



Alice Harrison

Principal Engineer

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Alice is a Principal Engineer at the UNSW Water Research Laboratory. She has the unique qualifications of being a specialist water engineer with a background in economics, having completed both a Bachelor of Civil Engineer (Hons 1) and Bachelor of Commerce in 2015.

Alice is interested in estuary and coastal processes and works to bridge the gap between engineers, economists, and decision makers to improve coastal and estuary management. Her work is highly varied, from detailed hydrodynamic modelling to inform coastal floodplain and estuary management, to extensive fieldwork in both pristine and degraded environments, to completing cost-benefit analysis for large scale wetland restoration projects in NSW. Alice is particularly interested in the growing and evolving field of environmental economics, with a focus towards ensuring that the true value of the environment is acknowledged and accounted for by decision makers.

Qualifications and awards

BE Hons 1 (Civil Engineering), UNSW, 2015
BComm (Finance), UNSW, 2015
MIEAust: Engineers Australia
AWA NSW R&D Excellence Award 2024 (Team)

Professional history

2023-Current: Principal Engineer, UNSW WRL
2022-2023: Senior Project Engineer, UNSW WRL
2015-2021: Project Engineer, UNSW WRL
2013-2014: Undergraduate Engineer, Leighton Contractors

Expertise

- Coastal floodplain modelling & management
- Estuarine management and modelling
- Environmental economics
- Environmental data collection and interpretation
- Plume dispersion
- Hydrodynamic modelling
- Saline dynamics
- Economic analysis in coastal zone projects

Summary of relevant experience

Floodplain management and wetland restoration

NSW coastal floodplain prioritisation project
Assessment of overtopping of Bray Park weir
Big Swamp restoration monitoring
Upland peat swamps hydrological monitoring and modelling

Environmental economics

Big Swamp cost benefit analysis
Tuckean Swamp cost benefit analysis
Key fish habitat offsets: ecosystem services approach
Site level Environmental Economic Accounting for blue carbon restoration projects

Coastal processes

NSW Beach Profile Database
Eurobodalla coastal hazard study

Coastal tailwater levels: Adventure Bay and Snug Bay
Lake Illawarra entrance channel management study
Sea level rise impacts at Margate, Tasmania

Numerical modelling in estuaries

Manly Lagoon hydrodynamic modelling
Tuckean Swamp hydrology and hydrodynamic study
Botany Bay stormwater modelling
Sewage overflow impacts on oyster harvest areas in NSW estuaries

Saline dynamics modelling of climate change in NSW estuaries

Plume dispersion

Merimbula outfall – dye tracing experiment
Burwood outfall - modelling and marine assessment
Cooks River dye tracing

Publications

Selected journal papers

Cairns, J., Mason, M., **Harrison, A.**, Johnson, F., Davie, A., & Glamore, W. (2024). Mining impacts peatland hydrology reducing discharge and water storage volumes. *Journal of Hydrology*, 640, 131735.

Waddington, K., **Harrison, A.J.**, Rayner, D.S., Tucker, T.A. and Glamore, W.C. (2023) Estuarine Hypoxia—Identifying High Risk Catchments Now and Under Future Climate Scenarios. *Water Resources Research*, 59(9)

Waddington, K., **Harrison, A.J.**, Rayner, D., Tucker, T. and Glamore, W., 2023. Upscaling the remediation of acidic landscapes—the coastal floodplain prioritisation method. *Journal of Environmental Management*, 348, p.119260.

Ruprecht, J.E., King, I.P., Dafforn, K.A., Mitrovic, S.M., **Harrison, A.J.**, Birrer, S.C., Crane, S.L. and Glamore, W.C. (2022) Implications of bacterial mineralisation in aquatic ecosystem response models. *Water Research*, 209, p.117888.

Ruprecht, J.E., King, I.P., Mitrovic, S.M., Dafforn, K.A., Miller, B.M., Deiber, M., Westhorpe, D.P., Hitchcock, J.N., **Harrison, A.J.** and Glamore, W.C., (2022) Assessing the validity and sensitivity of microbial processes within a hydrodynamic model. *Water Research*, 218, p.118445.

Ruprecht, J.E., Birrer, S.C., Dafforn, K.A., Mitrovic, S.M., Crane, S.L., Johnston, E.L., Wemheuer, F., Navarro, A., **Harrison, A.J.**, Turner, I.L. and Glamore, W.C., (2021) Wastewater effluents cause microbial community shifts and change trophic status. *Water Research*, 200, p.117206.

Selected technical reports

Harrison, A. J., Mason, M., Doherty, Y. and Miller, B. M. (2025) Assessing the impact of sewage overflows on oyster harvest areas: User Guide and Results Report, WRL Technical Report 2024/26, UNSW Water Research Laboratory.

Harrison, A.J. and Carley, J.T. (2024) Cost database of nature based coastal management options, WRL Technical Report 2024/23, UNSW Water Research Laboratory.

Harrison, A.J. and Miller, B.M. (2024) Hydrological study of Blue Lagoon, WRL Technical Report 2024/06, UNSW Water Research Laboratory.

Harrison, A.J. and Tucker, T.A. (2024) Sea level rise vulnerability mapping for the Hunter River estuary, WRL Technical Report 2024/08, UNSW Water Research Laboratory.

Montano, L., Miller, B.M., and **Harrison, A.J.** (2023) Methodology to estimate ecological impacts of flow alterations due to constructions of water regulating infrastructure, WRL Technical Report 2024/06, UNSW Water Research Laboratory.

Harrison, A.J., Cairns, J., Mason, M., Rayner, D.S. and Glamore, W.C. (2023) Upland Peat Swamps of the Woronora Plateau – hydrological monitoring and water balance modelling, WRL Technical Report 2021/25, UNSW Water Research Laboratory.

Harrison, A. J. and Rayner, D.S. (2023) Tuckean Swamp Wetland Remediation: Cost Benefit Analysis, WRL Technical Report 2022/05, UNSW Water Research Laboratory.

Harrison, A. J., Henderson, B., Glamore, W.C. (2022) Key fish Habitat Offsets: An Ecosystem Services Approach, WRL Technical Report 2021/03, UNSW Water Research Laboratory.

Harrison, A. J., Rayner, D. S., and Glamore, W.C. (2021) Cooperook Remediation Feasibility Assessment and Cost Benefit Analysis WRL Technical Report 2020/39, UNSW Water Research Laboratory.

Rayner, D. S., **Harrison, A. J.**, and Glamore, W.C. (2020) Tuckean Swamp Hydrologic Options Study WRL Technical Report 2021/21, UNSW Water Research Laboratory.

Harrison, A. J., Glamore, W.C. and Costanza, R. (2019) Cost Benefit Analysis of Big Swamp Restoration Project WRL Technical Report 2019/19, UNSW Water Research Laboratory.

Harrison, A. J. and Rayner, D.S. (2018) Manly Lagoon Estuary Dynamics and Entrance Modelling WRL Technical Report 2018/13, UNSW Water Research Laboratory.

Miller, B.M., Rahman, P.F., Deiber, M. and **Harrison, A.J.** (2016) Calibrated Modelling of Botany Bay WRL Technical Report 2016/02, UNSW Water Research Laboratory.