<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09h00</td>
<td>Tea/Coffee on Arrival</td>
</tr>
<tr>
<td>09h30</td>
<td>Fill in CARDS for main area of interest, FEPA Launch presentation, Purpose of this training workshop</td>
</tr>
<tr>
<td>10h00</td>
<td>Frequently asked questions about FEPA maps</td>
</tr>
<tr>
<td>10h20</td>
<td>Question time</td>
</tr>
<tr>
<td>10h30</td>
<td>Explanation of FEPA map categories</td>
</tr>
<tr>
<td>10h45</td>
<td>Question time</td>
</tr>
<tr>
<td>11h00</td>
<td>Tea</td>
</tr>
<tr>
<td>11h15</td>
<td>Ecosystem management guidelines</td>
</tr>
<tr>
<td>11h30</td>
<td>Question time</td>
</tr>
<tr>
<td>12h00</td>
<td>Use of FEPA maps in strategies for managing, conserving &amp; restoring ecosystems. integrate discussion/questions</td>
</tr>
<tr>
<td>13h00</td>
<td>Lunch</td>
</tr>
<tr>
<td>13h30</td>
<td>Use in processes as determined by main areas of interest in CARDS</td>
</tr>
<tr>
<td>14h30</td>
<td>Using BGIS/GISVIEWER and underpinning data</td>
</tr>
<tr>
<td>15h30</td>
<td>Closure</td>
</tr>
</tbody>
</table>
Introduction

- Please fill in cards indicating your major areas of interest, e.g.
  - Biodiversity planning
  - Conservation and restoration initiatives
  - Water Resource Classification
  - EIAs, environmental or water use authorisations
  - River Health, Present Ecological Status, Reserve Determination
  - Use of GIS shapefiles

- Handouts
  - DVDs
  - Slides handouts from today
  - Key messages and recommendations – push at every point
  - Summary of GIS layers used/developed by NFEPA
FEPA Launch Presentation
Purpose of this training session

• To give participants a basic overview of FEPA maps and supporting information
• To show the basics of how to access the GIS layers and data underpinning the FEPA maps
• Participants range in level of experience and expertise
  • We cannot cover every use in detail
• This is a learning journey
  • We don’t yet have all the answers
• Contacts for help
  • SANBI’s Biodiversity GIS website (http://bgis.sanbi.org, bgishelp@sanbi.org.za)
  • SANBI’s Freshwater Programme (freshwater@sanbi.org.za)
  • Project team
Stimulate the use of FEPAs and other tools

• FEPA maps are ONE tool in a suite of many others
  • They are not intended to replace existing tools for managing freshwater ecosystems, but to complement them
  • They are based on good science, but there will still be discrepancies

• Be careful with how you communicate this uncertainty
  • Communicate honestly but with respect to the overall FEPA map products
  • **Small discrepancies should not give cause for overall INACTION**
  • Stimulate the use of FEPAs in all planning and decision-making that affects water
  • Everyone is a champion – help this initiative gain momentum
Frequently asked questions
1. What are freshwater ecosystem priority areas, or FEPAs?
   • Those areas of the country that are most important for sustaining the integrity and continued functioning of our freshwater ecosystems
   • They should be kept in a good condition (A or B ecological category)

2. What do we mean by freshwater ecosystems?
   • Same as “inland water ecosystems”
   • All inland water bodies whether fresh or saline, including rivers, lakes, wetlands, sub-surface waters and estuaries

3. What’s the difference between NFEPA and FEPA?
   • NFEPA refers to the project, which produced a range of outputs
   • FEPA maps are one of the outputs of the NFEPA project
   • River FEPAs and wetland FEPAs are categories on the FEPA maps
4. What is PES?

