

Dynamic Wastewater Discharge Management via Cost Effective Monitoring & Modelling of Receiving Water Conditions

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Session 5A – Urban Drainage

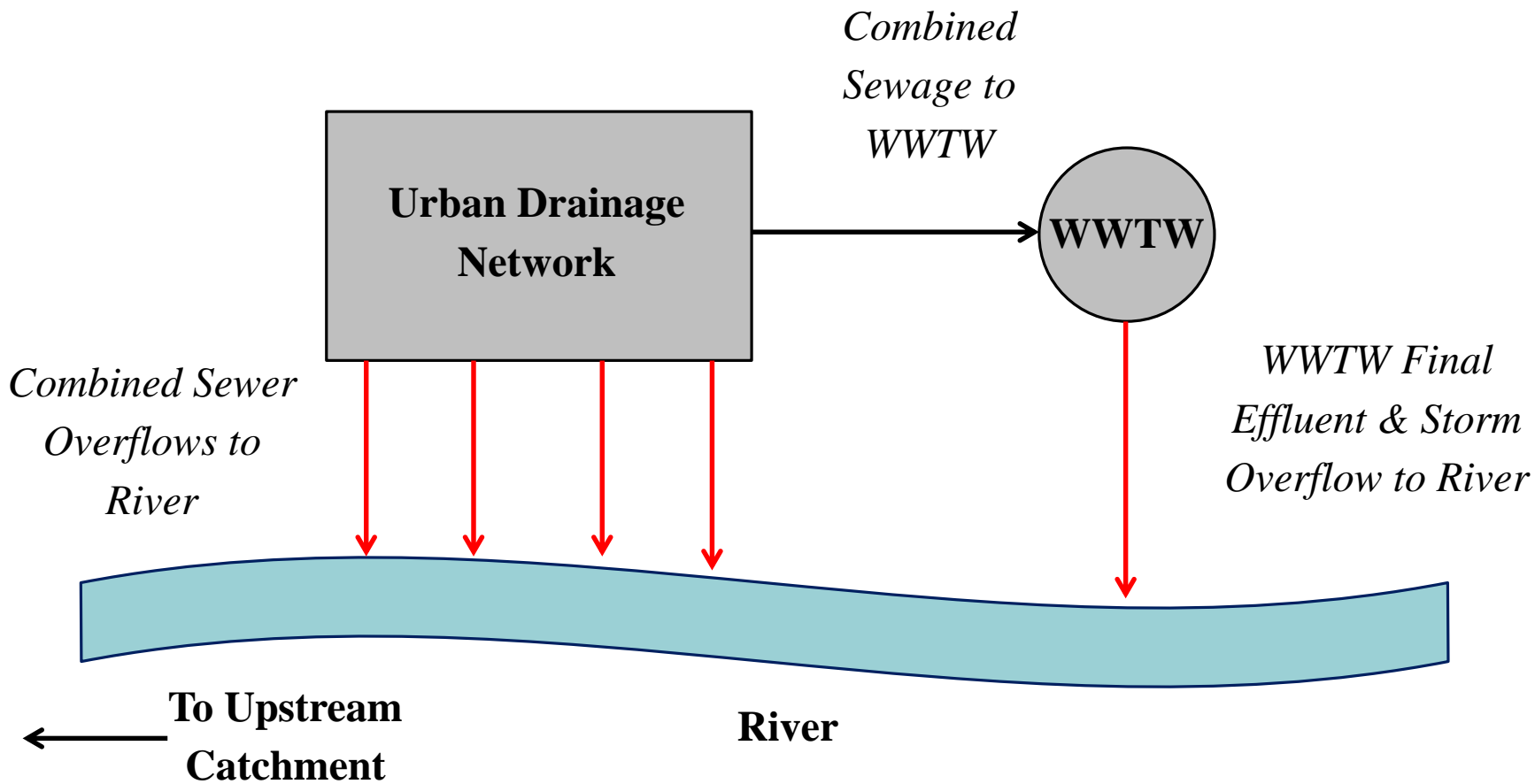


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“Active control of wastewater treatment works operations and discharges in response to forecasted fluctuations in the assimilative capacity of its receiving water”

- **Mitigation of Carbon & Energy Costs Associated with Meeting Water Quality Goals**
 - *Ministerial Directive – SR10*
- **Robust Protection of Water Quality in a More Variable & Extreme Climate**
 - *Sustainability & Continuity of Business*
- **Proof of Concept: Proactive, Model Based Control of Small to Medium Sized WWTW**
 - *Aspirational & Innovative Move Towards Intelligent Solutions*

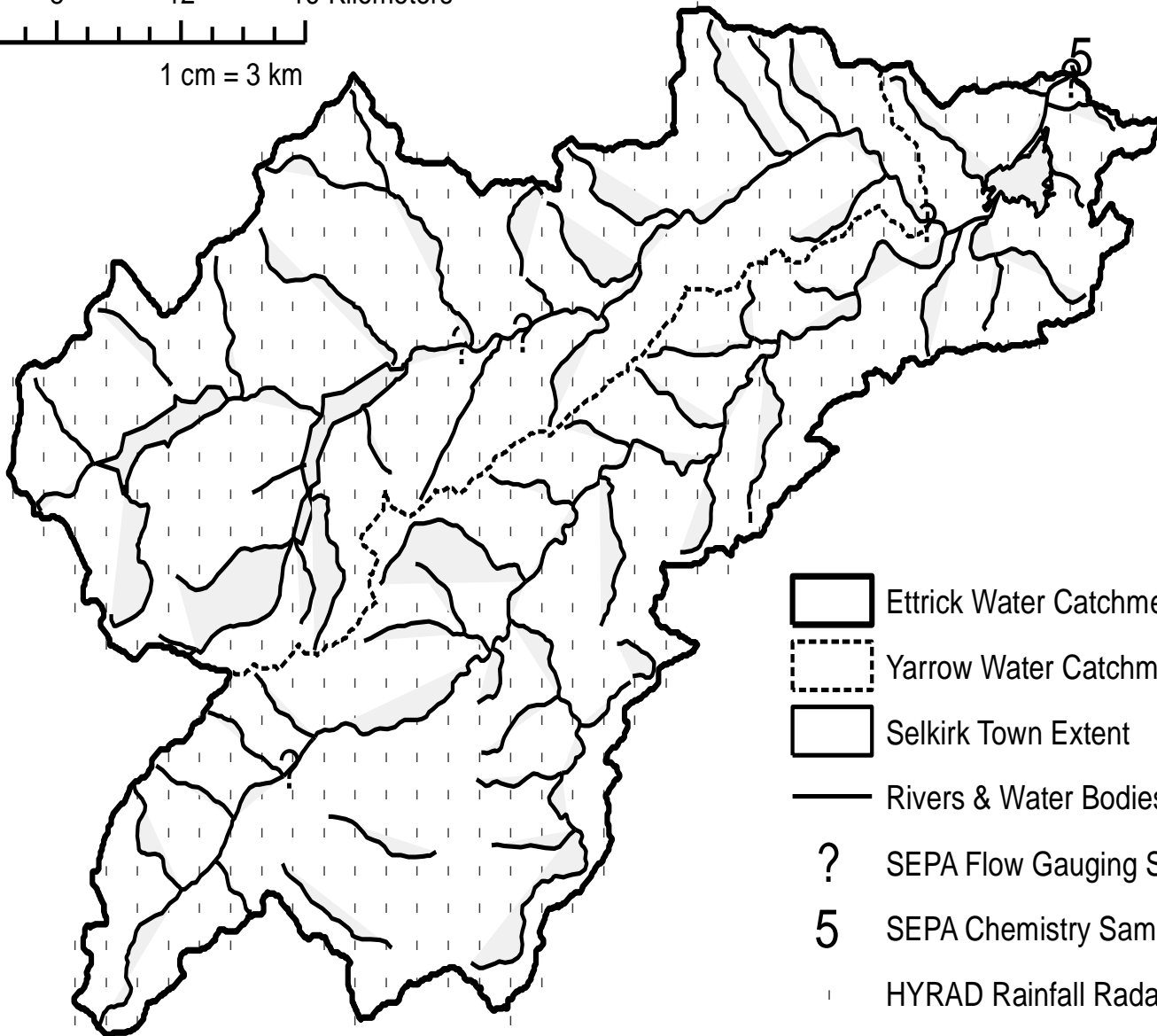
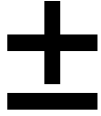








