A METHOD FOR DETERMINING APPROPRIATE BUFFER ZONES FOR WETLANDS, RIVERS, AND ESTUARIES

THE WRC BUFFERS PROJECT

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What are buffer zones? A strip of land with a use, function or zoning specifically designed to protect one area of land from impacts from another.

Selection of an appropriate approach for setting buffers

- International approaches to determine required buffer zone widths vary considerably.
- **Fixed-width:** A standard buffer width to a particular water resource type.
- **Modified fixed-width:** Category specific standard buffer widths being applied to the resource. These widths may however be modified based on relevant on-site factors where more detailed information is available.
- **Variable width:** A detailed methodology for considering site-specific factors.
- Each approach has a number of advantages and disadvantages, however, the modified fixed-width approach was regarded as most appropriate for the South African context. Principally due to the need to develop a tool that could be applied across a range of scales, while maintaining a level of predictability and consistency between approaches.

Design criteria used to inform the development of the method for buffer determination

- Levels of expertise
- Precautionary principle
- Predictability and administration
- Data collection and assessment
- Buffer widths tailored according to:
  - The risks posed by adjacent landuses or activities;
  - The importance and sensitivity of the water resource;
  - The conservation status of aquatic and semi-aquatic species;
  - The characteristics of the buffer that affects the functionality of the buffer; &
  - Mitigation measures that may be applied to reduce risks.

So…

The method proposes highly conservative fixed buffer widths for broad-scale assessments but allows for modification where additional information is used to undertake a more robust assessment.

What buffers don't do

Despite the range of functions potentially provided by buffer zones, buffer zones are far from a "silver bullet" to address all water resource related problems.

- Buffers can do little to address hydrological changes caused by stream flow reduction activities or changes in flow brought about by abstractions or upstream impoundments.
- Buffer zones are also not the appropriate tool for militating against point-source discharges (e.g. sewage outflows), which can be more effectively managed by targeting these areas through specific source-directed controls.
- Contamination or use of groundwater is also not well addressed by buffer zones and requires complementary approaches such as controlling activities in sensitive groundwater zones.

The role that buffers can play must be well understood when applying these guidelines.

Overview of approach

Flexible approach to allow buffers to be tailored according to site-specific requirements

- Maintaining basic aquatic processes, services and values
  - Protection of the water resource, including riparian habitat.
- Reducing impacts from upstream activities and adjoining landuses
  - Define aquatic impact buffers based on an understanding of specific risks and the ability of buffer zones to address potential impacts.
  - Define alternative mitigation measures where buffer zones are not appropriate
- Meeting requirements for aquatic and semi-aquatic species
  - Understand specific-species habitat and protection requirements and set aside and manage areas accordingly
- Providing habitat for terrestrial species
- Societal benefits

Step-wise process

Step 1	• Define objectives and scope of assessment and determine the most appropriate level of assessment
Step 2	• Map and classify water resources in the study area
Step 3	• Determine the management objective for mapped water resources
Step 4	• Assess risks from proposed development and define mitigation measures necessary for protecting mapped water resources in the study area
Step 5	• Assess risks posed by proposed development on biodiversity and identify management zones for biodiversity protection
Step 6	• Delineate and demarcate zones for water resources and biodiversity protection
Step 7	• Document additional management measures necessary to maintain effectiveness of mitigation measures identified
Step 8	• Monitor implementation and review effectiveness

Determining the most appropriate level of assessment (Step 1)

- **Desktop assessment**: Red-flag land located adjacent to water resources that should potentially be set aside and managed to limit impacts on water resources. Not to be used as a basis for authorizing development or activities with a potential impact on water resources.
- **Rapid assessment**: Designed for site-based assessments where a rapid risk assessment is used to inform the need for mitigation measures, including buffer zones. Buffer zone widths proposed are conservative in that they do not take site-specific buffer characteristics into account.
- **Detailed assessment**: Designed for site-based assessments but includes a more detailed evaluation of risks and consideration of site-specific factors that can affect buffer requirements. Appropriate in a high risk scenario or where a decision is taken to fine-tune conservative buffer zone widths. Buffer zone widths proposed in this assessment are tailored according to the local situation, with less conservative buffer widths typically being proposed.

