

# CONTRIBUTION OF SWOT DATA TO WETLAND HYDROLOGICAL MODELLING WITH HYDROTEL: THE OROMOCTO WATERSHED CASE STUDY

Anne-Marie Laroche<sup>1</sup>, Mélanie Trudel<sup>2</sup>, Yannick Duguay<sup>3</sup>, Alain N. Rousseau<sup>4</sup>, Arij Messai<sup>1</sup>, Cheick Doumbia<sup>2</sup>  
 Université de Moncton<sup>1</sup>, Université de Sherbrooke<sup>2</sup>, Centre de géomatique du Québec<sup>3</sup>, Institut national de recherche scientifique<sup>4</sup>

## CONTEXT & PROBLEM STATEMENT

- Wetlands act as natural buffers for floods and low flows.
- Current models face challenges in parameterizing wetland processes.
- SWOT provides unique spatial and altimetric data, offering an alternative source of hydrometric information.

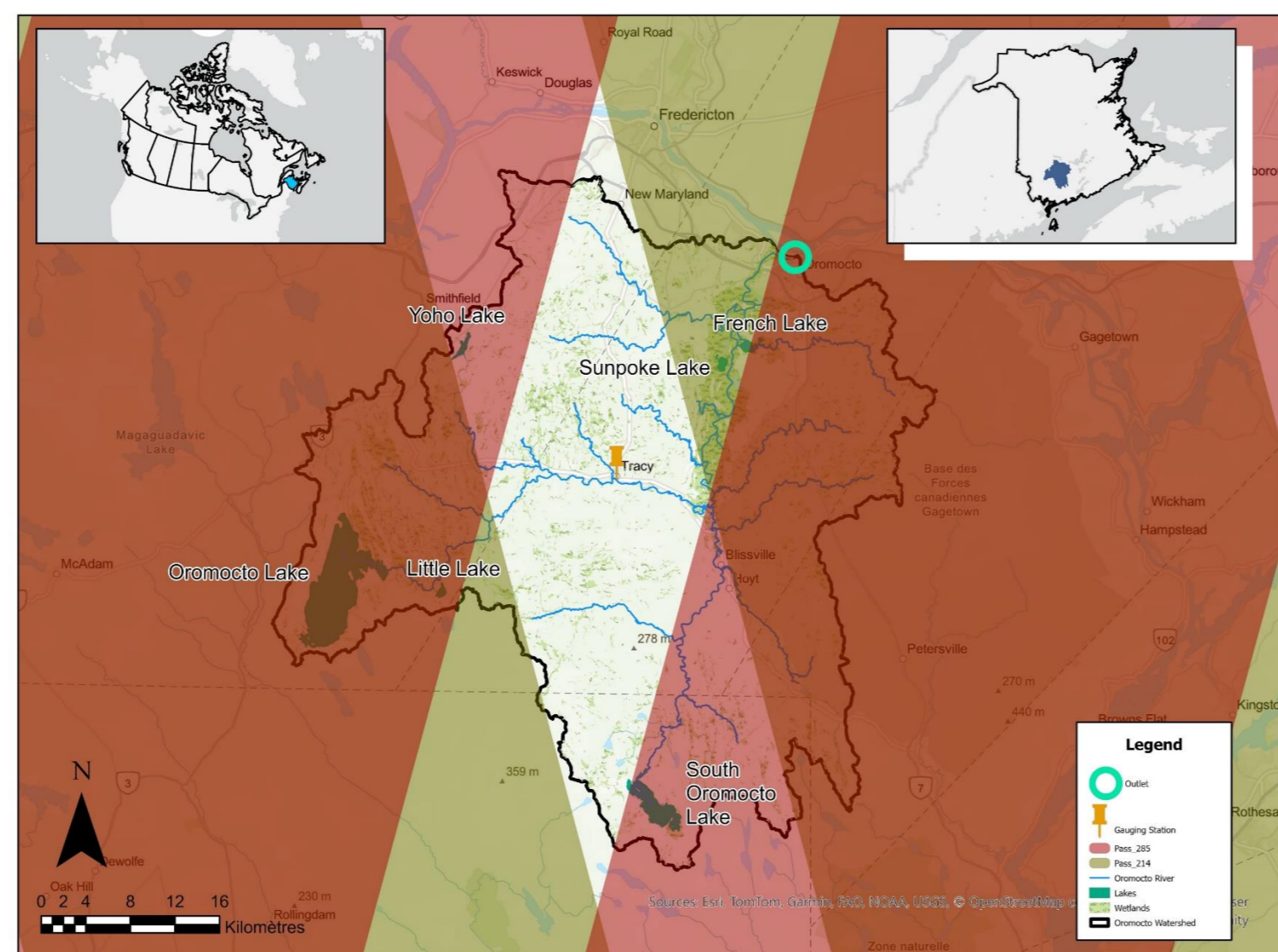


## OBJECTIVES

- Integrate SWOT-derived products into the Hydrotel model (this poster).
- Compare scenarios with and without explicit wetland representation.
- Assess the effects on flood peaks, low flows, and water storage dynamics.

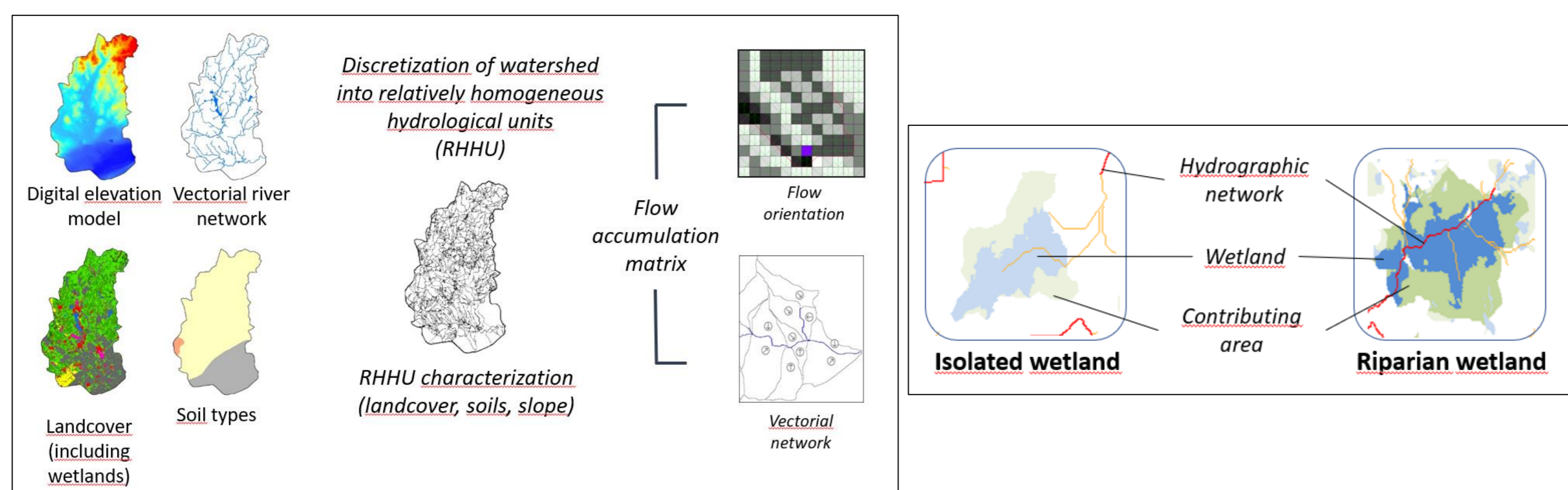
## STUDY AREA

- Oromocto River Basin, New Brunswick, Canada.
- High density of wetlands and riparian areas.
- Calibration/validation rely on an upstream tributary gauge (~one-third coverage); basin-wide evaluation remains partial.