*Key Challenge:
Data Scarcity*

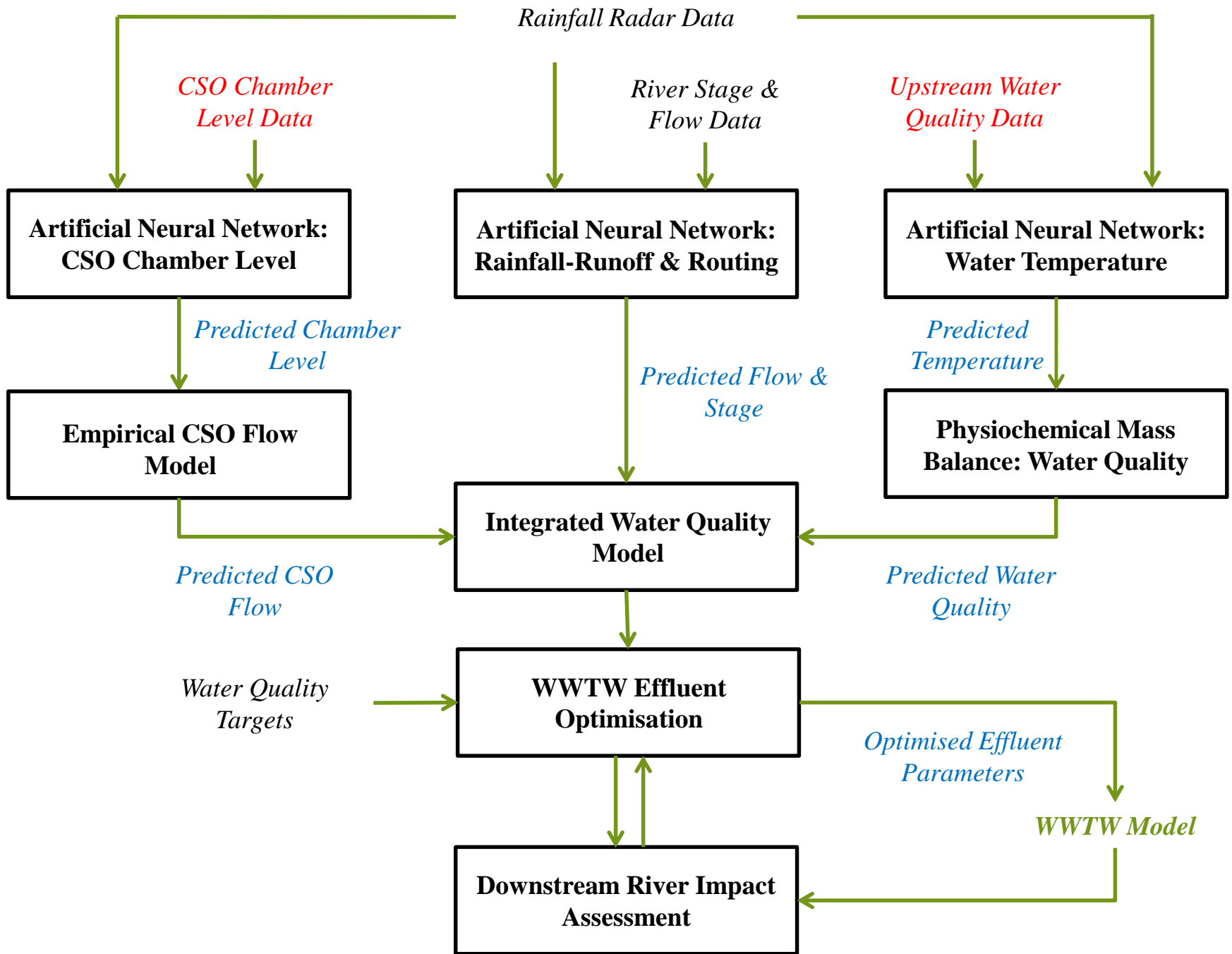
0 2 4 8 12 16 Kilometers



1 cm = 3 km



-  Etrick Water Catchment Boundary
-  Yarrow Water Catchment Boundary
-  Selkirk Town Extent
-  Rivers & Water Bodies
-  SEPA Flow Gauging Stations
-  SEPA Chemistry Sampling Points
- HYRAD Rainfall Radar Grid Points

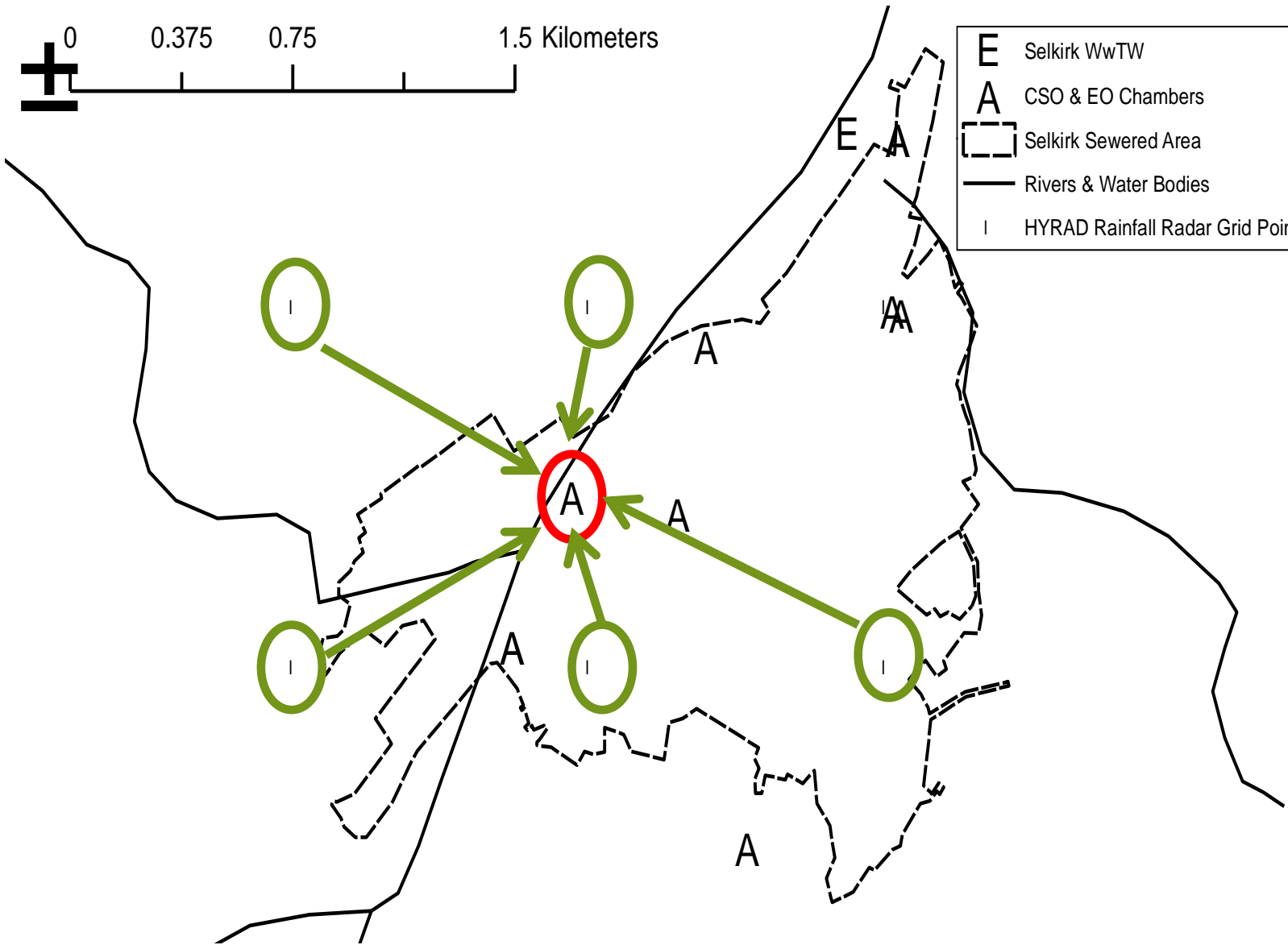
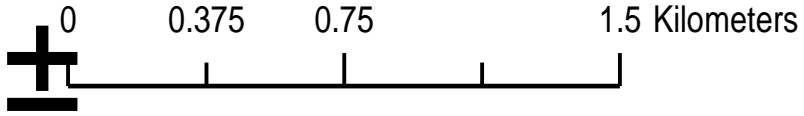


