Content

- Sappi the Company
- GIS is Green in Sappi
- Land Management
  - Data Management
  - Data Structure
  - Data Distribution
- Environmental Management
  - EIA Mapping
  - Water/Hydrological Management
  - Environmental Incident Monitoring
  - Sustainable Forestry Practices
  - GPS Camera Game Spotting
  - Sappi Important Conservation Areas
- Catchment Management
- Mobile GIS
  - Incident logging
- Spatial Analysis
  - Timber Flow Modelling
  - Transport Optimisation
- Remote sensing
  - Disaster Mapping
  - Predictive Modelling
- Conclusion
Sappi the Company

- Regions
  - South Africa
    - 4 Paper Mills
    - 1 Paper and Specialised Cellulose Mill
    - 1 Specialised Cellulose Mill
    - 1 Saw Timber Mill
    - Forestry Plantations
      - Operations supply 70% of Sappi requirements (approximately 35 millions tons of standing timber – 495 000 Ha of Forests)
      - 150 000 ha of land is set aside to conserve the natural habitat and biodiversity
  - Europe
    - 7 Paper Mills
  - North America
    - 1 Paper Mill
    - 1 Speciality Paper Mill
    - 1 Paper and Specialised Cellulose Mill
Content

• Sappi the Company

• **GIS is Green in Sappi**
  • Land Management
    • Data Management
    • Data Structure
    • Data Distribution
  • Environmental Management
    • EIA Mapping
    • Water/Hydrological Management
    • Environmental Incident Monitoring
    • Sustainable Forestry Practices
    • GPS Camera Game Spotting
    • Sappi Important Conservation Areas

• Catchment Management

• Mobile GIS
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster Mapping
  • Predictive Modelling

• Conclusion
GIS is Green in Sappi

- **Green Management using GIS**
  - Sappi managed 495 000 hectares of commercial timber plantations
    - **Accurate mapping of all standing timber and natural areas**
      - Mapping Important Conservation Areas
      - Accurate data enable accurate planning and cost effective operations
    - **EIA maps for re-establishment of trees**
      - Identifying non-conformance areas
      - Identifying natural areas
    - **Accurate Delineation**
      - Cut back planting areas close to streams and wetlands
    - **Reduce transport cost using route optimisation**
      - Network Analysis
    - **Natural area and erosion management**
      - Catchment management
      - Stream crossing management
      - Flow simulation
    - **Effective operational planning**
      - Identifying correct Timber Extraction Method (terrain, slope, distance to road)
      - Harvesting Maps and Analysis
GIS is Green in Sappi

- **GIS Infrastructure**
  - Sappi use an Enterprise GIS

  - **ArcGIS for Server**
    - SQL Database
    - Portal for ArcGIS
    - Web map publishing

  - **Mobile Application**
    - Collector for ArcGIS
    - ArcGIS Mobile

  - **Desktop Applications**
    - ArcGIS Desktop Advanced
    - ArcGIS Flex Viewer
Content

- Sappi the Company
- GIS is Green in Sappi

- Land Management
  - Data Management
  - Data Structure
  - Data Distribution

- Environmental Management
  - EIA Mapping
  - Water/Hydrological Management
  - Environmental Incident Monitoring
  - Sustainable Forestry Practices
  - GPS Camera Game Spotting
  - Sappi Important Conservation Areas

- Catchment Management

- Mobile GIS
  - Incident logging

- Spatial Analysis
  - Timber Flow Modelling
  - Transport Optimisation

- Remote sensing
  - Disaster Mapping
  - Predictive Modelling

- Conclusion
Land Management

- **Data Management**
  - All land categories (owned, leased and contracted) are mapped and managed in GIS
  - Landuse model consist of Planted Areas, Natural Areas and Roads
  - Data accuracy of sub-meter
Land Management

• **Data Structure**
  – Landuse Model is representation of what is currently on the ground
    ▪ Boundaries, Planted, Natural, Roads, Structures, Forestry Features, etc.
  – Plantation are mapped and maintained on a continuous basis

• **Other Data**
  – Structures (Houses, Fire Towers, Offices)
  – Stream Crossings
  – Sample Plots (Research)
  – Dams and Dam Walls
  – Depots
  – Non-Conformance Areas
Land Management

- **Data Distribution**
  - GIS web pages
  - Mobile GIS
  - Maps provided by Cartographer
  - **Precision Mapping** – Extraction and Harvesting
Content

• Sappi the Company

• GIS is Green in Sappi

• Land Management
  • Data Management
  • Data Structure
  • Data Distribution

• Environmental Management
  • EIA Mapping
  • Water/Hydrological Management
  • Environmental Incident Monitoring
  • Sustainable Forestry Practices
  • GPS Camera Game Spotting
  • Sappi Important Conservation Areas

• Catchment Management

• Mobile GIS
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster mapping
  • Predictive modelling

• Conclusion
Environmental Management

- **EIA Mapping**
  - EIA’s have to be completed before trees can be re-established
  - Cut back planted areas from streams
Environmental Management

• **Water/Hydrological Management**
  - Conformance to National guidelines
    - 20m buffer from edge of streams and wetlands
      (*Delineation of Riparian zones and Wetlands*)
    - GIS allows for accurate conformance and the ability to identify areas best suited for planting trees
    - Wetland conservation on Sappi owned land (Physical field assessment and photography)
    - Historical areal imagery used to assess wetlands as far back as 1940’s
Environmental Management

- **Environmental incident monitoring** – Location and date of incident

- **Sustainable forestry practices**
  - Recording and monitoring of plantation cycles, species, felling dates and felling type (e.g. coppice) for best management of the land

- **GPS Camera Game spotting**
  - Camera sites for wildlife species data capture and in the interest of conservation.
Environmental Management

- **Sappi Important Conservation Areas**

Areas that have important features which contribute to provincial and national conservation.