- Present Ecological Status used by Water Affairs to estimate the ecological condition of a river
- First done in 1999 and currently being updated
- Approach uses existing river health data, land cover data and expert knowledge
- Rates rivers into ecological categories that range from A to F

<table>
<thead>
<tr>
<th>Ecological category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unmodified, natural</td>
</tr>
<tr>
<td>B</td>
<td>Largely natural</td>
</tr>
<tr>
<td>C</td>
<td>Moderately modified</td>
</tr>
<tr>
<td>D</td>
<td>Largely modified</td>
</tr>
<tr>
<td>E</td>
<td>Seriously modified</td>
</tr>
<tr>
<td>F</td>
<td>Critically/Extremely modified</td>
</tr>
</tbody>
</table>

- 1999 PES rated change in:
  - flow, inundation, water quality, stream bed condition, introduced instream biota, and riparian or stream bank condition
- 2010/11 update rates changes to similar stressors but applies a weighting
How was PES used in NFEPA?

- NFEPA used PES for quaternary mainstem condition – updated where possible
- Where no condition data existed, condition was modelled using land cover data
5. At what scale do FEPA maps apply?

- FEPAs suitable to use at a desktop level for planning and decision-making processes at the national or water management area level.
- In general, confidence in the FEPA maps at a national level is high but decreases at more local levels of planning.
- For local-level planning and decision-making it becomes more important to ground-truth FEPAs, and potentially to refine them with additional local data and knowledge.
- This is very important when undertaking site assessments.
6. Is there legislation supporting FEPA maps?

- FEPA maps have no formal legal status, but several of the processes they inform do.
- Primary means of securing FEPAs is through the classification of water resources in terms of the National Water Act.
- Other legal processes that should be informed by FEPA maps include:
  - Publication of bioregional plans and listing of threatened ecosystems in terms of the Biodiversity Act.
  - Declaration of protected areas in terms of the Protected Areas Act.
  - Environmental impact assessments in terms of the National Environmental Management Act.
  - Development of Spatial Development Frameworks in terms of the Municipal Systems Act.
7. What about rivers, wetlands and estuaries that aren’t FEPAs?

- Ecological condition can be managed along a continuum of use, from natural (A or B) to heavily modified (D)
- National Water Act does not allow freshwater ecosystems to degrade to an unacceptably modified condition (E or F)
- FEPAs should be kept in good condition (A or B), but it may be acceptable to manage other rivers and wetlands not identified as FEPAs in a C or D ecological category
- Other factors can also be taken into account, e.g.
  - Any river or wetland should have a buffer of natural vegetation
  - Does the river or wetland have a high Ecological Importance and Sensitivity (EIS) score
  - In considering a development application, rivers and wetlands that are not FEPAs may still require a biodiversity assessment because knowledge of special ecological features or species of special concern is incomplete
8. How do I deal with new and better data?

- Ten year update likely
- If better data becomes available, it should be used to supplement the existing FEPAs rather than replace them
- Unless new evidence provides sound justification to replace a FEPA in one place with a new FEPA in another place – evidence should be clearly documented
  - This can be sent to freshwater@sanbi.org.za
- Ideally, the decision should also be based on the impact this change will have on achieving biodiversity targets for river and wetland ecosystem types as well as fish species
  - May require a biodiversity planner
9. What criteria were used to ID FEPAs?

- Represent river, wetland and estuary ecosystem types
- Represent threatened fish
- Represent free-flowing rivers
- Represent NB migration routes
  - Fish corridors
  - Wetland clusters
- Maintain water supply areas
  - High water yield areas
  - High groundwater recharge areas
- Represent estuary habitats & species
- Identify connected systems

SET TARGETS TO ACHIEVE EACH OF THESE CRITERIA
10. What was the approach to ID’ing FEPAs?

- **National Project Inception Workshop** (August 2008)
  - Identify and involve key stakeholders

- **Regional Stakeholder Workshops to review input layers** (May-June 2009)
  - Delineate planning units
  - Map biodiversity & set targets for its representation & persistence
  - Quantify and map constraints in the region

- **Stakeholder workshops in case study areas** (November 2010)
  - Enable effective & sustained implementation
  - Interpret results for end users
  - Select planning units to achieve targets & minimize constraints

- **National Stakeholder Workshop to review draft outputs** (July 2010)

**Rules for:**
- Aligning with existing protected areas, and focus areas for expansion
- Rules for connectivity (river, wetlands & estuaries)
11. What are sub-quaternary catchments?