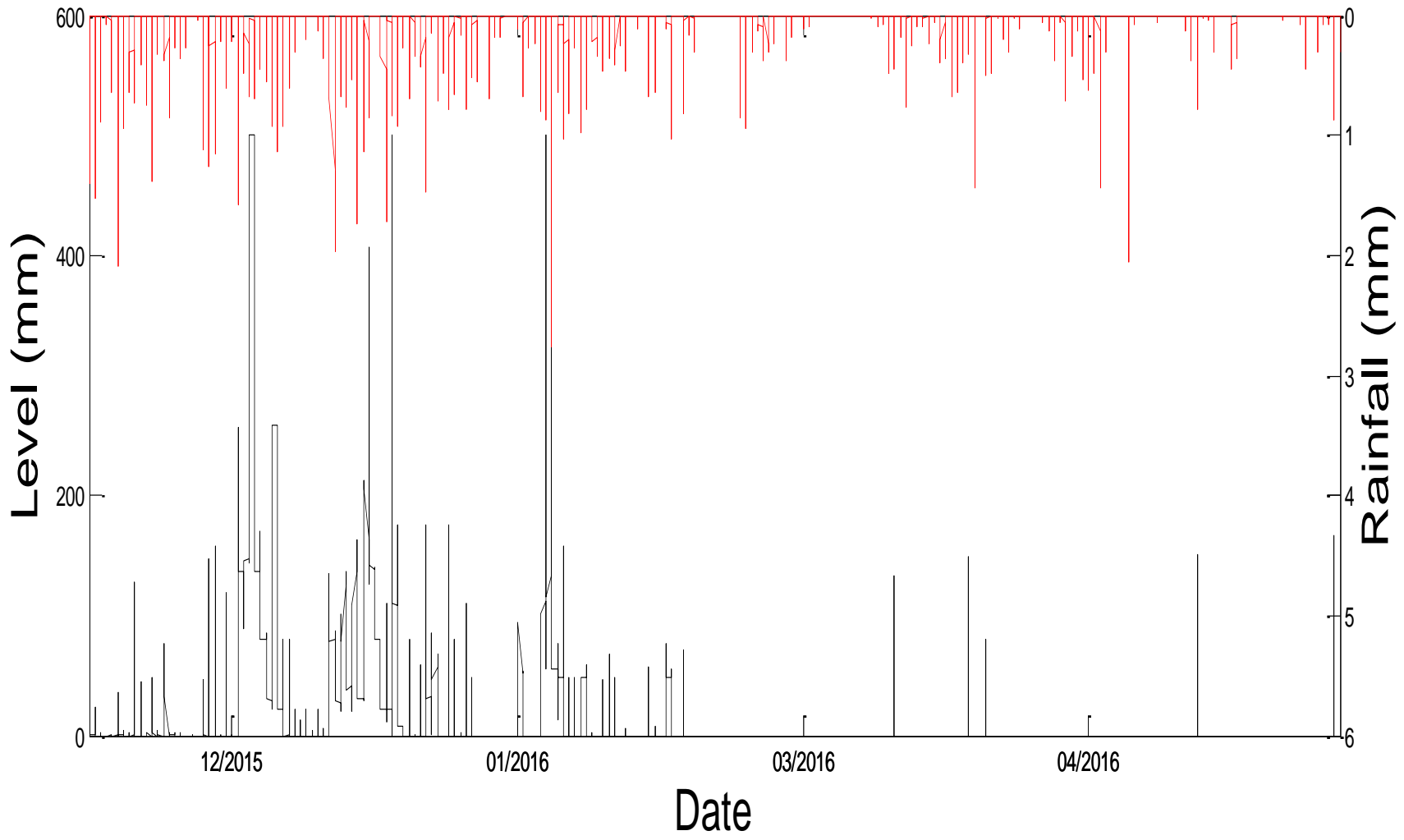


ENVIRONMENTAL MONITORING SOLUTIONS

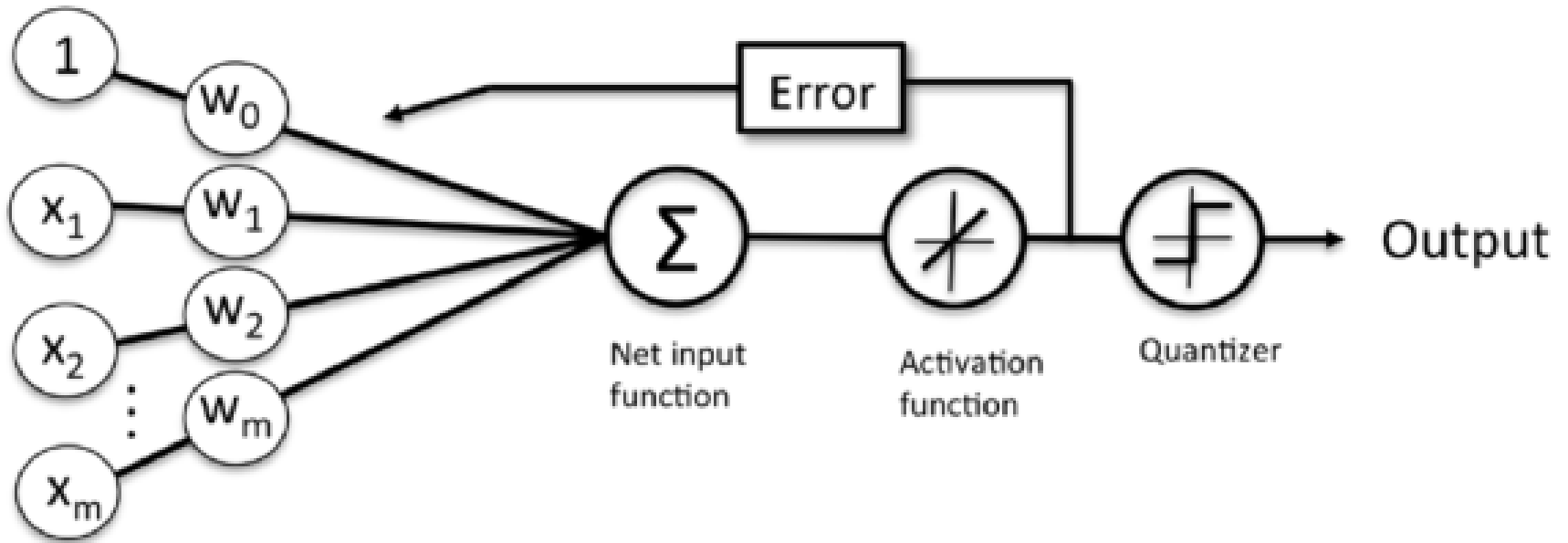


*Case Study: ANN
