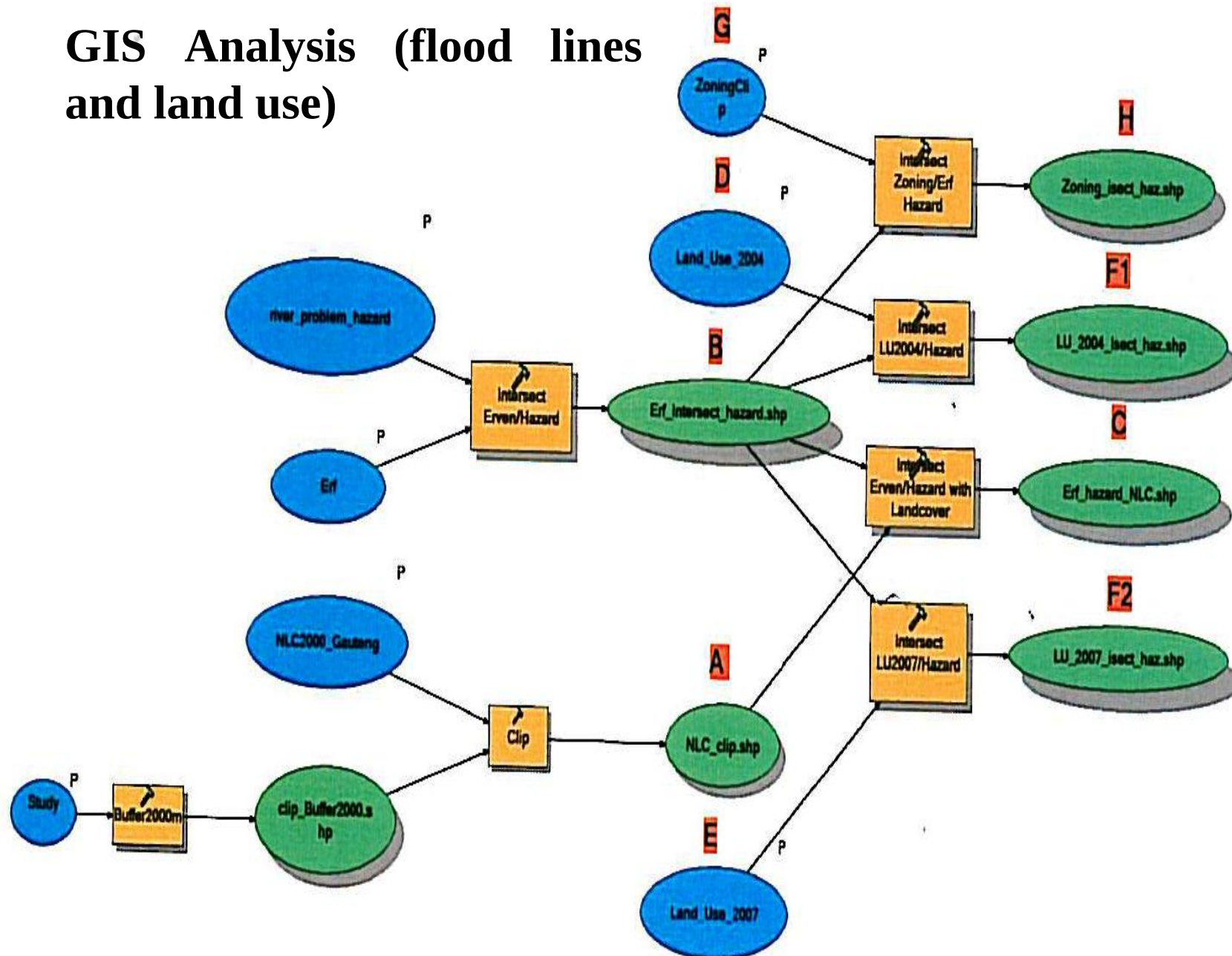
- (Flood) Disasters – acts of man or acts of God?
- Floods and their impacts
- What interventions?
 - Focus on flood lines principles



METHODOLOGY

- **Literature study:** To review a body of research and establish how other researchers have investigated the subject of flood management, in particular, the application of flood lines in the urban context.
- **Analysis of the legal framework with reference to flood lines:** To determine legislative requirements for the application of flood lines
- **Interviews and a focus group discussion:** To establish the extent to which principles of flood lines are integrated in land use control concerns.
 - Samples: Purposive sampling (Strydom, Fouche, & Delport, 2005)

GIS Analysis (flood lines and land use)



Credit: Dirk Craigie (DWA Senior GIS Analyst)

Disaster Risk Management is everybody's business - towards a resilient South Africa



Erven : Hazard Class

Legend

— Moreletta_focus

Erf_Intersect_hazard

HAZARD

- High Hazard
- Low Hazard
- Medium Hazard



HB29
 Projection: Transverse_Mercator
 False_Easting: 0.000000
 False_Northing: 0.000000
 Central_Meridian: 29.000000
 Scale_Factor: 1.000000
 Latitude_Of_Origin: 0.000000
 Linear Unit: Meter

GCS_Hartebeesthoek_1994
 Datum: D_Hartebeesthoek_1994

Visualization of how flood hazards were computed



These flood scenarios were used, defined in terms of probability of flood hazard occurrence:

- Low Flood Hazard : 1 in 100 years
- Medium Flood Hazard : 1 in 50 years
- High Flood Hazard : 1 in 20 years

Sources of data sets:

- Data on flood lines: obtained from SRK Consulting
- Aerial photos of the study area: obtained from CTMM Geomatics
- Vegetation cover (NCL2000): obtained from DWAF GIS Section
- Land use data: obtained from GeoTerraImage