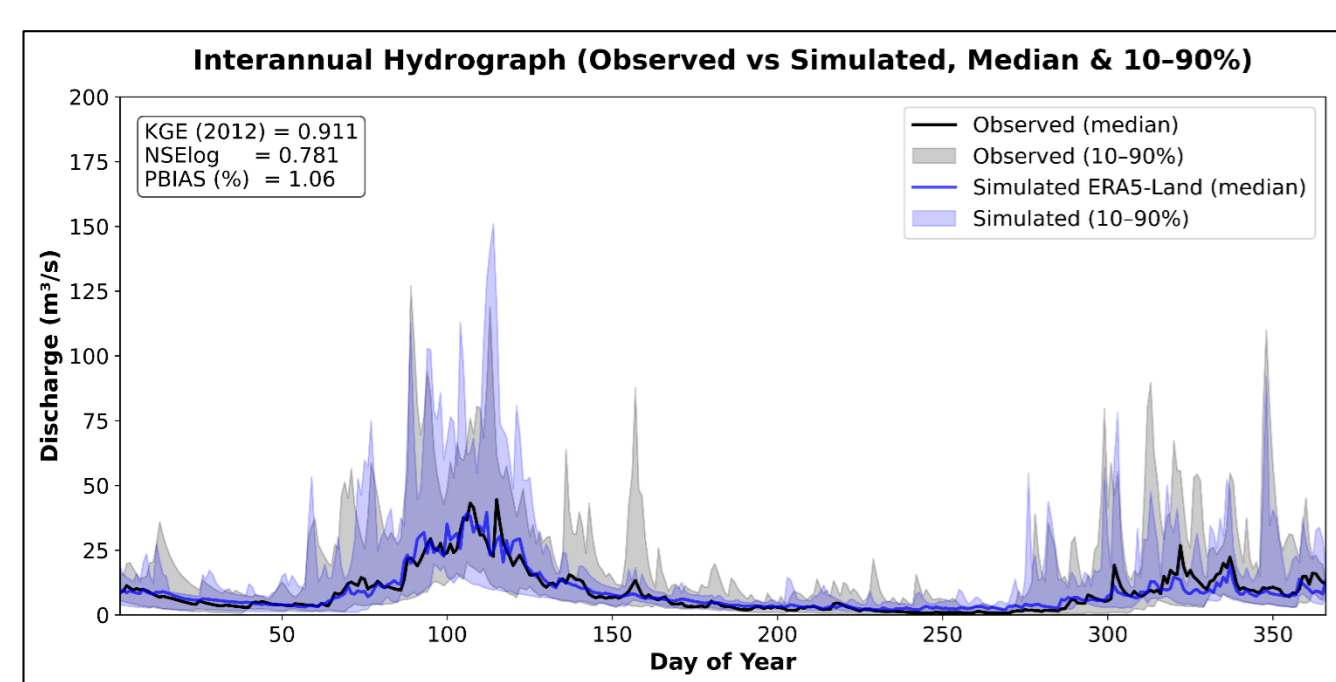
## HYDROLOGIC MODEL

- Model: Hydrotel (semi-distributed, deterministic).

