



SPATIAL INFORMATION DAY 2010

Adelaide Convention Centre | FRIDAY 13 AUGUST 2010

Spatial Information Day 2010 Abstract

Title: Application of a Digital Elevation Model to Hydrological Modelling in the South East of South Australia.

Session: 6 – Securing Water Resources

Presenter: Mary Lewitzka – Department for Water

Abstract:

The south east of SA is an area of low topography covering approximately 28 000 km². Drainage is ill defined, natural drainage has consisted of a small number of cross-border streams draining from Victoria into extensive wetland systems draining slowly towards the Coorong in the north west of the region. Natural drainage has been extensively modified since settlement by the construction of a network of drains to remove water from the landscape and make the drained land productive for agriculture. With increasing awareness of the importance and value of wetland systems comes the need to actively manage them.

As part of a NWI-funded project to develop a surface water management strategy for the SE region a digital elevation model (DEM) was developed, jointly funded by the National Water Commission; the DWLBC; DEH; and ForestrySA at a total cost of \$1.5 million. The project was managed by the South East Resource Information Centre (SERIC) in Mount Gambier.

The elevation data was collected by AAM Hatch Pty Ltd between July 2007 and December 2008 using airborne laser scanning (LiDAR) and involved the collection and processing of in excess of 10 billion laser returns. DEM data was supplied in 11 separate instalments with subsequent validation undertaken by DEH before raster DEM data was supplied to DWLBC via SERIC.

The gridded DEM data was supplied as 8000 or so 2km x 2km data tiles, with each tile having DEM data at both 10m and 2m horizontal resolutions. Target vertical accuracy was +/-0.15m across the project area. With the addition of similar data supplied by the Wimmera Catchment Management Authority (VIC), DWLBC created a single regional 10m DEM (ESRI file geodatabase).

DWLBC have used the DEM to define the stream network from the modelled topography using the ArcHydro suite of tools. Extensive pre-processing was required in the form of “stream burning” and “wall building” to ensure that ArcHydro accurately modelled known drainage patterns (eg. drains). Constructed features such as drain crossovers presented particular challenges. The use of ArcHydro enabled catchments and watersheds to be defined accurately and consistently.

This information then formed the basis of rainfall-runoff models that have been used to model patterns of flow and wetland storages across the region. Model accuracy was increased by using the DEM to define volumes of wetland storage.

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The DEM has enabled the definition of depth to groundwater using a potentiometric surface generated by SKM, and the DEM-defined surface topography. This has served to emphasise the close connection between surface water and groundwater and the dependence of wetland ecosystems on the groundwater resource.

The potential of the DEM is being explored for use in conjunction with satellite imagery to estimate end of season wetland volumes. This has the potential to be used in environmental monitoring of the wetlands themselves; and in the validation of hydrological models.

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