

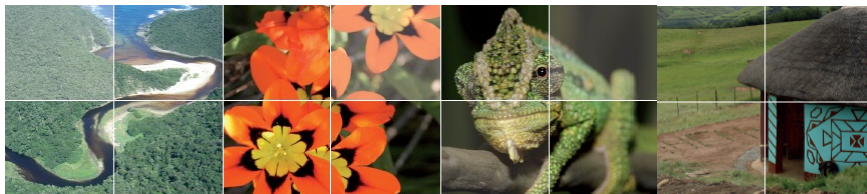
# Urban Hydrology Workshop Wetland Rehabilitation

Plant Sciences Auditorium,  
University of Pretoria  
24 January 2014



## Overview

- Wetlands and their challenges
- What Working for Wetlands does
- The Wetland rehabilitation model it uses
- Wetlands in the urban areas
- Future investments in wetlands



## What are wetlands?

National Water Act (1998) defines wetlands as:

*“land which is transitional between terrestrial and aquatic systems where the **water table** is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support **vegetation** typically adapted to life in **saturated soil**”*



## What are wetlands?

- Saturation
- Distinctive plants
- Modified soils





## So what?

Wetlands are valuable natural infrastructure that provide a range of beneficial services to people:

- water supply
- Stream-flow regulation
- flood reduction
- water quality improvement
- habitat for specialised wetland species
- products (fish, grazing, building and crafts material)
- cultural values
- recreation and tourism



South of Kriel, Mpumalanga : Coal mining extending into a floodplain



## Consequences of wetland loss

- Reduced food security
- Desertification
- Lost livelihoods
- Diminished water security
- Increased vulnerability to floods and droughts
- Reduction in biodiversity
- Poverty and environmental degradation are linked - poverty is a consequence as well as a cause of environmental degradation



## Rehabilitation purpose

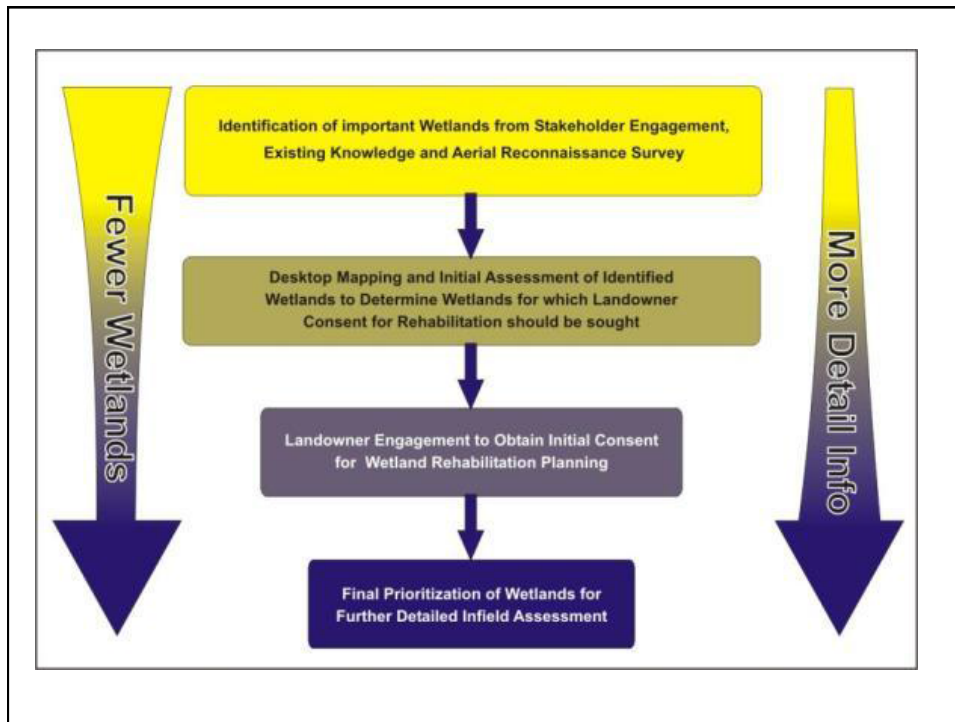
- Restore the natural functioning of wetlands
- Stabilize the further erosion of wetlands (head-cuts at top end of gully erosion)
- Re-hydrate the wetland by lifting the water table
- Ensuring better water security (hydrological buffering) and water quality (natural filter)
- Increase biodiversity – plants, birds, frogs
- Aesthetics – tourism potential