- Quaternaries
  Average size ~650 km²

- Sub-quaternaries 9,417
  Average size ~135 km²

**WARNING:** There are a few ugly ones

- Flat sub-catchments
- Coastal/estuarine sub-catchments

- Used as planning units
12. How were river ecosystem types mapped?

- 31 Level 1 Ecoregions
- 4 longitudinal zones
- 2 flow regime categories
13a. How were wetlands mapped?

**INPUT DATA**

- **National Land Cover 2000**
  - Waterbody
  - Wetland

- **DWAF 2004 Farmdams & rivers**
  - Dam
  - Lake
  - River

- **Chief Directorate: Surveys & Mapping 2005-2007 Inland Water Features**
<table>
<thead>
<tr>
<th>Natural Waterbody</th>
<th>Artificial Waterbody</th>
<th>Wetland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry pan</td>
<td>Dam</td>
<td>Marsh vlei Swamp</td>
</tr>
<tr>
<td>Lake</td>
<td>Fish farm</td>
<td></td>
</tr>
<tr>
<td>Mudflats</td>
<td>Large reservoir</td>
<td></td>
</tr>
<tr>
<td>Non-perennial pan</td>
<td>Purification plant</td>
<td></td>
</tr>
<tr>
<td>Perennial pan</td>
<td>Sewerage works</td>
<td></td>
</tr>
<tr>
<td>Pool</td>
<td>Water tank</td>
<td></td>
</tr>
</tbody>
</table>

**NATIONAL WETLAND MAP 1**
- ("Beta version")
  - Waterbody
  - Wetland

**NATIONAL WETLAND MAP 2**
- Artificial waterbody
- Wetland
- Natural waterbody
- Unclassified waterbody (20%)

**NATIONAL WETLAND MAP 3**

**NFEPA DRAFT: WETLAND MAP 3**
- Natural waterbody
- Unclassified waterbody
- Artificial waterbody

"Artificial" = artificial and/or transformed
Combining these data results in a bit of a messy layer!!

- Fringe vegetation or natural?
- Left as is, but calculated whether “majority natural” or “majority artificial”
13b. How were wetland ecosystem types mapped?

**WETLAND TYPING FRAMEWORK** (Ollis et al., 2010)

- 6 hierarchical levels

1. Systems: Marine, Estuarine, Inland
2. Regional context: Bioregions, Biogeographic Zones and Ecoregions
3. [grouping of landscape settings]
4. Landform, hydrological characteristics
5. Hydroperiod
6. Site characteristics: geology, veg, substratum, salinity, pH, naturalness

1. Seep
2. Valley-head seep
3. Channelled valley-bottom
4. Unchannelled valley-bottom
5. Floodplain
6. Depression
7. Flat
Wetland types: Regional context

- Used SANBI vegetation map as basis
- Grouped into 133 vegetation type groupings ("wetveg types")
- Each wetland was assigned its majority "wetveg type"
- 792 wetland types
14. How was river condition mapped?

**COMBINED:**
- Present Ecological State data (1999)
- PES updates in certain regions
- River Health Programme data
- Reserve data
- Modelled land cover data
- Expert opinion
Scale issues

NFEPA condition data

Reality on the ground

- A river
- D river
- Dam
- Wetland
15. How was wetland condition mapped?

- Used to rank the relative importance of a wetland

**CONDITION OF NON-RIVERINE WETLANDS**
- Based on the minimum % natural land cover in and around the wetland:
  - Wetland
  - 50 m area around a wetland
  - 100 m area around wetland
  - 500 m area around wetland

**CONDITION OF RIVERINE WETLANDS**
- The condition of the river is also considered
  - If river condition is D, E or F  
    → wetland condition is D, E or F
  - If river condition is A, B, C or unknown  
    → wetland condition is based on minimum % natural landcover in and around the wetland
Wetland condition

- AB – intact wetland
- C – riverine wetland with associated C river
- DEF – riverine wetland with associated D, E or F river
- Z1 – not intact and based on % natural land cover
- Z2 – majority of wetland unit “Artificial”
- Z3 - “Artificial” from CDSM
16. How were ranks used to favour wetlands selected to achieve ecosystem type targets?