Modelling of CSO
Events*

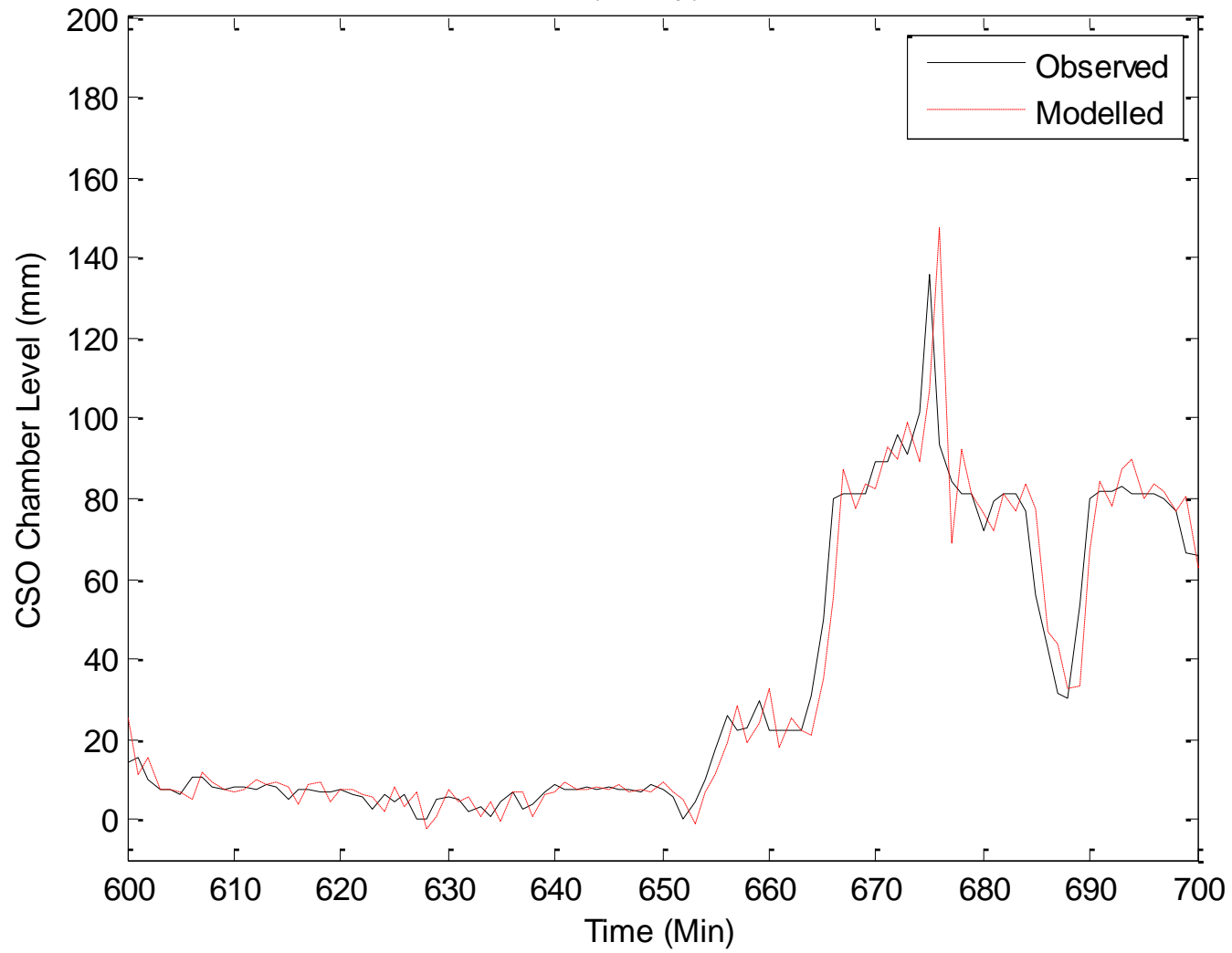




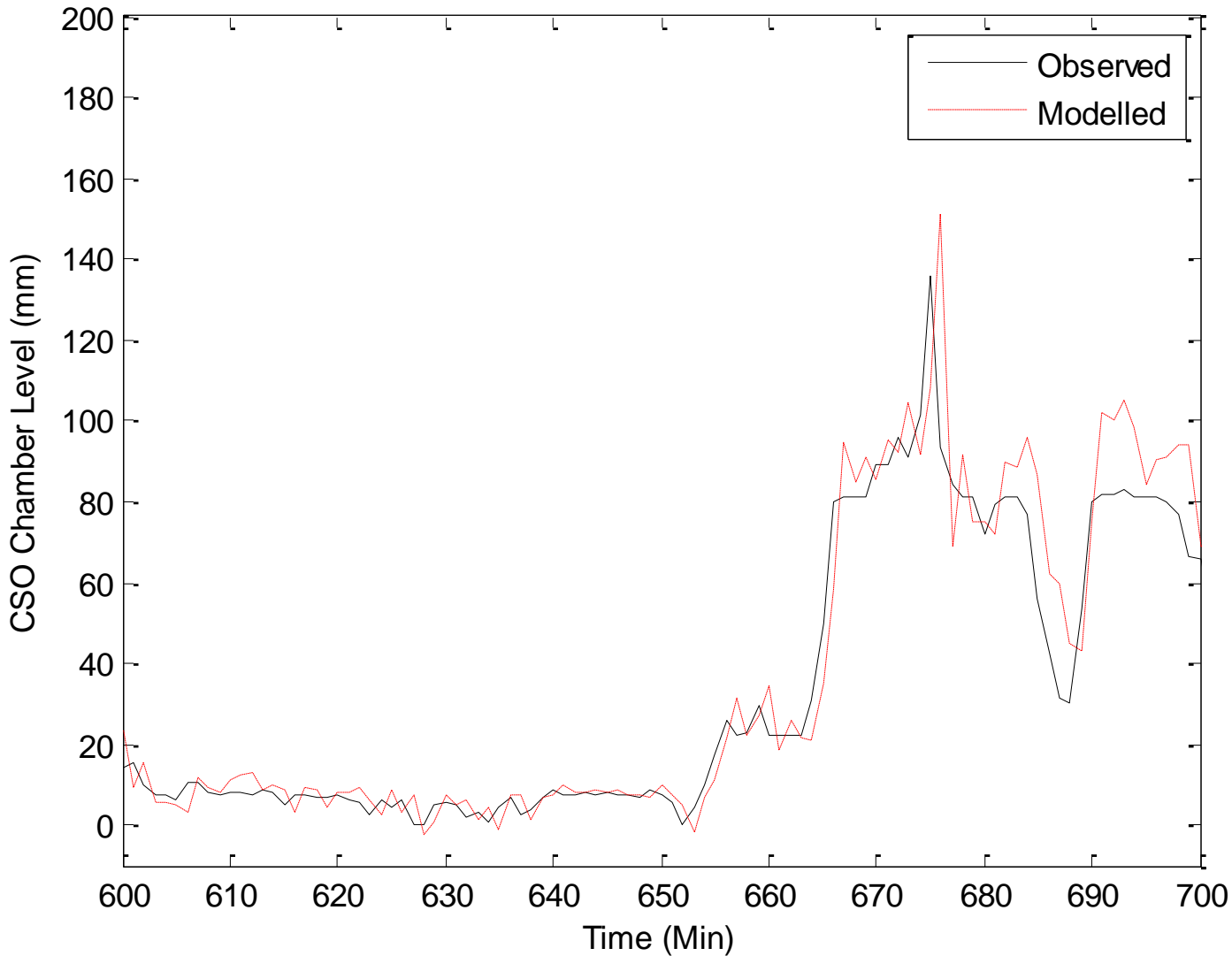
Adaptive Linear Neuron (ADALINE)