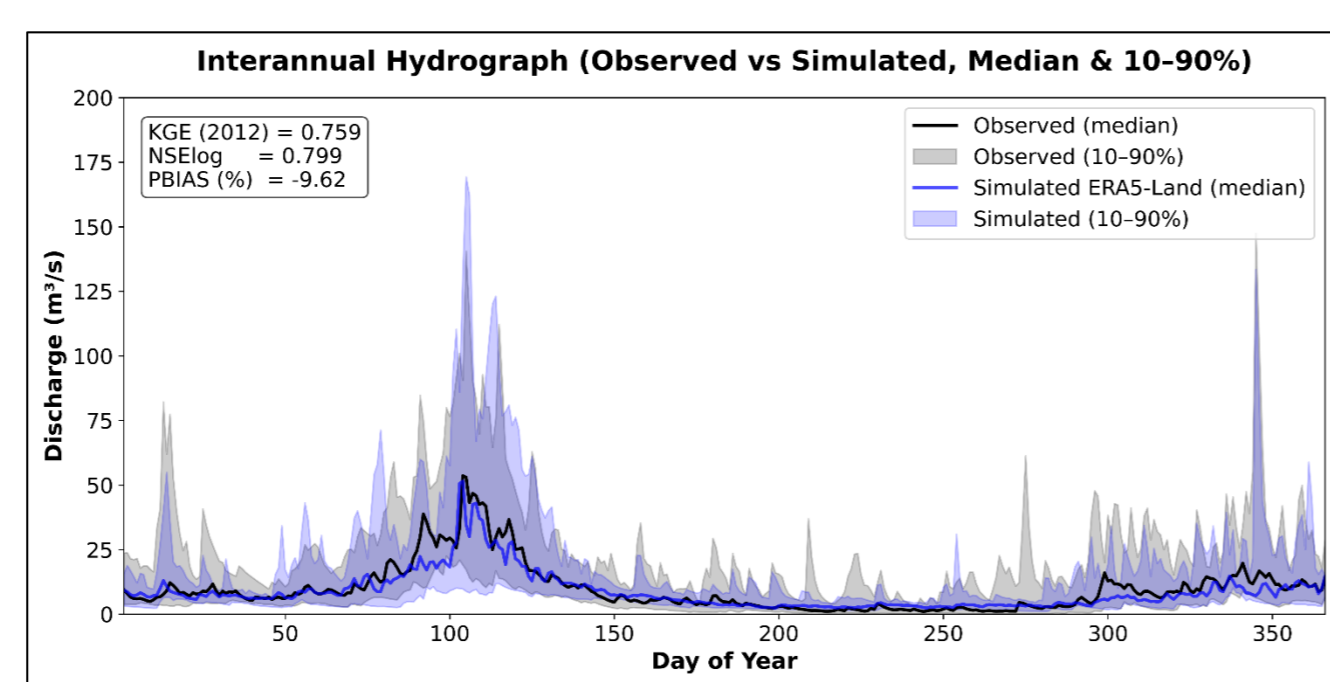


- Data: Daily ERA5-Land meteorological dataset (2000–2019) + daily observed streamflow.

- Evaluation: Nash–Sutcliffe Efficiency (NSE), Kling–Gupta Efficiency (KGE).



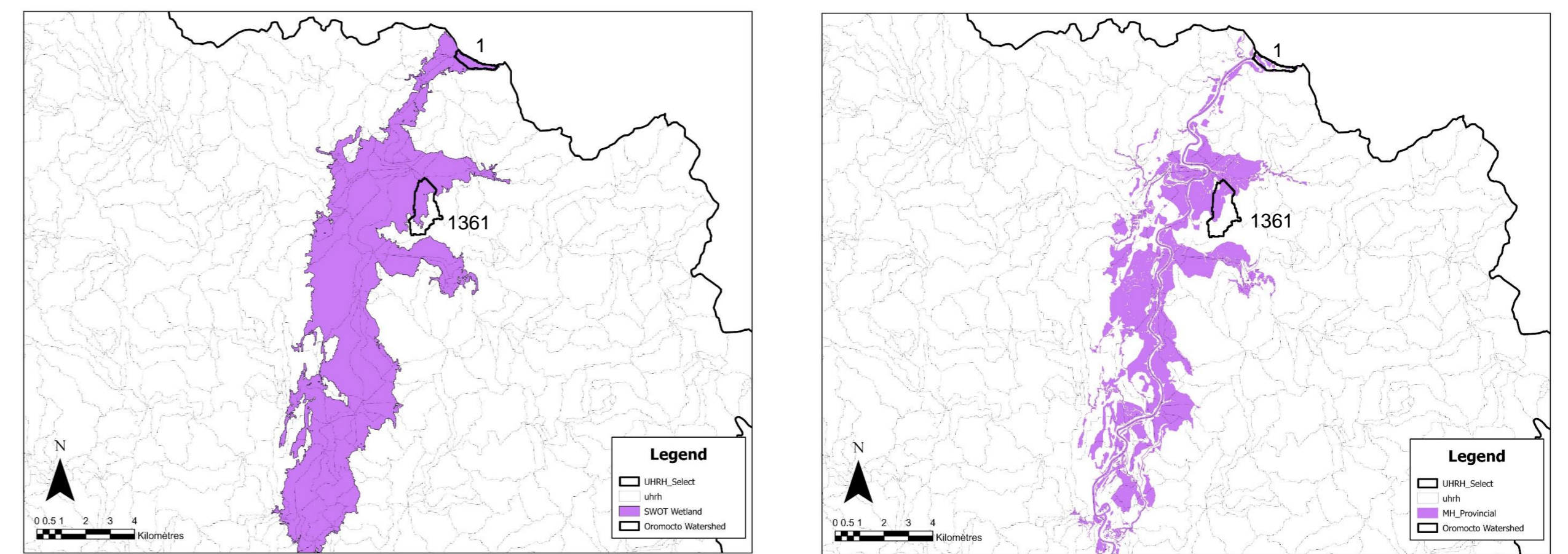
Calibration (2000-2011)