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands that intersect with a <strong>Ramsar</strong> site</td>
<td>1</td>
</tr>
<tr>
<td>Wetlands within 500 m of a IUCN threatened <strong>frog</strong> point locality</td>
<td>2</td>
</tr>
<tr>
<td>Wetlands within 500 m of a threatened <strong>waterbird</strong> point locality</td>
<td>2</td>
</tr>
<tr>
<td>Wetlands (excluding dams) with the majority of its area within a sub-quaternary catchment that has sightings or breeding areas for threatened <strong>Wattled Cranes, Grey Crowned Cranes and Blue Cranes</strong></td>
<td>2</td>
</tr>
<tr>
<td>Wetlands (excluding dams) within a sub-quaternary catchment <strong>identified by experts</strong> at the regional review workshops as containing wetlands of exceptional biodiversity importance, <strong>with valid reasons documented</strong></td>
<td>2</td>
</tr>
<tr>
<td>Wetlands (excluding dams) within a sub-quaternary catchment <strong>identified by experts</strong> at the regional review workshops as containing wetlands that are good, intact examples from which to choose</td>
<td>2</td>
</tr>
<tr>
<td>Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of biodiversity importance, but with <strong>no valid reasons documented</strong></td>
<td>3</td>
</tr>
<tr>
<td>Wetlands (excluding dams) in A or B condition AND associated with more than three other wetlands (both riverine or non-riverine wetlands were assessed for this criterion)</td>
<td>4</td>
</tr>
<tr>
<td>Wetlands in C condition AND associated with more than three other wetlands (both riverine or non-riverine wetlands were assessed for this criterion)</td>
<td>4</td>
</tr>
<tr>
<td>Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing impacted Working for Wetland sites</td>
<td>5</td>
</tr>
<tr>
<td>Any other wetland (excluding dams)</td>
<td>6</td>
</tr>
</tbody>
</table>
QUESTION TIME
FEPA MAP categories
FEPA map
FEPA map: Upper Breede

Don’t forget:
• High water yield areas
• Free-flowing rivers
High water yield areas

- Strategic water supply areas based on Mean Annual Runoff interpolations
- Can overlay these with FEPAs using the shapefiles

> 3 x higher than rest of catchment
Free-flowing rivers

- 62 rivers
- Only 4% of our river length
- Only 24 ≥ 100 km
- 19 FLAGSHIPS acknowledge need for some development
- Coded in NFEPA_Rivers.shp
  - FFRID > 1
  - FFRFLAGSHIP = 1
QUESTION TIME
Ecosystem Management Guidelines
Purpose of guidelines

- The guidelines provide additional detail to supplement the FEPA maps, focusing on:
  - Whether particular land-use practices or activities are compatible with the overall management objective for FEPAs
  - How to minimise the risk of impacting negatively on the condition of FEPAs when undertaking particular land-use practices or activities
- Generic guidelines
  - Can be used as the foundation for more detailed site specific assessments
- Ecosystems do not behave predictably
  - Outcome are not certain → monitor actions closely and adapt actions on the basis of this feedback
Structure of guidelines

• Link specific land-use practices and activities to three categories of stresses on rivers and wetlands:
  • changes in water quality
  • changes in water quantity
  • changes in habitat and biota
• This aligns with the approach used in the guidelines for setting and monitoring resource quality objectives
MANAGEMENT GUIDELINES