## Planning for Wetland Rehabilitation

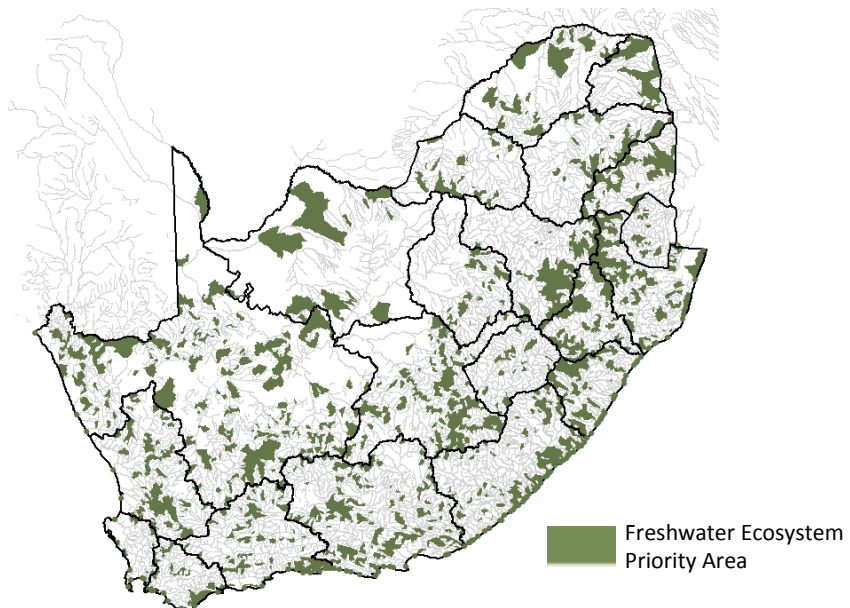
Phase 1	Desktop planning by ecological specialist
Phase 2	Field visit & compilation of rehab plan: -Detailed ecological assessment -Engineering design -Environmental impact assessment
Phase 3	Implementation/Construction

### **Phase 1: Desktop planning by ecological specialist**

1. Consult with regional forums to identify focus areas
2. Identify the priority wetland systems in your catchment – aerial survey
3. Delineate wetland and identify problems within the wetland by making use of aerial photographs.
4. Walk the wetland to establish the magnitude of the problem.
5. Obtain landowner consent.



