

Water Quality Modelling (Salinity)

Maintenance of the Crocodile West River System Reconciliation Strategy Study



What is WQT?

- Water Quality – TDS model
- Monthly time step water quality model
- WQT calibrated against measured TDS concentrations
- Requires hydrology as input
- Calibrated WQT model parameters are input to the WRPM

What is WQT?

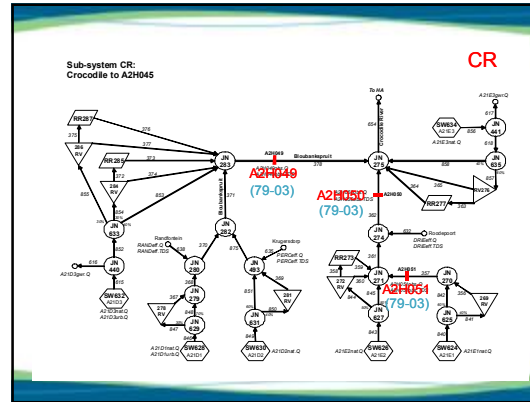
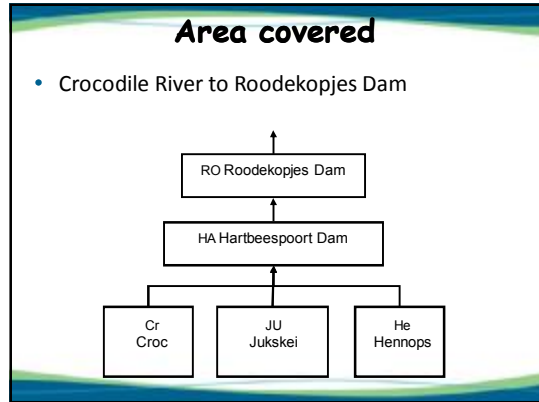
- Represents system using modules
- Modules include
 - Catchment washoff
 - Irrigation
 - Reservoir
 - Demand centre
 - Channel reach/junction node

Steps in applying WQT

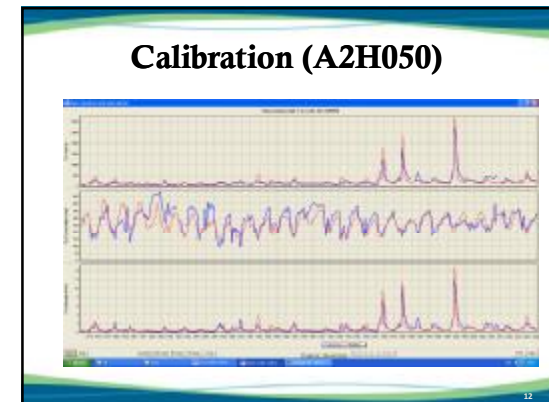
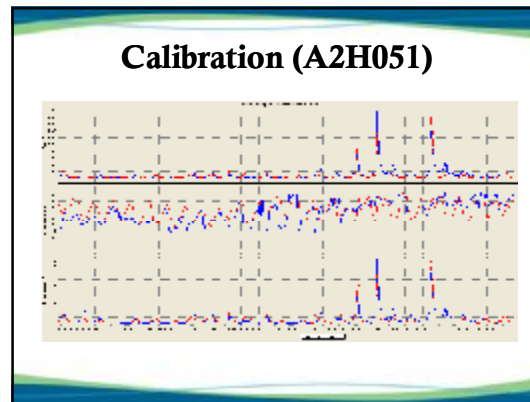
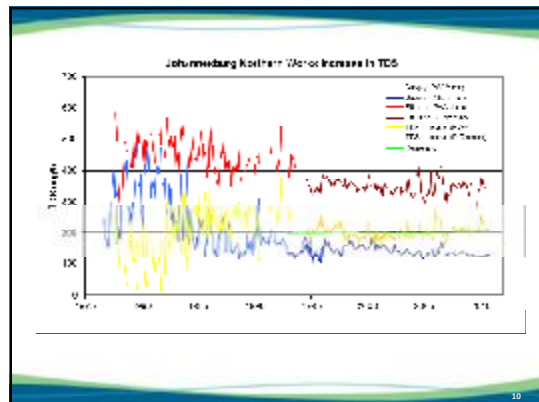
- Collate available TDS water quality data
- Discretise study area into sub-areas
- Select calibration points
- Patch water quality data at calibration points
- Set up system schematics – based on hydrology schematics
- Collect point source data - patch
- Setup WQT model
- Calibrate model
- Transfer inputs to WRPM



Crocodile West River System SSC – 29 July 2010



- ### Collect Data
- Point source discharge TDS concentrations and volumes – wastewater treatment works/industrial discharges
 - Abstractions – hydrology study
 - Water quality of water taken into urban areas to calibrate demand centre – Rand Water
 - Irrigation return flow volumes and TDS concentrations – Limited data



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Calibration - Stats

A2HD51 ROUTE No. 357 1978-2003

Parameter	Discharge (M cub.m)		Concentration (mg/l)		Load (t)	
	Observed	Modelled	Observed	Modelled	Observed	Modelled
Mean	0.551	0.542	143.894	151.299	86.847	86.482
Std. dev.	0.386	1.109	22.536	29.213	179.241	211.223
N	312	312	286	286	287	287
r		0.827477		0.568942		0.819772
B1		-1.41		5.15		-0.42
B2		12.53		-10.52		17.78
SF		1.02		0.99		0.96
Mean		0.542		151.796		82.687
Std. dev.		1.109		28.429		203.057
N		312		312		312

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Conclusions

- Difficulty in point source data collection
- Point source data sparse
- Achieving reasonable calibrations
- Add in mine decant from Western Basin in WRPM as point source