IMPACT CATEGORIES

- Water Quantity
- Water Quality
- Habitat and biota

LAND USE ACTIVITIES

- Drainage
- Obstruction of flow
- Canalisation
- Input of waste water
- Abstraction
- Mining and prospecting
- Afforestation and removal of indigenous plant species
- Invasive alien plant invasion
- Discharge of waste or waste water
- Irrigation with treated wastewater
- Irrigation return flows
- Mining and prospecting
- Cultivation and organic pollution from livestock
- Increased sedimentation, erosion and turbidity
- Loss of connectivity
- Modifications to bed and banks
- Canalisation
- Cultivation
- Grazing
- Invasive alien species
- Afforestation and removal of indigenous plant species
- Burning of wetlands

MANAGEMENT GUIDELINES

- Wetland FEPAs or portions thereof should not be drained or filled in.
- Cut-off drains should be located in such a way that the zone of influence (the area affected by the drain – these drains divert surface and sub-surface flow in a certain direction, and lead to drawdown over a wide area) is well away from any wetland FEPAs. The area of influence should be determined by a hydrogeologist.
- No roads should be constructed through or around more than 20% of the edge of wetland FEPAs or their buffers.
- Existing wetland drains should be plugged (i.e. filled with soil, rocks, etc.) and natural patterns of water flow restored.
- No land-user should drain or cultivate any wetland or area within the flood zone of any watercourse (including its buffer), except in terms of a written permit in terms of the National Water Act.
- The diversion of natural stormwater runoff away from wetland FEPAs and into a stormwater management system should be avoided wherever possible.
## Implementation Manual lookup table

<table>
<thead>
<tr>
<th>Land-use practice or activity</th>
<th>Management guidelines</th>
</tr>
</thead>
</table>
| Drainage for cultivation, road-building etc | • Wetland FEPAs or portions thereof should not be drained or filled in.  
• Cut-off drains should be located in such a way that the zone of influence (the area affected by the drain – these drains divert surface and sub-surface flow in a certain direction, and lead to drawdown over a wide area) is well away from any wetland FEPAs. The area of influence should be determined by a hydrogeologist.  
• No roads should be constructed through or around more than 20% of the edge of wetland FEPAs or their buffers.  
• Existing wetland drains should be plugged (i.e. filled with soil, rocks, etc.) and natural patterns of water flow restored.  
• No land-user should drain or cultivate any wetland or area within the flood zone of any watercourse (including its buffer), except in terms of a written permit in terms of the National Water Act.  
• The diversion of natural stormwater runoff away from wetland FEPAs and into a stormwater management system should be avoided wherever possible. |
| Damming and obstruction of flow | • Wetland FEPAs and their buffers should not be dammed, unless this is for the purposes of rehabilitation.  
• Wetland FEPAs should be considered priorities for reserve determination.  
• Reserve determinations for wetland FEPAs should be done at the highest confidence level possible. It is recommended that at least a Rapid III Reserve Determination should be completed prior to new abstraction permits being considered for wetland FEPAs.  
• Weirs should preferably not be built in, within 1km downstream of, or within 2km upstream of a wetland FEPA, unless for the purposes of rehabilitation.  
• Wetland FEPAs and their buffers should not be flooded, either permanently or temporarily, as a result of a downstream dam or weir.  
• Flood control berms should not be placed in or close to (less than 100m from) wetland FEPAs or their buffers.  
• No roads or railway lines should be constructed through or around more than 20% of the edge of wetland FEPAs.  
• The laying of pipelines through wetland FEPAs and their buffers should be avoided. |
River and wetland buffer zones

- Buffers are an important management tool for freshwater ecosystems, and are referred to frequently in the management guidelines.
- Legislation:
  - None in Water Act but aligned to sustaining water quality → apply to water use applications.
  - Integrated Coastal Management Act: recommend 5m contour line as a buffer around estuaries.
- FEPA guidelines recommend a **generic buffer** of 100m around wetland and river FEPAs:
  - Wetland FEPAs: 100m from the outside edge.
  - River FEPAs: either the delineated riparian area or 100m measured from the top of bank – whichever is greater.
- **Generic buffer can be refined on site visit**:
  - Buffer must address risks to the receiving environment, e.g. Wattled Cranes.
  - Potential to be reduced by assessing risk of specific development and proposed mitigation measures → buffer tool in preparation.
Protocol for buffer determination