Undertake risk assessment to assess potential impacts of planned activities on water resources (Step 4)

- The risk of a proposed activity on water resources is used as the primary driver for defining the level of mitigation required (including buffer zone width).
  - Where risk is high, a more conservative approach (e.g. larger buffer zone) is recommended
  - A less conservative approach (e.g. narrower buffer) where risks are low.
- Risk is based on two criteria:
  - The **threat** or potential impact of the activity on the resource, and
  - The **sensitivity** of the water resource
  - These are integrated into a risk score which is used to inform the level of mitigation required.
- Risk assessment considers both construction and operational phases

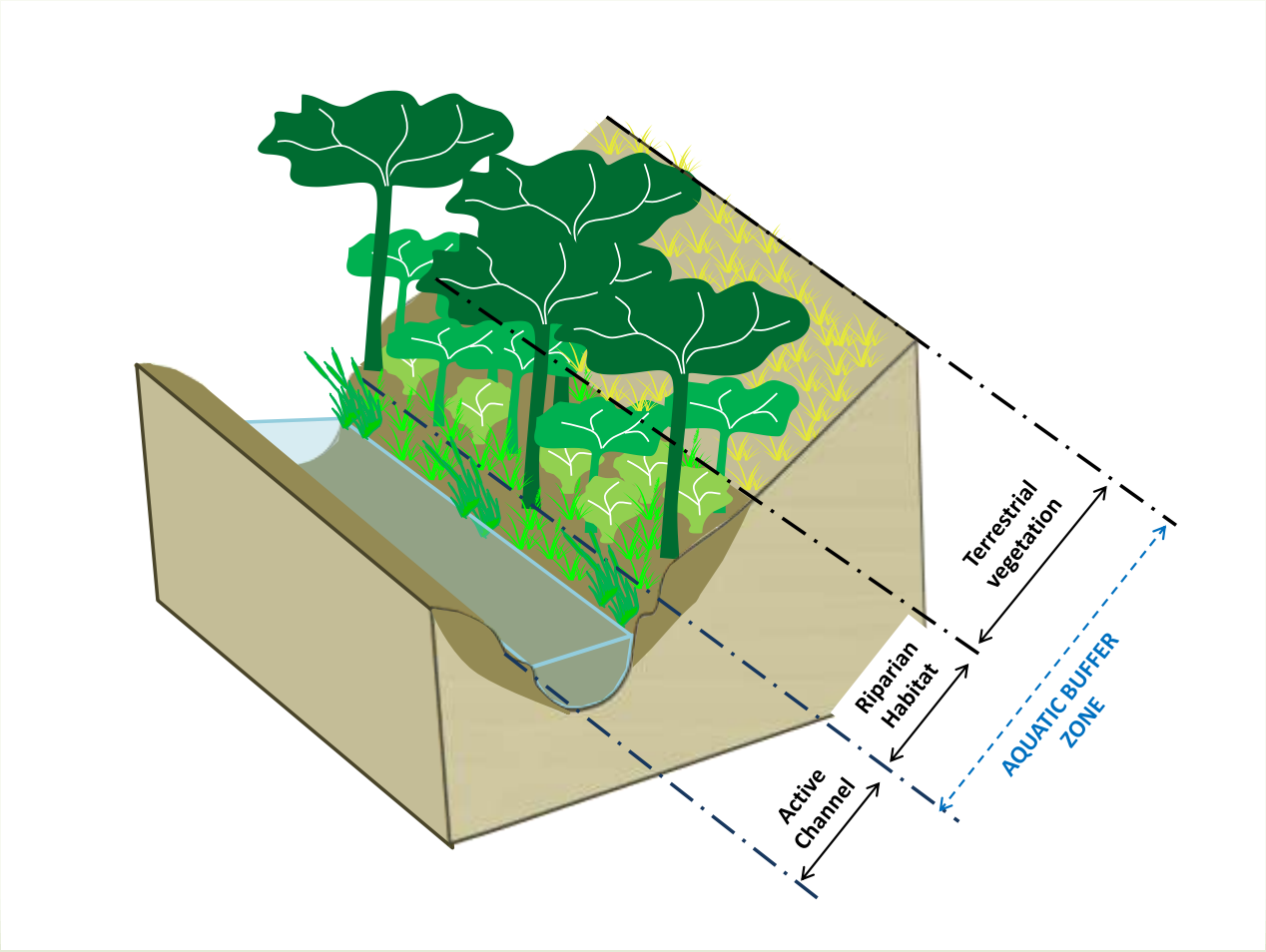
Assessing risks to biodiversity & identifying management zones (Step 5)

- Desktop assessment to assess whether important biodiversity elements are likely to be present
- Undertake survey to verify occurrence
- Identify core areas required to protect any important biodiversity features
- Adjust aquatic impact buffer requirements based on sensitivities of any important biota identified
- Identify any additional biodiversity buffer requirements

Way forward…

- Finalize method and model
- Best practise management of buffer zones and mitigation of impacts
- Field testing
- Training Workshops
  - SASAQS Conference (30 June – 4 July 2013)
  - NWI (22 – 25 October 2013)
- Industry workshop – May 2014

Questions ???


Terrestrial vegetation
Riparian Habitat
Active Channel
AQUATIC BUFFER ZONE