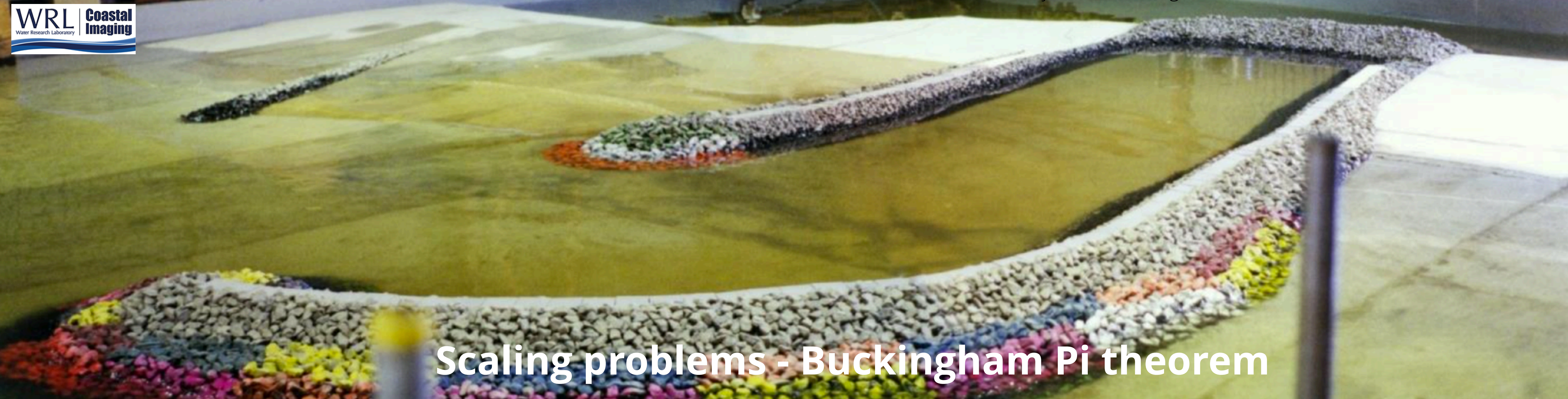


# Physical modelling: laboratory models

Physical Modelling of Shell Cove Boat Harbour Entrance (NSW)



## Scaling problems - Buckingham Pi theorem

Forming dimensionless numbers from selected variables is somewhat arbitrary it is usually the result of physical reasoning and observations!

- Fall speed parameter:  $H/\omega T$  where  $\omega$  is the angular frequency
- Breaker index:  $H_b/h$
- Ursell number:  $L^2 H/h^3$  (linear/Airy wave theory)



# Physical modelling: laboratory models

Physical Modelling of Shell Cove Boat Harbour Entrance (NSW)

Symbol	Dimensionless Number	Force Ratio	Definition
$R_e$	Reynolds Number	Inertia/Viscous	$\frac{UL}{\nu}$
$F_n$	Froude Number	Inertia/Gravity	$\frac{U}{\sqrt{gL}}$
$M_n$	Mach's Number	Inertia/Elasticity	$\frac{U}{\sqrt{E_v/\rho}}$
$W_n$	Weber's Number	Inertia/Surface tension	$\frac{U}{\sqrt{\sigma/\rho L}}$
$St$	Strouhall number	-	$\frac{f_v D}{U}$
$KC$	Keulegan-Carpenter Number	Drag/Inertia	$\frac{U_A T}{D}$