- Water Research Commission project; Doug MacFarlane, EcoPulse, Doug dmacfarlane@eco-pulse.co.za
- Spreadsheet tool scoring river, wetland or estuary according to:
  - Risk posed by the proposed development
  - Ability to reduce risk if mitigation measures are implemented
- Risk posed by the development is based on:
  - Threat rating of activities (e.g. mining, road construction, planting an irrigated crop)
  - Sensitivity of the water resource (e.g. conservation importance, slope, susceptibility to soil erosion)
- Applied at a low-confidence desktop level or a higher confidence site-based level
  - Higher confidence requires a site visit and collection of specific information
  - Wetlands and riparian areas are accurately delineated using a minimum mapping scale of 1:10 000, rather than a 1:50 000 scale which is considered too coarse.
Overall management guidelines for river and wetland FEPAs

• Activities that will lead to deterioration in the current condition are not acceptable
• For wetland FEPAs, activities that will make rehabilitation difficult or impossible are not acceptable
• Assess changes in condition of:
  • **Water quantity** – flow and inundation changes; whether too much or too little
  • **Water quality** – Use generic water quality boundary values
  • **Habitat/biota** – assess impacts on habitat loss and connectivity that affect feeding, breeding and movement of fauna and flora
• Generic water quality boundary values
  • **Wetlands**: there is a method currently being developed as a WRC project by Heather Malan
• Seasonal variability in water quantity and quality must be maintained
• Check location of wetland clusters in assessing impacts on habitat or biota
• At a site level, use approved River Health Programme methods to assess habitat and biota changes in river FEPAs
Overall management guidelines for sub-quats associated with river FEPAs, and Upstream Management Areas

- Need to manage the network of streams and wetlands that drain into the river FEPA
- A proportion of streams and wetlands in the sub-quat and Upstream Management Area need to remain healthy and functional to maintain river FEPA condition
- Impacts tend to be more immediate in the associated sub-quat than in an Upstream Management Area, but cumulative impacts from Upstream Management Areas have the potential to be very large and can be difficult to manage
- Activities in the sub-quat (not just at the site of the river FEPA itself) need to be managed. Activities that deteriorate current condition river FEPA are not acceptable
- Cumulative impacts of activities in sub-quats associated and Upstream Management Areas need to be managed
  - It may be acceptable for some streams and wetlands to be impacted, but only if the cumulative impacts do not result in deterioration of the condition of the downstream river FEPA
- Very rule of thumb from overseas (Allan 2004; Weitjers et al. 2009):
  - Streams in agricultural catchments usually remain in good condition until the extent of agriculture in the catchment exceeds 30-50%.
  - For every 10% of altered catchment land use, a correlative 6% loss in freshwater diversity was noted, as a linear relationship
QUESTION TIME
GENERAL OVERVIEW: Using FEPA maps for pro-active landscape planning
Identifying spatial priorities

- For preparing strategies and plans for conservation and restoration initiatives
  - Biodiversity planning
  - Catchment Management Strategies – see Appendix of Manual for a template
  - Working for Water
  - Biodiversity and Wine
  - Healthy Rivers Programme
- Which of the map categories you use, and how you use them depends very much on your objectives
- Spatial prioritization will almost always need to be augmented with other data, e.g.
  - Social data
  - Where are the opportunities – funding; land owner willingness
  - Are you looking for “last remaining” or “wild and free” or just to sustain very hard-working or abused mainstem rivers
Biodiversity planning: Critical Biodiversity Area maps

- A Critical Biodiversity Area map is a map of Critical Biodiversity Areas and Ecological Support Areas based on a systematic biodiversity plan.
- Critical Biodiversity Area maps are generally developed at a finer scale to that of sub-quaternary catchments.
- They also integrate terrestrial and aquatic priority areas.
- FEPAs should feed into the development of Critical Biodiversity Area maps.
How FEPAs feed into Critical Biodiversity Area maps