LEGISLATIVE REQUIREMENTS

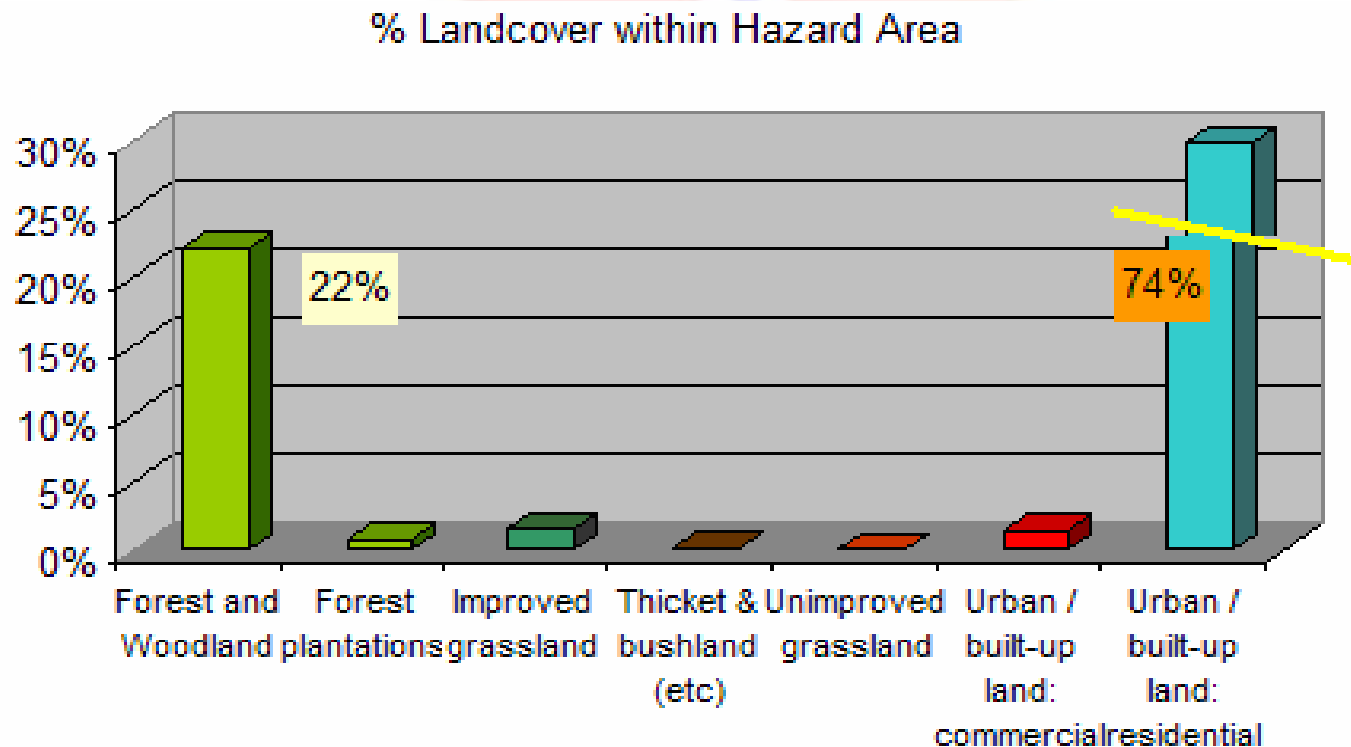
- South African policy:
 - NWA (No 36 of 1998): “no person may establish a township unless the layout plan shows, in a form acceptable to the local authority concerned, lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years” (NWA, Section 143).
 - CARA (No. 43 of 1983): restrictions of certain plants within 30m of a 1:50 flood line (Section 15).
- CTMM (Flood Management Plan & by-laws)



WHY FLOOD LINES?

- To control development in flood plains (Alexander 2000)
- Flood lines have been determined – the 200-year and 100-year indicative flood lines have been calculated for the whole Spruit whilst the 50-year flood line for most of the Spruit. The 100-year actual flood line, however, has not been determined yet (SRK Consulting, 2006)
 - Moreleta Spruit flood lines are post-development.

LAND USES IN FLOOD HAZARD AREAS



- The purpose was neither to do vulnerability assessment nor flood damage assessment, but rather to identify and demonstrate the land uses falling within the different sized (20-year; 50-year and 100-year) flood hazards.



SYNOPTIC REMARKS

- **Development of guidelines:** for the establishment and application of flood lines with clearly defined roles and responsibilities for all sector departments and foster efficient communication and integration of pertinent role players
- **Flood lines vs. development lines**
- **Major floods vs. minor floods**
- **Environmental considerations:** the benefits of any development/land use undertaken without incorporating the principles of integrated environmental management will only be short lived.



SYNOPTIC REMARKS cont.

- Part of the solutions could include **engineering works, education and (early) warning systems and enforcement**
- **Political commitment:** defined in terms of political commitment and strong institutions, the government must elevate disaster risk reduction as a policy priority, allocate the necessary resources for it, enforce its implementation and assign accountability for failures, as well as facilitate participation from civil society and private sector.
- **Public responsibility:** families, businesses and industries whose properties are within flood hazard areas should build fence walls to prevent flood waters from entering into their yards and to raise their buildings foundations above the 1:50 year flood line (and 1:100 flood line where feasible).
- **Applaud** the good, **correct**/change the bad



Concluding statement

The precursor to any effective risk and vulnerability reduction is not purely the implementation of a disaster management programme, it is the implementation of a sound development programme (Westgate 1999 in Viljoen, du Plessis, Booysen, Weepener, Braune, Van Bladeren, & Butler . 2001).

Kanimambo!!!