This include areas of high biodiversity, areas that contain species that are endemic to that specific area, or where habitats/veid types are threatened.
Content

• Sappi the Company

• GIS is Green in Sappi

• Land Management
  • Data Management
  • Data Structure
  • Data Distribution

• Environmental Management
  • EIA Mapping
  • Water/Hydrological Management
  • Environmental Incident Monitoring
  • Sustainable Forestry Practices
  • GPS Camera Game Spotting
  • Sappi Important Conservation Areas

• Catchment Management

• Mobile GIS
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster Mapping
  • Predictive Modelling

• Conclusion
Catchment Management

- **Catchments are managed with accurate and up-to-date spatial data**
  - Flood mitigation (possible flood damage and prevention)
  - Stream crossings are mapped (potential stream blockages and to respond to it)
  - Catchment basins can be monitored and modelled for environmental risk factors (e.g. pollution)
Content

• Sappi the Company

• GIS is Green in Sappi

• Land Management
  • Data Management
  • Data Structure
  • Data Distribution

• Environmental Management
  • EIA Mapping
  • Water/Hydrological Management
  • Environmental Incident Monitoring
  • Sustainable Forestry Practices
  • GPS Camera Game spotting
  • Sappi Important Conservation Areas

• Catchment Management

• **Mobile GIS**
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster Mapping
  • Predictive Modelling

• Conclusion
Mobile GIS

- **Incident Logging**
  - Capture events or incidents on GIS Web page or mobile device (reducing waste)
    - Safety incidents
    - Environmental incidents
    - Operational non-conformances
Content

• Sappi the Company

• GIS is Green in Sappi

• Land Management
  • Data Management
  • Data Structure
  • Data Distribution

• Environmental Management
  • EIA Mapping
  • Water/Hydrological Management
  • Environmental Incident Monitoring
  • Sustainable Forestry Practices
  • GPS Camera Game Spotting
  • Sappi Important Conservation Areas

• Catchment Management

• Mobile GIS
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster Mapping
  • Predictive Modelling

• Conclusion
Spatial Analysis

- **Timber Flow Modelling**
  - Shortest distance to depot from each compartment
  - Felling extraction analysis using DEM
    - Provides closest central extraction point to road
    - Extraction length calculations
    - Up Hill and Down Hill extraction modelling for efficient planning (type of equipment)
Spatial Analysis

• **Transport Optimization**
  - Transportation of timber is improved with Network Analysis
  - Optimised transport routes to Markets / Mills
  - Cost savings in transport optimisation
Content

• Sappi the Company

• GIS is Green in Sappi

• Land Management
  • Data Management
  • Data Structure
  • Data Distribution

• Environmental Management
  • EIA Mapping
  • Water/Hydrological Management
  • Environmental Incident Monitoring
  • Sustainable Forestry Practices
  • GPS Camera Game Spotting
  • Sappi Important Conservation Areas

• Catchment Management

• Mobile GIS
  • Incident logging

• Spatial Analysis
  • Timber Flow Modelling
  • Transport Optimisation

• Remote sensing
  • Disaster Mapping
  • Predictive Modelling

• Conclusion
Remote Sensing

• **Disaster Mapping**
  – Post fire analysis
    ▪ Determine where the fire originated
    ▪ The area affected by the fire
Remote Sensing

- **Disaster Mapping**
  - Mapping affected areas and severity of fire damage
    - High quality aerial photography to assess and map damaged areas
    - Identify damaged based on severity if fire
    - Classification of burned areas
    - Recovery strategy based on classification
Remote Sensing

- **Predictive Modelling** – Sirex Model
  - Sirex wasp injecting larva into tree.
  - Sirex is identified in the field.
  - Imagery used to predict Sirex risk locations by:
    - Average temperature
    - Rainfall
    - Elevation
    - Aspect
    - Slope
    - Species (*Pine*)
  - Risk areas are identified and classified.
  - Trees at risk are inoculated to prevent Sirex wasp from spreading
Remote Sensing -

- **Predictive Modelling** – MODIS Land Surface Temperature
  - Land surface temperature can be used to predict various factors using models
  - Frost prone areas identified
  
  (MODIS, Elevation, Aspect, Temperature and various other factors)
Remote Sensing - Cool Air Pooling Algorithm

- **Predictive Modelling**
  - Cool air pooling algorithm
  - For frost prediction
  - Cold resistant species can be planted accordingly
Conclusion

• **Using GIS, Sappi Strives to**

  Achieve a high quality of data that is accurate and reliable

  Help manage all plantations in a environmentally friendly manner

  Maintain and conserve our natural and important conservation areas

  Sharing information and knowledge to all Sappi foresters and Contractors

• **Final Thought**

  GIS is the tool to manage accurate and reliable data

  **BUT MOST IMPORTANTLY**

  Data is the basis for Good Knowledge

  &

  Success is how you implement the Knowledge