• FEPAs should be favoured in ID’ing Critical Biodiversity Areas and Ecological Support Areas. All river and wetland FEPAs should at least be considered to be Ecological Support Areas
• Ecological corridors along large river corridors and wetland clusters should be established and managed
• If finer, local-scale freshwater input layers and priorities, these can be used to refine priorities identified in FEPA maps
• Finer-scale data that can be gathered to improve on existing data include:
  • Wetland delineation can be improved by manual mapping either using desktop imagery or in the field
  • A more detailed river network, e.g. 1:50 000, can be used
  • Mapping of wetland and river condition can be improved – this is the most strategic layer to collect in transformed landscapes, as condition will drive the selection of areas (by virtue of the fact that few choices of selecting good condition ecosystems exist)
• Species other than fish can be included
• River and/or wetland ecosystem types can be refined
What happens when FEPA maps and CBA maps exist?

- Where FEPA maps and CBA maps exist, the combined priorities should be considered, rather than one replacing the other.
- Where FEPAs and CBAs overlap, their importance is reinforced.
- Where they do not overlap, FEPA maps cannot replace CBA maps.
- .....plenary discussion on problems experienced here can commence if needed.
QUESTION TIME
Use in policy processes
A list of the policy processes covered in the Implementation Manual

- Catchment Management Strategies
- Classification of water resources
- Reserve determination
- Resource quality objectives
- Water use authorisations
- Bioregional plans and biodiversity sector plans
- Biodiversity management plans
- Alien and invasive species regulations and aquaculture
- Environmental Impact Assessments
- Environmental Management Frameworks
- Biodiversity offsets, including wetland mitigation banking
- Integrated Development Plans
- Spatial Development Frameworks
- Mining-related implementation mechanisms
- Agriculture-related implementation mechanisms
- Provincial spatial biodiversity plans
- Payments for Ecosystem Services
- Using FEPA maps in monitoring freshwater ecosystems
- River Health Programme
Use of FEPA maps in EIAs

- EIAs are required by NEMA, most recent regulations Aug 2010
- FEPA should inform the EIA process in the following way:
  - CONSULT spatial information. If a FEPA is present → may need to consult a freshwater specialist especially if the significance rating is medium to high
  - If impact results in an ecological condition lower than A or B → rank as medium to high significance
  - If overall residual impact on FEPA and its immediate surrounds is greater than a low negative significance → not acceptable
  - If development is unavoidable → set up mitigation measures to reduce overall impact to low negative significance, or set up a biodiversity offset
  - Ideally the specialist should also highlight possible cumulative impacts of other developments that are likely to occur in the sub-quaternary catchment in the near future
  - Wetland clusters will be important in assessing cumulative impacts too
- Procedural steps in the Implementation Manual can be used as Terms of Reference for consultants
- Steps are not necessarily uni-directional
EIA Step 1 of 5: Consult the FEPA maps, Free-flowing rivers and high water yield

• Desktop screening to see whether you will need a freshwater specialist
• Will the development impact on a FEPA, Free-flowing river (particularly flagships), Fish Support Area or Wetland cluster
• Worked example: Upper Breede
  • Black fish, red fish
  • Free-flowing river
  • Lookup table
  • Context – upstream management areas, fish corridor, cumulative effects
## Lookup table per sub-quaternary catchment: 8786 Amandel River

<table>
<thead>
<tr>
<th>SppCode</th>
<th>Species</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>Barbus amatolicus</td>
<td>VU</td>
</tr>
<tr>
<td>1019</td>
<td>Galaxias breede slow (Galaxias sp. 'zebratus cf. Breede')</td>
<td>EN</td>
</tr>
</tbody>
</table>