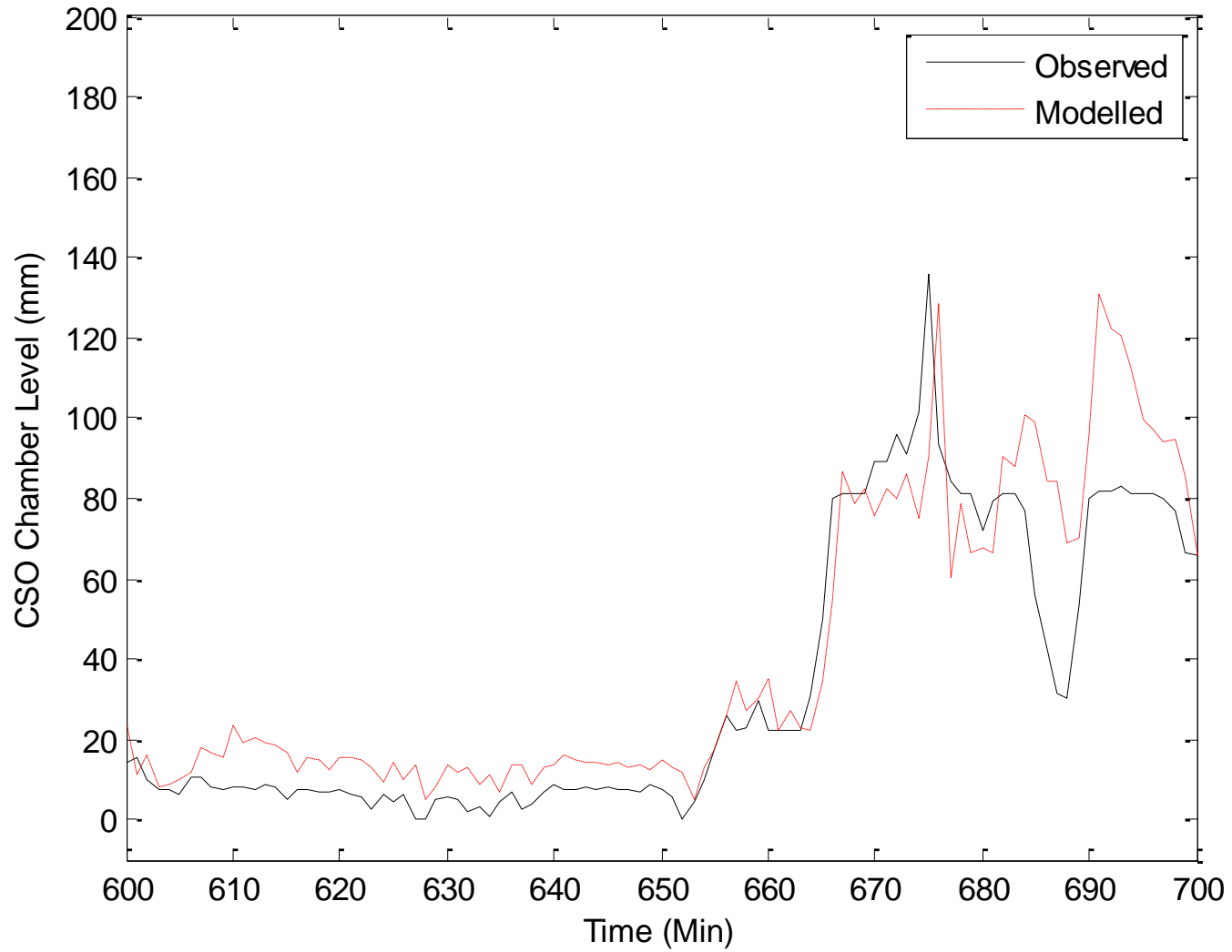
15 Min (1 Step) Forecast

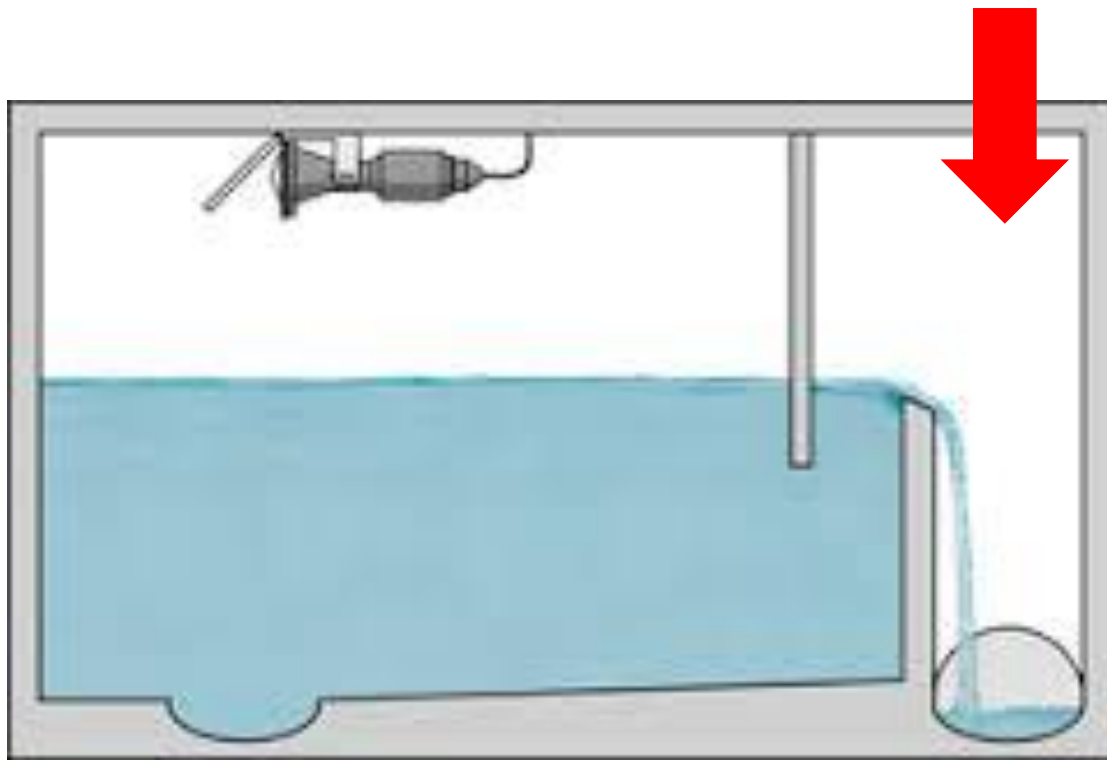


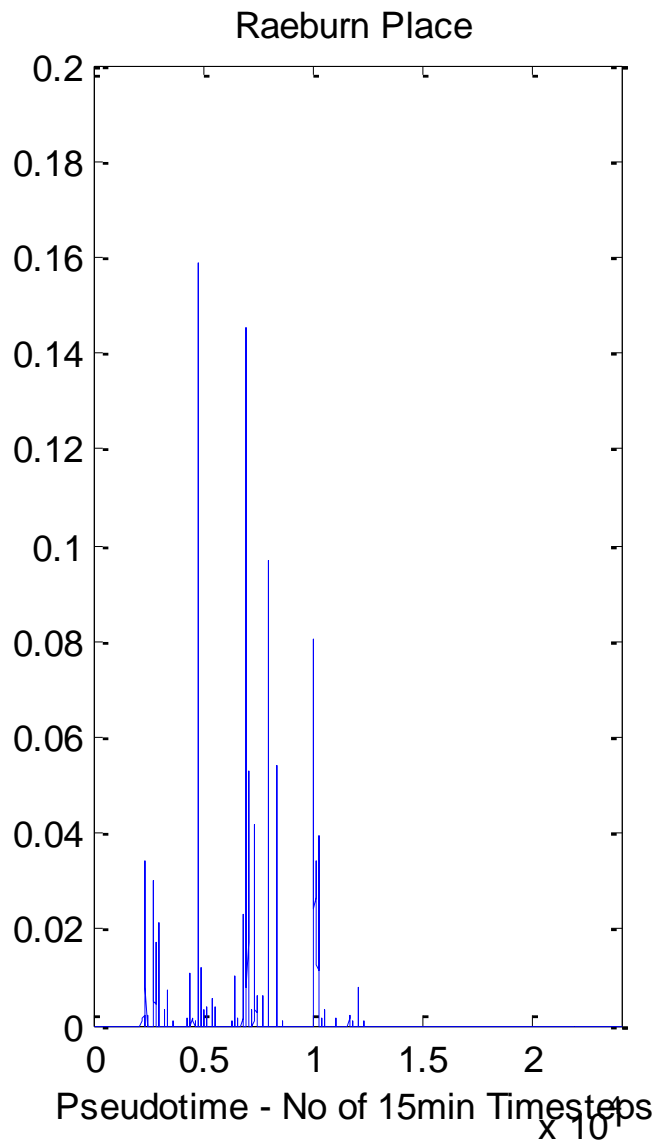
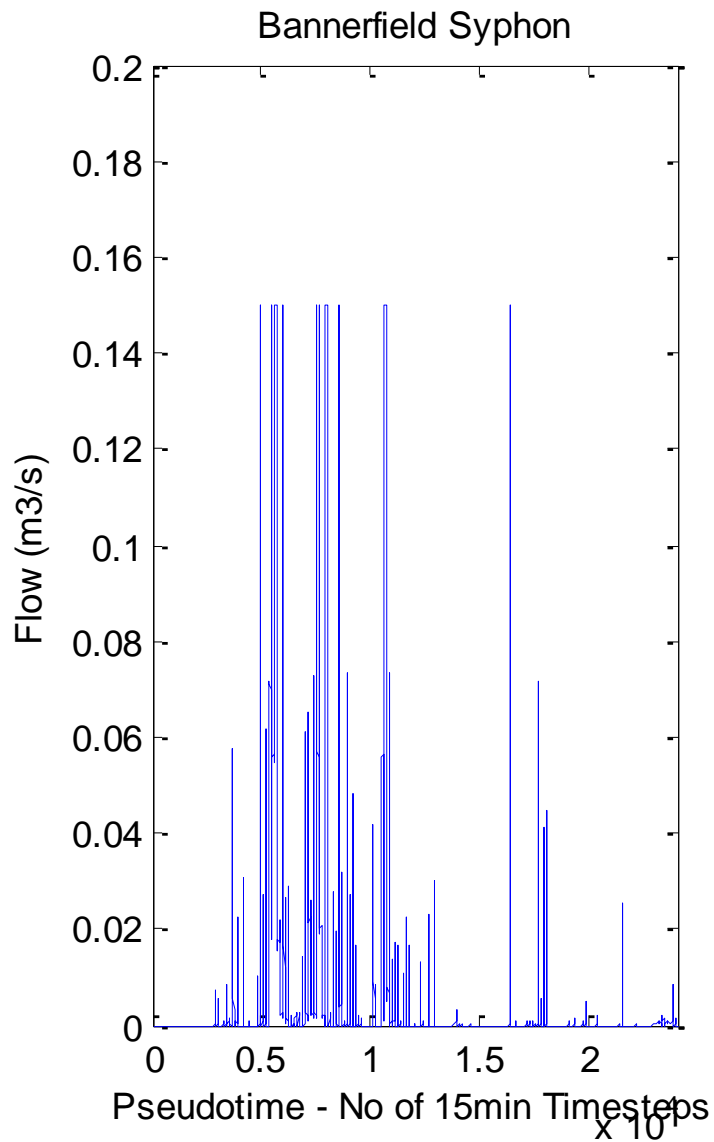
2 Hours (8 Step) Forecast