Validation (2012-2023)

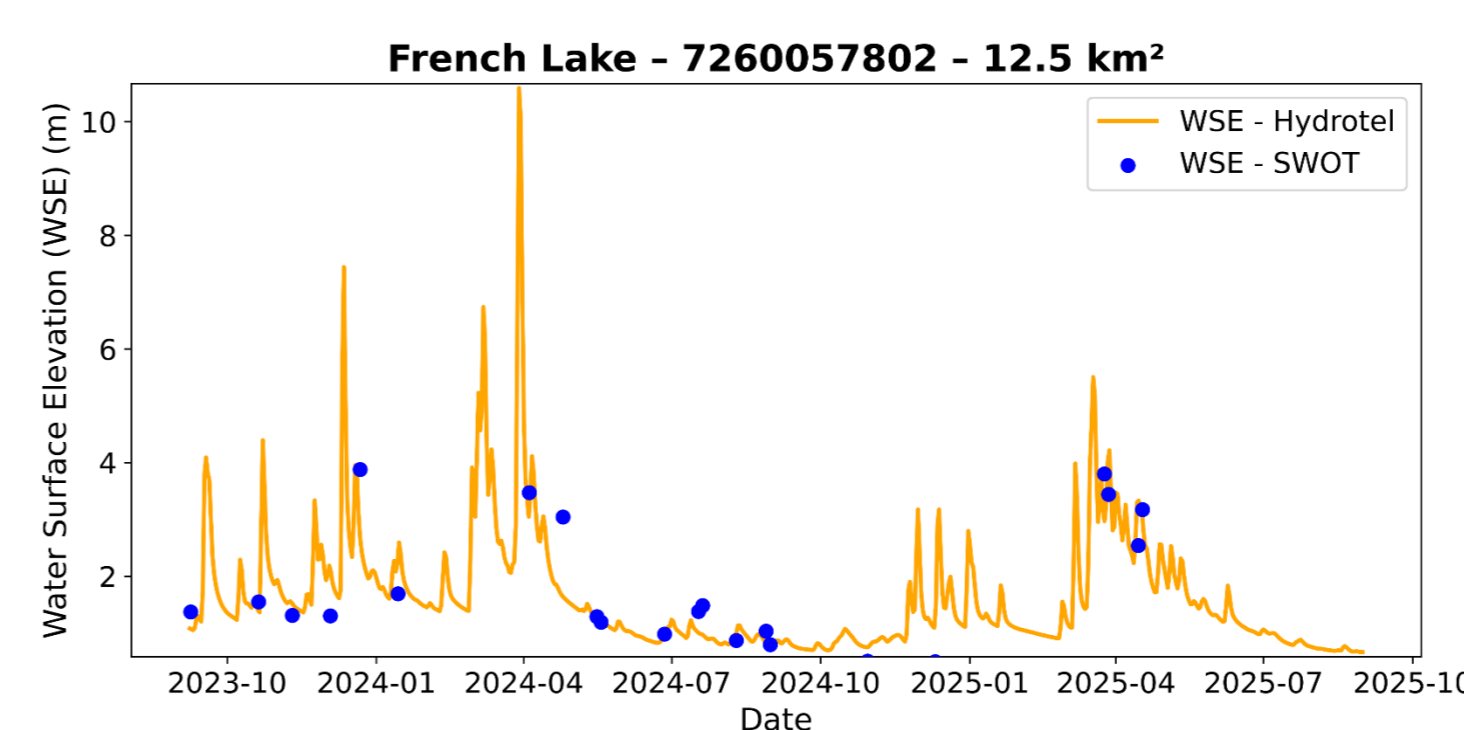
## RESULTS

- SWOT can help delineate wetlands limit. Surface area from SWOT are used in Hydrotel to parameterize wetlands, replacing the provincial database. Volume variations will be incorporated in future work.