### Lookup table for fish species

**GIS metadata for FishSanc_All_Spp_alb.docx**
EIA Step 2 of 5: Site assessment

• Visit the site **to collect primary data**
• Check that the FEPA or fish sanctuary is not heavily modified
• Map the habitats containing the river and wetland ecosystem types as used by NFEPA
  • Sometimes a very small portion of the sub-quaternary
• Examine the surrounding sub-quaternary catchment, finding other freshwater ecosystems in good condition, and/or of apparent ecological importance and/or sensitivity
  • E.g. tributaries or wetlands not on the FEPA maps
• Determine current condition and compare with NFEPA condition. Some possible tools are:
  • River Health Programme tools; or EcoStatus (PES) for rivers (Neels Kleynhans, Water Affairs, KleynhansN@dwa.gov.za)
  • WET-Ecosystem Services for wetlands
  • If it is different the burden of proof is on the application to prove that it has a low significance impact rating
EIA Step 3 of 5: Delineate the ecosystem

• Map the extent of the FEPA accurately, using the DWA protocol for delineation of wetlands and riparian areas (DWAF, 2005);

• Determine the appropriate buffer width, using accepted national protocols
  • Example from EcoPulse
EIA Step 4 of 5: Assess the significance of the impact of the proposed development

- Determine ecological importance and sensitivity (EIS) using DWA protocol (Neels Kleynhans, Water Affairs, KleynhansN@dwa.gov.za)
- Assess the significance of impacts
  - Dependent on degree of deterioration in ecological condition that would result from the proposed development
  - Also dependent on its reversibility (e.g. whether the impact is short-term, medium-term or long-term)
  - Deterioration of a FEPA from a B ecological condition to a C condition might be considered an impact of medium significance but should never be considered of low significance
EIA Step 5 of 5: Make recommendations

• Consult the NFEPA ecosystem management guidelines, and apply these to the development application
• Develop suitable and realistic mitigation measures
• Determine rehabilitation requirements, in order to meet management objectives for FEPAs
• Design a monitoring programme that aims to track the impacts associated with the development and how these affect the condition of the affected FEPAs
  • Monitoring nodes ideally above and below site
QUESTION TIME
Use of FEPAs in Water Resource Classification
We can design catchments to support both use and conservation

- Keeping some ecosystems healthy supports intensive use
- Healthy rivers dilute pollutants of downstream hard-working rivers
- This integrated planning is embedded in the National Water Act
Water Resource Classification

- Sets a ‘Class’ for every significant water resource through consultation
- The class defines management objectives for the water
  - Describes the desired condition of the resource & extent to which it can be utilised
- Three classes
  - CLASS I: minimally used
  - CLASS II: moderately used
  - CLASS III: heavily used
- There are guidelines on the required configuration of ecological categories within a catchment for achieving the assigned class

<table>
<thead>
<tr>
<th>IUA class</th>
<th>Percentage category representation at units represented by biophysical nodes in an IUA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥A/B</td>
</tr>
<tr>
<td>Class 1</td>
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<td>Class 2</td>
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<tr>
<td>Class 3</td>
<td>Either</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
</tbody>
</table>
Configuring the catchment conditions
FEPAs should be used in scenario development

- Terms of Reference for consultants should include explicit mention of the need to incorporate FEPAs.
- Provision should be made for the inclusion of an aquatic ecologist and the relevant provincial conservation authority to serve as advisers and technical members of the planning process.
- Water-use scenarios should include at least one scenario that achieves the desired condition for FEPAs (i.e. A or B ecological category).
- These should be considered as the “conservation scenario” or “minimum use” scenario and should NOT be integrated with Water Affairs’ Recommended Ecological Category (REC).
  - One that is integrated with REC can be considered as an additional scenario.
Integrated Units of Analysis

<table>
<thead>
<tr>
<th>IUA class</th>
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</tr>
</thead>
<tbody>
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<td>&gt;A/B</td>
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</tr>
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<td>Class 2</td>
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<tr>
<td>Class 3</td>
<td>Either</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
</tbody>
</table>
Using BGIS/GIS Viewer and underpinning data

one hour
• 30 min: Overview of GIS data
• 15 min: Using GIS viewer
• 15 min: Using BGIS