## National Freshwater Ecosystem Priority Areas

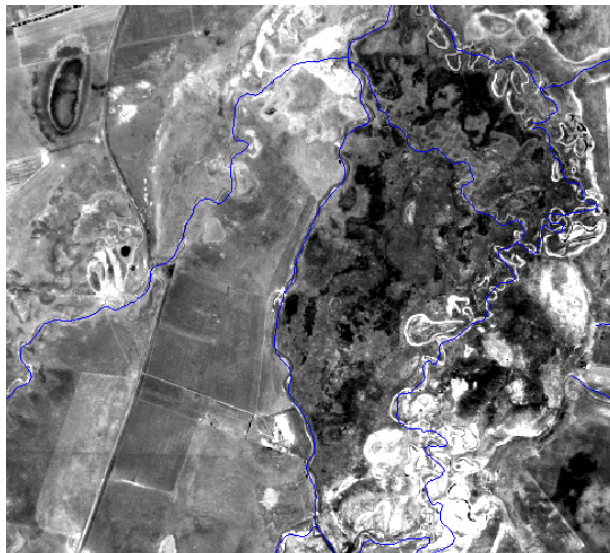




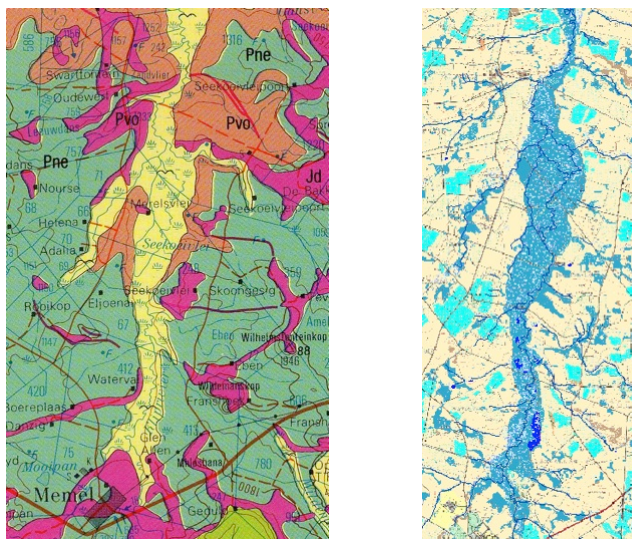
## Aerial survey



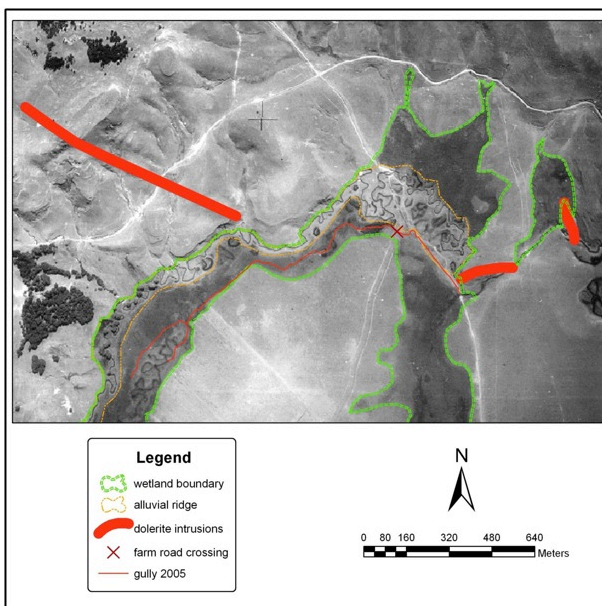
## Study historic imagery



## Study geological maps



## Desk-top delineation of rehab area



## Planning for Wetland Rehabilitation

Phase 1	Desktop planning by ecological specialist
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### Phase 2 Field visit & compilation of rehab plan



## Phase 2: Field visit follow-up

Detailed assessment of wetland problems by multi-disciplinary team:

- Ecological functioning by Wetland Ecologist
- Engineering design by Engineer
- Environmental impact and authorisation requirements by Environmental Assessment Practitioner
- Budget, labour, training and community aspects by SANBI Provincial Co-ordinator
- Construction aspects by Implementer

## Wetland assessment procedure

- Step 1: Assess impacts and threats
- Step 2: Set rehabilitation objectives and agree appropriate measures
- Step 3: Assess rehab intervention contribution to wetland health

## Deciding on an intervention

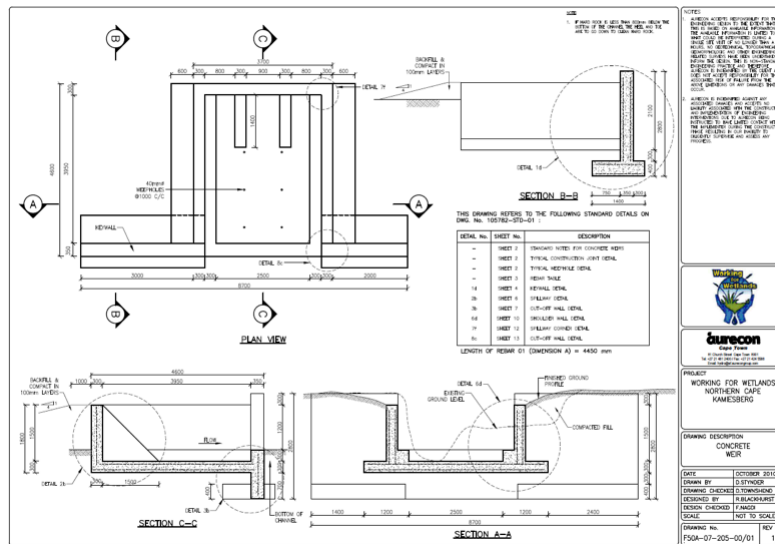
- Need to consider the best long term intervention for the problems in wetlands
- Most cost effective in the long term? – chutes, concrete weirs, gabions, bio-engineering options, earth plugs
- Where is the problem in relationship to the entire catchment, energy levels, gradient, flood intensities, wetland dynamics, sedimentation processes, catchment condition, geology
- Return on your investment – how much wetland area will be rehabilitated
- Is the problem really an unnatural problem.

## Rehabilitation Plan



- Documents base info, assessments and decisions taken per wetland
- Includes detailed designs
- Used to engage with public and obtain Environmental Authorisation from DEA
- Used as base document for implementation

# Engineering drawing



## Planning for Wetland Rehabilitation

Phase 1	Desktop planning by ecological specialist
Phase 2	Field visit & compilation of rehab plan: -Detailed ecological assessment -Engineering design -Environmental impact assessment
Phase 3	Implementation/Construction

## Implementation



## Completed



## The urban challenges

- Densely populated,
- Paved or tarred creating storm-water needs,
- Many rivers are canalised, losing key ecological functions,
- No natural wetlands retained, creating additional stress during heavy rain events,
- Issue with litter and sedimentation.
- And others ....







### Alien plant species

Alien plant species could exacerbate flooding, increase the risk of runaway fires, reduce our natural water resources, impact on the natural functioning of ecosystems, and inhibit growth of indigenous vegetation. As required by law, they must be removed.