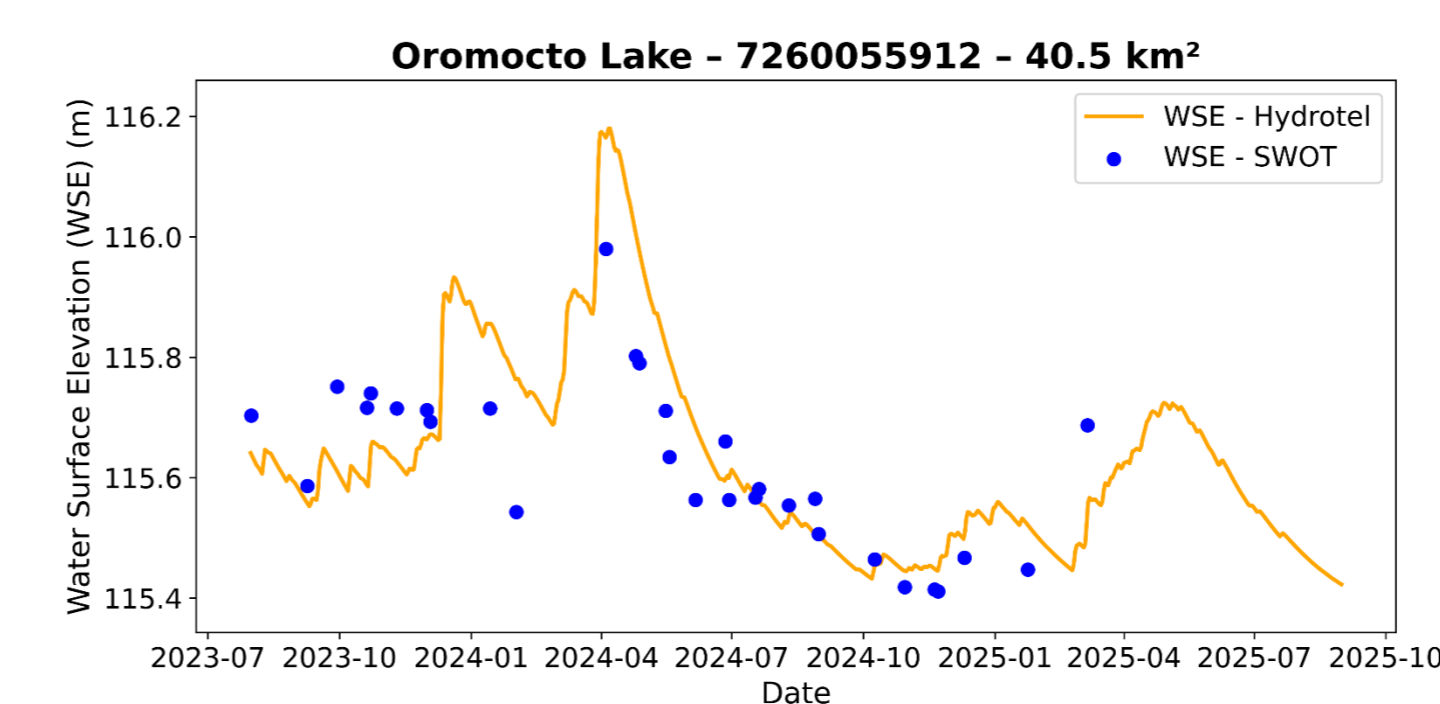


SWOT maximum wetland area (72 km<sup>2</sup>)

Provincial wetland area (42 km<sup>2</sup>)

