

OHLANGA ESTUARY

Specialist Workshop on Potential
for "Recovery"

Purpose

To answer the following:

“If the council were to discharge up to 30MI/day (as presently permitted) of effluent to the estuary for a period of 5 years, would the further degradation of the system (from present state C to E), be reversed on withdrawal of the effluent i.e. would the ecological state return to the present condition”

Ecological State = hydrology + physicochemical characteristics
+ habitat diversity + biodiversity

Participants

Specialists

- Prof Renzo Perissonotto: *Microalgae*
- Ms Shamilla Pillay: *Macrophytes*
- Ms Nicolette Demetriades: *Benthic fauna*
- Dr Allan Connell: *Fish (+Zooplankton)*
- Prof Ticky Forbes: *Birds*
- Ms Lara van Niekerk: *Hydrological modeling*
- Mr Piet Huizinga: *Hydrological modeling*

Participants (continued)

- Mr Lyn Gravelet-blondin: DWAF (**KZN**)
- Mr Aadil Khan: DWAF (**KZN**)
- Ms Barbra Weston: DWAF (**National**)
- Ms Sarah Allan: Agriculture & Environment (**KZN**)
- David Shandler: Commonground
- Mr Pravin Amar: Pravin Amar Development Planners cc
- Mr John Harrison: eThekwini Municipality (**Stormwater**)
- Mr Bill Pfaff: eThekwini Municipality (**Water & Sanitation**)
- Mr Richard Boon: eThekwini Municipality (**Environment**)
- Dr Debra Roberts: eThekwini Municipality (**Environment**)
- Mr James Morris: SRK (**Hydrology**)
- Mr Russell Stow: SRK (**Hydrology**)

Hydological Changes

Expected Outcomes

- More frequent mouth breaching
- Little or no prolonged mouth closure periods
- River dominated flows (freshwater habitat)
- Reduced Saline/brackish habitat (approx. 0.5km vs 2km)

Uncertainties

- Cycles and duration of open and closed phases
- Water level predictions
- Interaction of sea state and river flow on mouth condition
- Increased flow due to higher runoff coefficients from urban developments

Macrophytes

Community Structure

- Simple community- essentially wide fringe of reeds (*Phragmites*) and a few *Barringtonia* & *Hibiscus*
- Community is not dependant on saline conditions

Main Impacts

- Prolonged lower water levels (open mouth) could result in drying of outer fringe of reeds – encroachment of weedy terrestrial species.
- Trees exposed to drier conditions could result in changes in leaf morphology (*Barringtonia*) and phenological changes (more deciduous)

Macrophytes

Potential for Recovery

- Return of hydrological regimes expected to restore any reed loss.
- Period – 2-3 years owing to short regeneration time for vegetative reproduction in reeds
- Recovery prediction is therefore a YES with a medium confidence level

Microalgae

Community Structure

- Benthic algae – inhabiting the surface and upper layers of sediments
- Planktonic algae – inhabiting the water column
- Present diversity of microalgae are poorly known

Main Impacts

- Change in species composition due to salinity changes
- Loss of overall diversity
- Reduction in productivity due to lack of prolonged mouth closure
- Resultant impacts on primary consumers

Microalgae

Recovery

- Whether a seed population of the present species will survive and regenerate is unknown
- Prediction on potential to recover cannot be made due to lack of info on present species composition
- Recovery to present condition is therefore a NO with a low confidence level

Benthic Fauna

Species Composition

- Presently a relatively poor diversity
- However the species present are dependent on the diversity of habitats and salinity ranges
- Includes the sand prawn which is absent from other local estuaries

Main Impacts

- Loss of habitats leading to change in species composition
- Reduction in primary productivity could lead to a reduction in faunal biomass
- Potential loss of the sand prawn

Benthic Fauna

Recovery

- Potential for re-colonization by the presently existing species is unknown.
- Reduced intertidal habitat could make loss of sand prawn permanent
- Recovery is therefore considered a NO with a low confidence level

Fish Populations

Species Composition

- Good diversity of estuarine & marine species
- Recent surveys showed increased biomass of freshwater species
- Believed to be important nursery area for marine species

Main Impacts

- Change in species composition due to restricted saline habitats
- Loss/reduction in nursery function
- Reduction in biomass due to loss of primary and Invertebrate productivity (reduced closed phase)

Fish Populations

Recovery

- Envisaged that the return to present salinity regimes would restore the species diversity (mobility of fish)
- However low confidence due to uncertainties regarding recovery of food organisms (benthic fauna + zooplankton)
- Recovery therefore considered a YES with a low confidence level

Birds

Species Composition

- Relatively good – similar to most local estuaries
- Darters, cormorants, kingfishers, herons + pair of fish eagles

Main Impacts

- Reduced closed phase will result in loss of physical habitat
- Possible reduced fish productivity may result in food scarcity
- Migration out of the system

Birds

Recovery

- Fish eagles are territorial- may be lost to the system
- Recovery of bird populations considered a NO because of uncertainties regarding changes in lower levels of the food chain and restoration of physical habitat
- Confidence level is low since these mobile animals could return if the ecology is restored to the present condition

Summary

Several Uncertainties

- Resetting of hydrological regimes to present condition
- Restoration of physical habitats
- Restoration of salinity regimes
- Insufficient data on microalgal diversity
- Changes in species composition
- Possible loss of biodiversity
- Possible loss of nursery function for marine fish

Conclusions

- The system will reset to some form of ecological functioning after withdrawal of the additional flow
- The similarity of the “recovered state” to the present ecological condition cannot be predicted
- Consequently the recovery to the present ecological condition (including hydrological regime, salinity distribution, physical habitats and biotic composition), is considered unlikely after temporary discharge of additional flow for a period of about 5 years
- The confidence level for this prediction is low