



Fred Chaaya

Project Engineer

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Fred is a Project Engineer at the Water Research Laboratory. He completed a double degree in Civil and Environmental Engineering at UNSW, with a focus towards aspects of water engineering including hydraulics and coastal engineering. As part of his studies, he completed an Honours thesis investigating techniques for forecasting coastal flood and erosion hazards.

Fred has become a proficient physical modeller, developing a sound understanding of complex hydraulic processes through laboratory testing of dam spillways, cruise ship prop-wash and coastal flume modelling. He is adept in a wide range of instrumentation and modelling skills, as well as model design, construction and operation. Fred's practical skills and extemporaneous problem-solving have been an asset to a number of projects involving field investigations and monitoring instrumentation installations. Fred's management of the globally renowned community science coastal monitoring program, CoastSnap, has led to the efficient and optimised administration of a large-scale, multi-client project.

Qualifications and affiliations

BE Hons 1 (Civil Engineering), UNSW, 2021
BE Hons 1 (Environmental Engineering), UNSW, 2021
MIEAust: Engineers Australia

Professional history

Jul 2021 - Current: Project Engineer, UNSW WRL
Feb 2021 - Jun 2021: Intern, UNSW WRL

Expertise

- Physical model design, construction and testing
- Coastal erosion and flooding processes
- Dam and reservoir hydrology and hydraulics
- Reservoir stratification and artificial destratification techniques
- Cruise ship prop-wash effects
- Monitoring instrumentation, fieldwork installation and telemetry
- Coastal monitoring systems and advanced image analytics

Summary of relevant experience

Physical modelling and hydraulics

Mozambique prop-wash physical modelling
Port infrastructure stability under prop-wash physical modelling
Somerset Dam 3D physical modelling
Salt Pond Bund Wall 2D physical modelling
Murray River Sediment Transport Demonstration model
iRex ferry terminal prop-wash physical modelling

Coastal processes and monitoring

CoastSnap community monitoring project
Shoalhaven Council coastal monitoring network
Shellharbour Council coastal monitoring network
Central Coast Council coastal monitoring network

Dam and reservoirs

Literature review of artificial destratification for mitigating cold water pollution

Review and analysis of cold water pollution mitigation in NSW dams

Pindari cold water pollution mitigation conceptual design projects

Technical support for Pindari Dam artificial destratification trial

Review of experiences with artificial destratification

Estimating evaporation savings through artificial destratification

Environmental monitoring and assessment

Clybucca Wetlands monitoring program

Tomago Wetlands monitoring program

Panboola Wetlands hydrological assessment and remediation

Werri Lagoon Rehabilitation Options

Publications

Selected technical reports

Chaaya, F.C. and Miller, B.M., (2022) A review of destratification techniques for cold water pollution mitigation, WRL TR2021/17

Flocard, F. and **Chaaya, F.C.**, (2023) Western Australia Mardie Salt Ponds 2D Modelling, WRL TR2022/02

Chaaya, F.C. and Miller, B.M., (2023) Pindari dam – mitigating cold water pollution through artificial destratification, WRL TR2022/04

Miller, B.M. and **Chaaya, F.C.**, (2024) Devonport rock bag revetment stability - prop wash physical modelling, WRL TR2023/04

Chaaya, F.C. and Miller, B.M., (2024) Pindari destratification trial - conceptual design details, WRL TR2023/05

Chaaya, F.C. and Modra, B., (2024) iReX Project - Scour protection stability under propeller wash physical model, WRL TR2024/03