**Five aquatic alien species you can help remove**

Kariba weed (*Salvinia molesta*)

Parrot's feather (*Myriophyllum aquaticum*)

Red water fern (*Azolla filiculoides*)

Water hyacinth (*Eichhornia crassipes*)

Water lettuce (*Pistia stratiotes*)

**Tips for removal of alien plant species**

- Eradication methods vary from hand removal or mechanical removal to approved chemical and biological control.
- Start clearing from a point as far as possible upstream, and work in a downstream direction.
- Start from the highest point on the bank, and move downwards.
- Stockpile cleared plants away from the river, and remove within a week to a City-controlled dump site.
- Regular follow-up clearing is essential.
- Work with your neighbours.

### Contact details

If you need any additional information, please feel free to use the following contact numbers:

City of Cape Town  
Catchment, Stormwater & River Management:  
Tel: 021 400 1205

Environmental Resource Management:  
Tel: 021 710 8000

SANBI  
Working for Wetlands:  
Tel: 021 799 8848/8736

Department of Water and Environmental Affairs  
Working for Water  
Tel: 021 976 8136

**Photographic credits**  
C & S Daise  
www.flickr.com  
Sm - *Salvinia molesta* - Larry Mayspin  
Af - *Azolla filiculoides* - Forrest & Kim Starr  
Ma - *Myriophyllum aquaticum* - Andre Karweh  
E - *Eichhornia crassipes* - Ted Carter  
Ps - *Pistia stratiotes* - Dinesh Valke

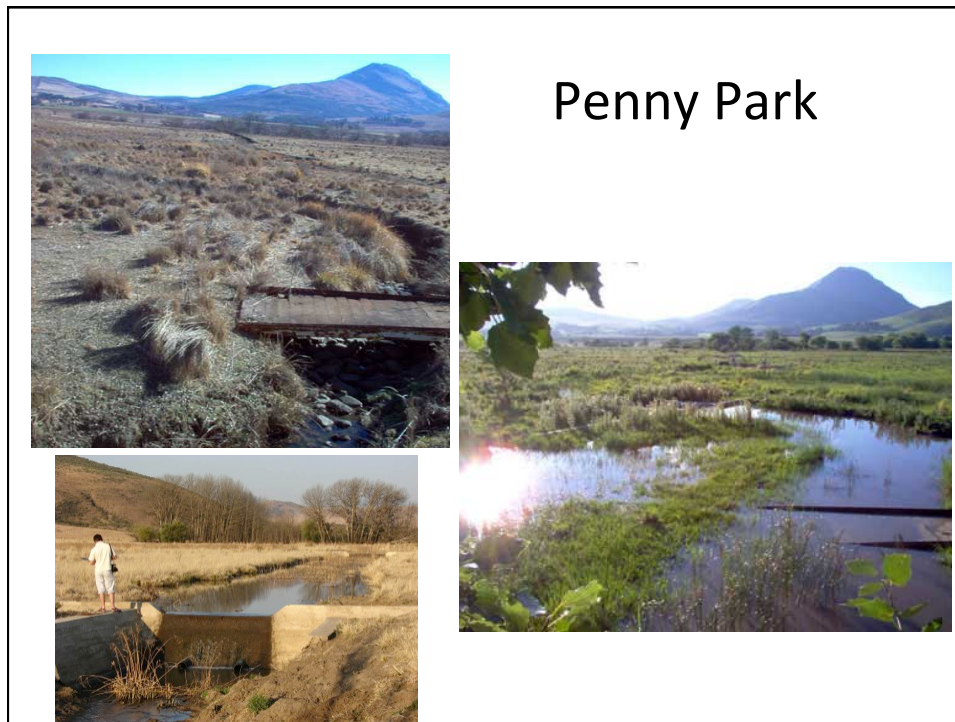
## RIVERS AND WETLANDS IN OUR BACKYARDS

021 400 1205 | 021 710 8000 | 021 976 8136  
**THIS CITY WORKS FOR YOU**



## We have worked at ...

- Rietvlei (Tshwane),
- Upstream from Kokstad (E Cape),
- Tokai (W Cape),
- Princess-vlei (W Cape),
- Soweto (Gauteng),
- Soshanguve (Tshwane)
- Bushbuckridge (Mpumalanga)



## Opportunities to work towards...

- Restoring of concrete channels to 'living systems'
- Improving water quality – to reduce nutrients (total phosphorous and total nitrogen) and suspended solids
- Improving flood protection - by detaining water and releasing it slowly
- Creating aquatic habitat - manufactured wetlands attract water birds, frogs and other organisms
- Providing opportunities for 'natural' recreational experiences in our suburbs
- Harvesting storm-water to be used for irrigation of local sports grounds instead of drinking water

## And gearing up for ...

- Exploring the opportunities that the new SIP 19 has to offer for us,
- Exploring artificial wetlands and the value it could give in urban settings and potential solutions to Centurion lake, for example.
- Moving the programme into a more simpler mode, making a difference when wetlands are just becoming degraded rather than those requiring very expensive solutions.

## Our Challenge is a Fundamental Global Transformation