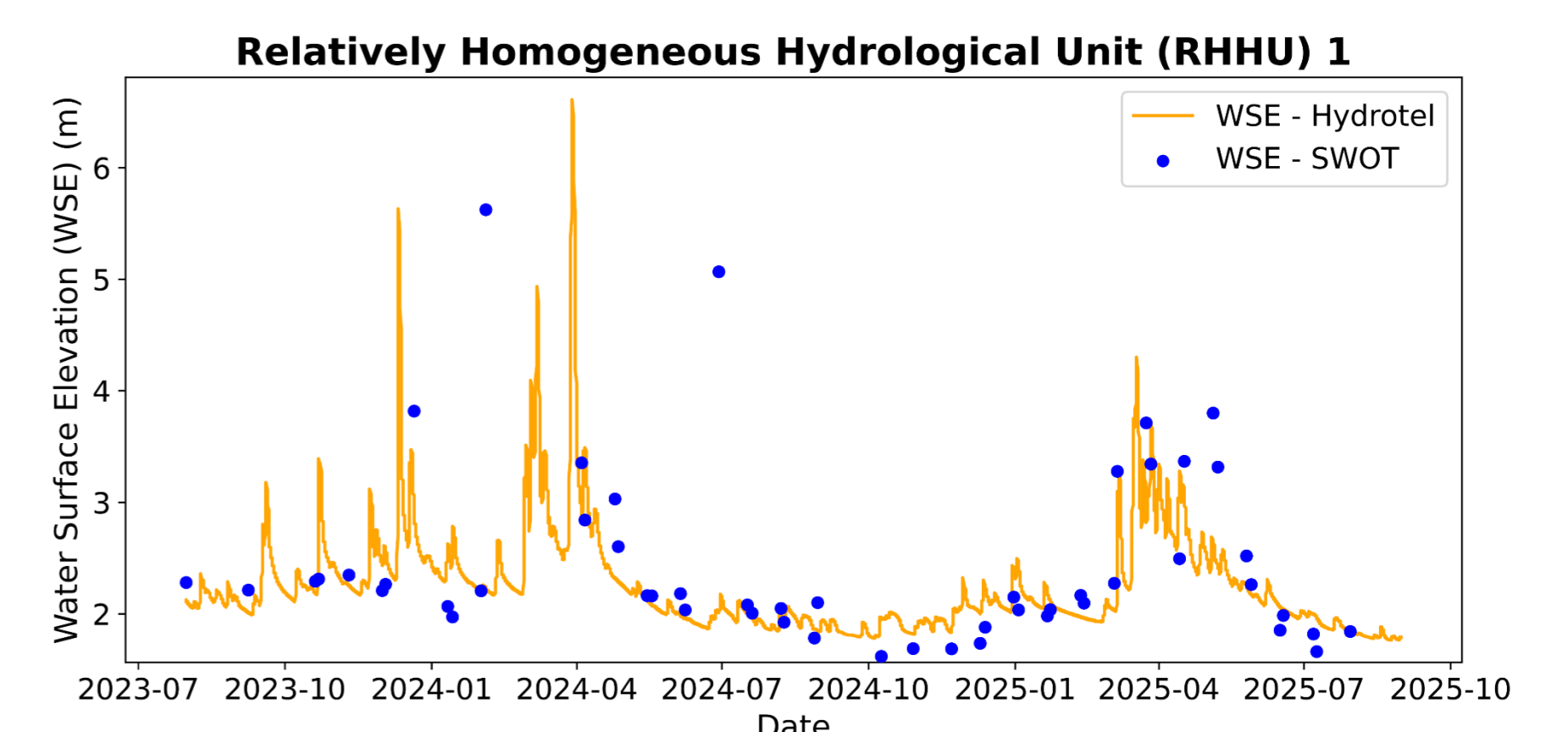


- SWOT data are filtered based on *wse\_u* and *wse\_std* to remove outliers.