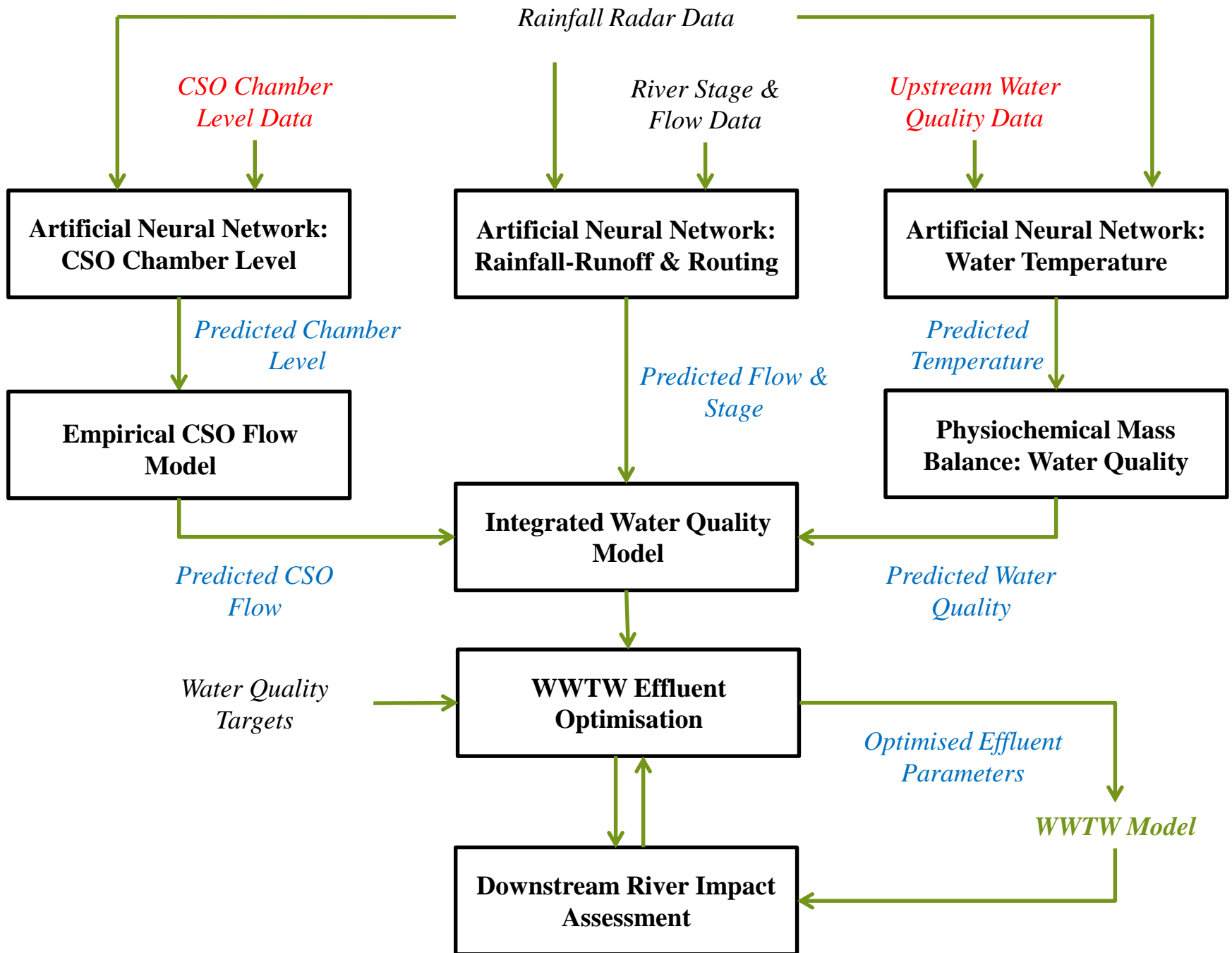


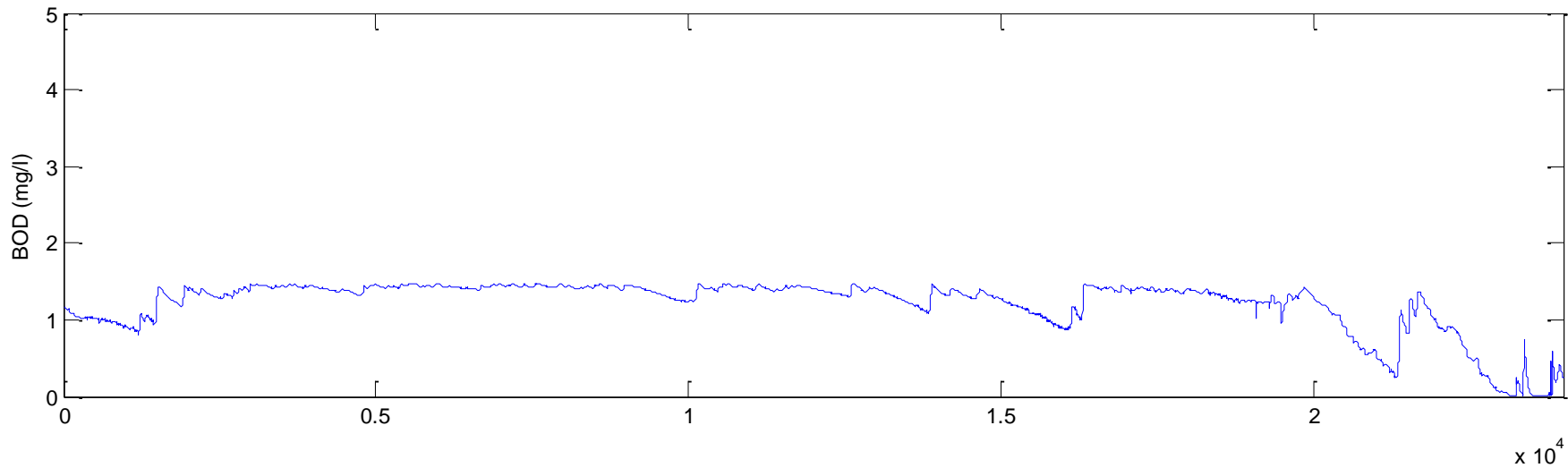
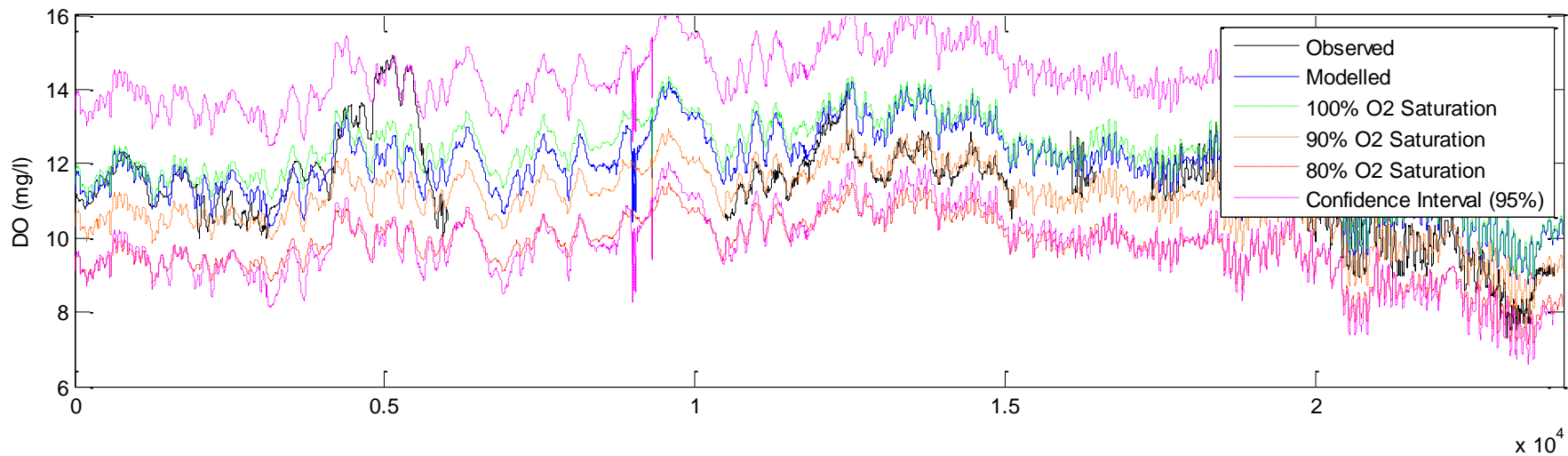
12 Hour (48 Step) Forecast