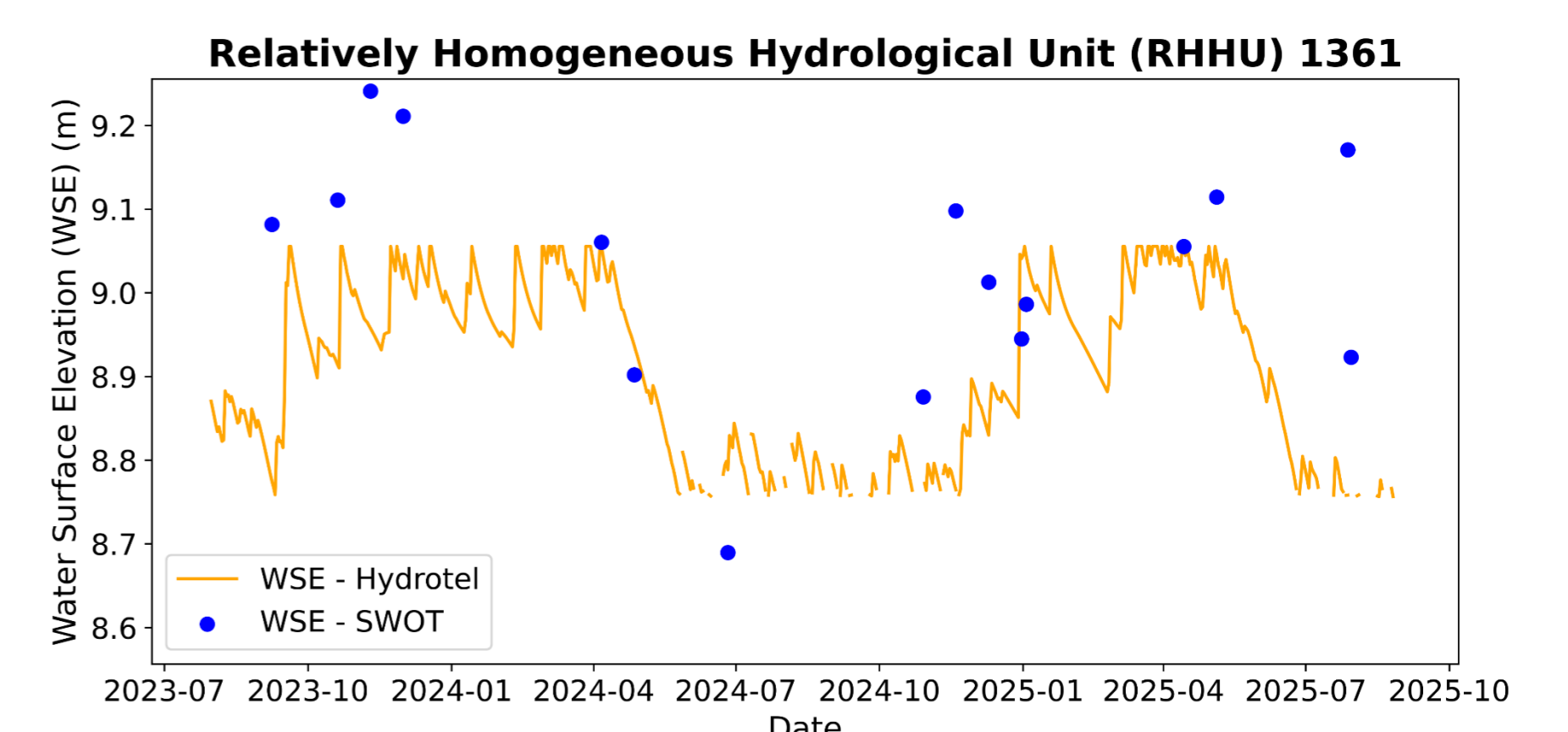


- SWOT and Hydrotel show similar variations in lake WSE

- SWOT and Hydrotel show similar variations in riparian wetland WSE



- The range of variation is similar for isolated wetlands, but the temporal patterns differ. Further analysis will be conducted on both Hydrotel and SWOT WSE to understand the differences.



## CONCLUSIONS

- SWOT could enhance hydrological modelling in poorly gauged basins.
- Provides insights into wetland storage and release mechanisms.
- Next steps:
  - Analysis of the RiverSP\_node product,
  - Calibration of the model with SWOT,
  - Refinement of low-flow simulations, and
  - Assessment of the approach to other wetland-rich basins.