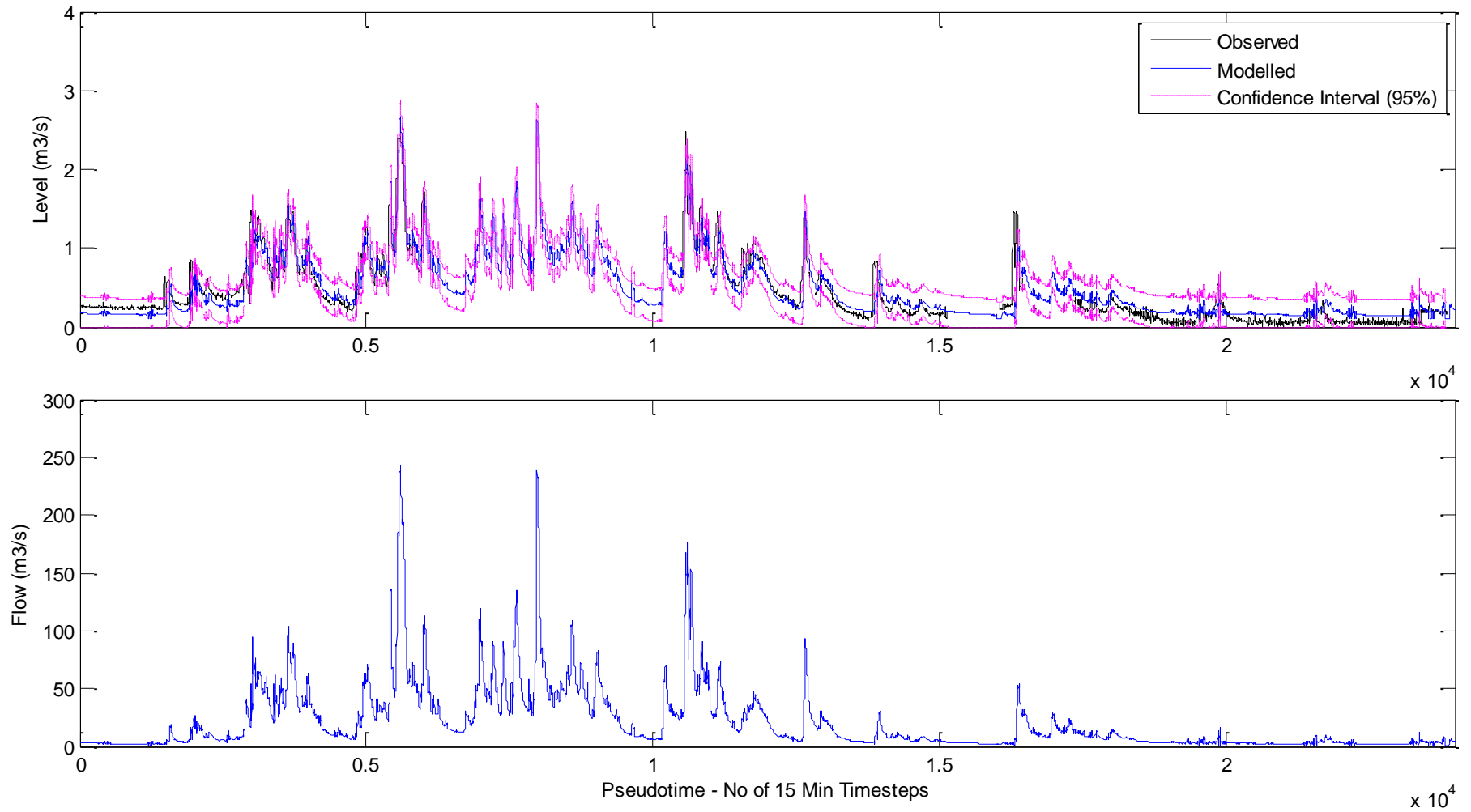


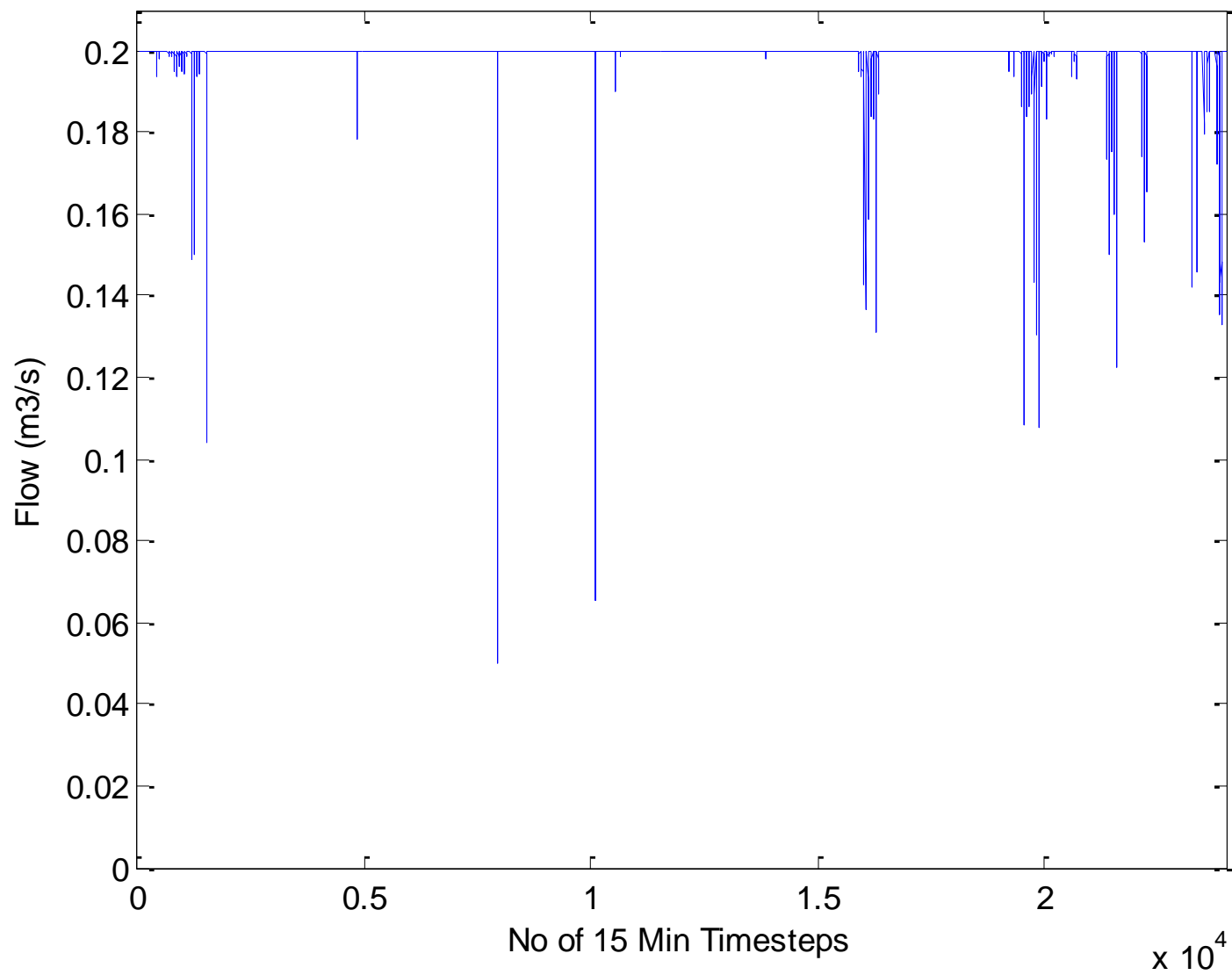


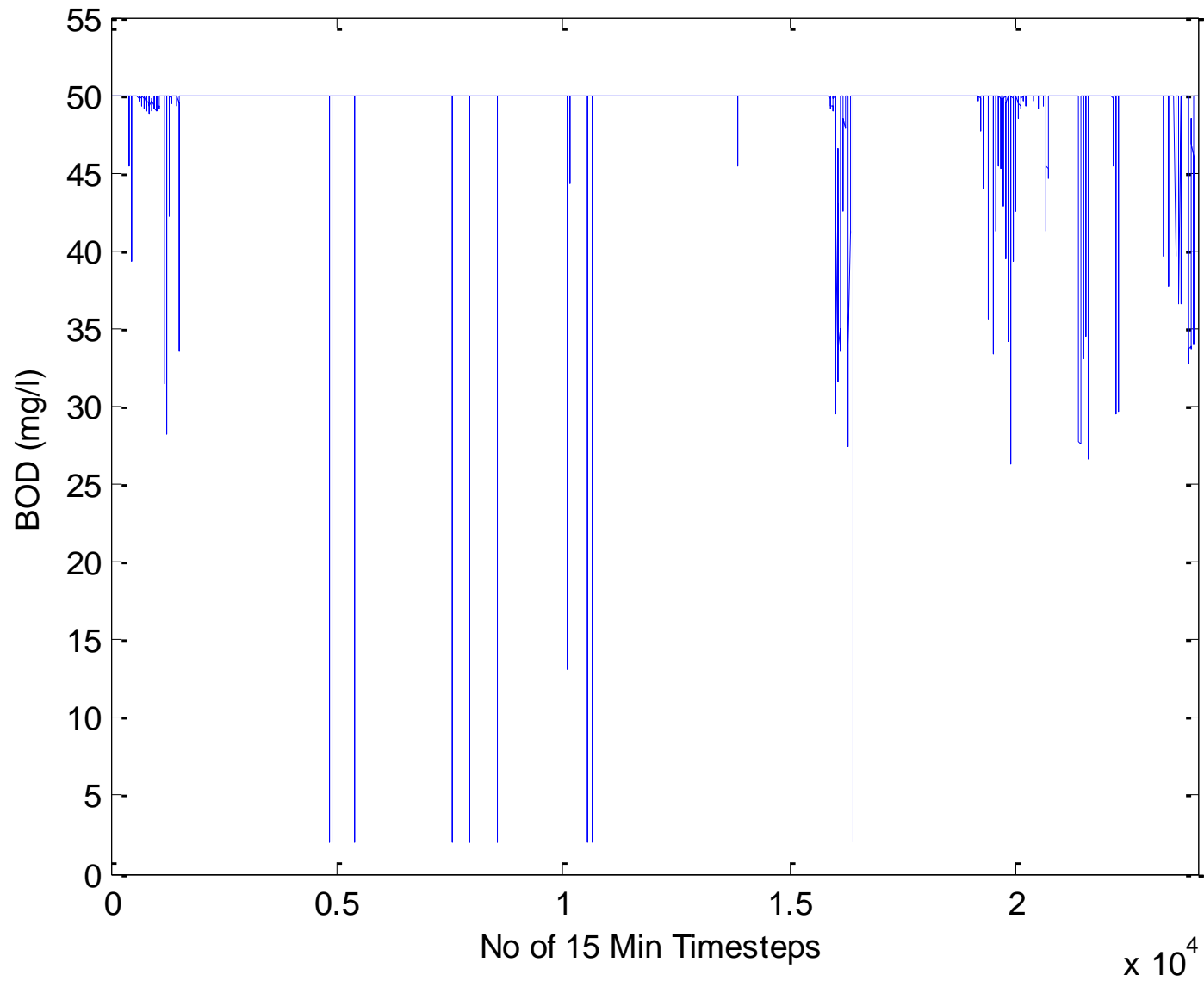


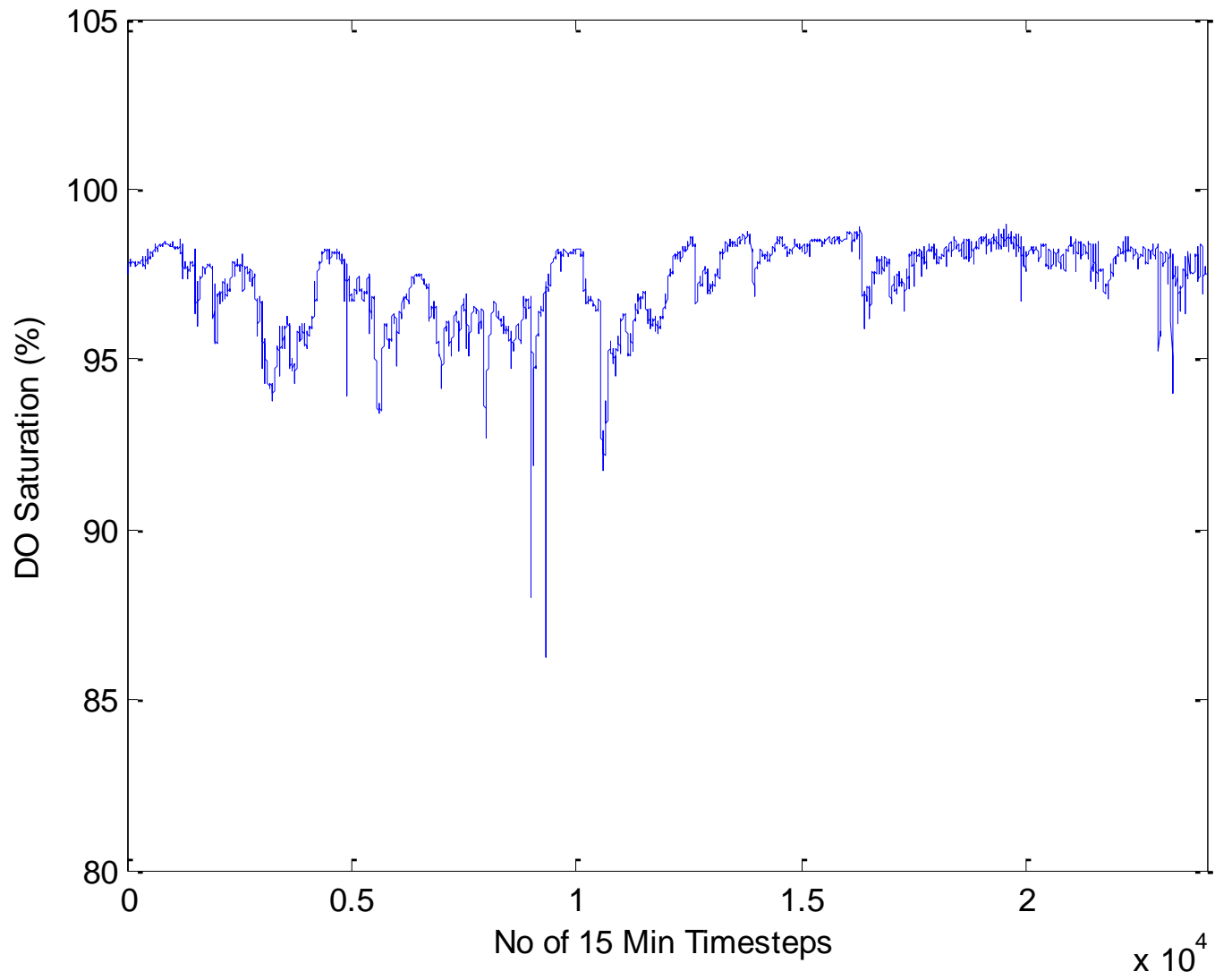


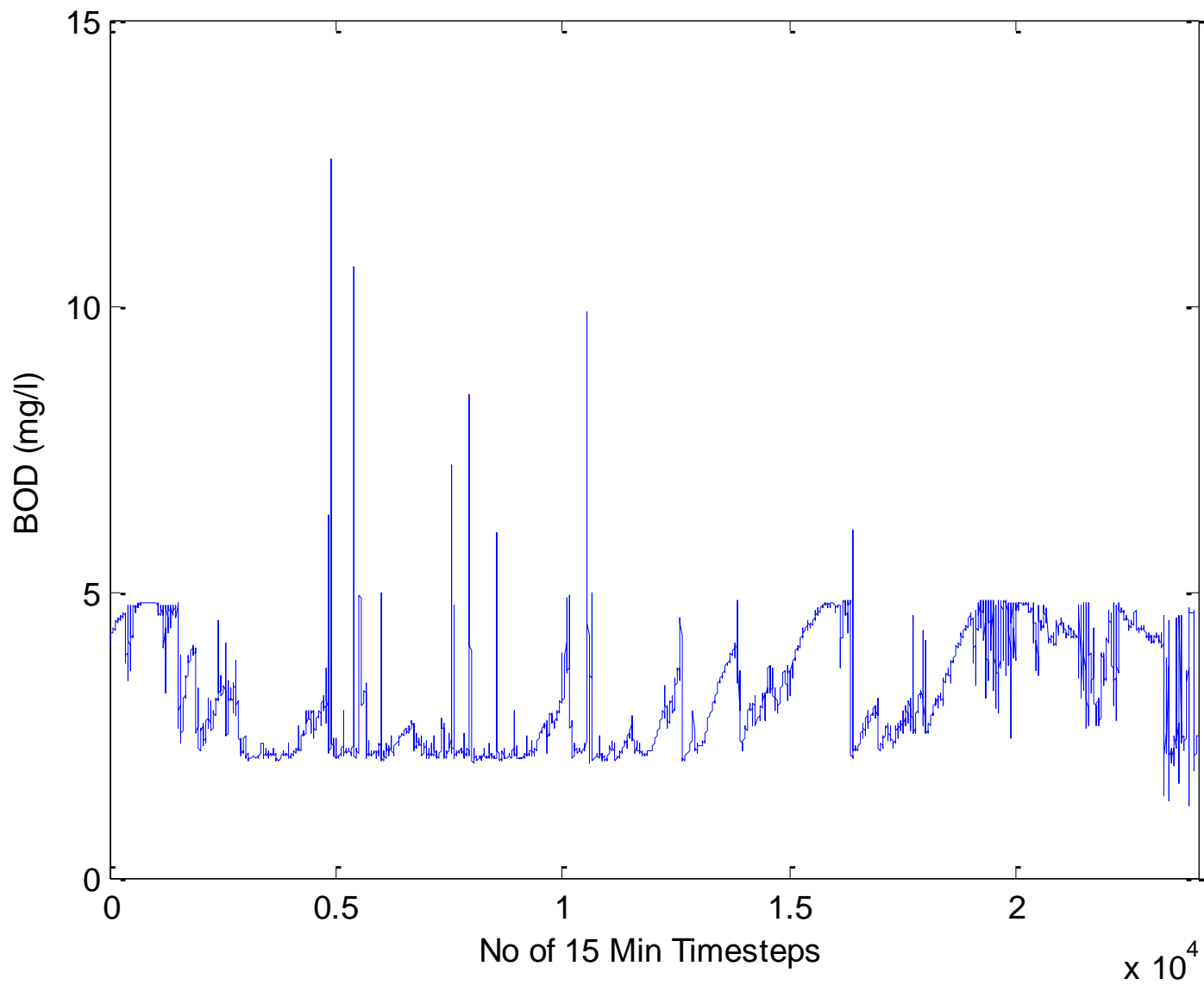












Thank You!

Any Questions?



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