

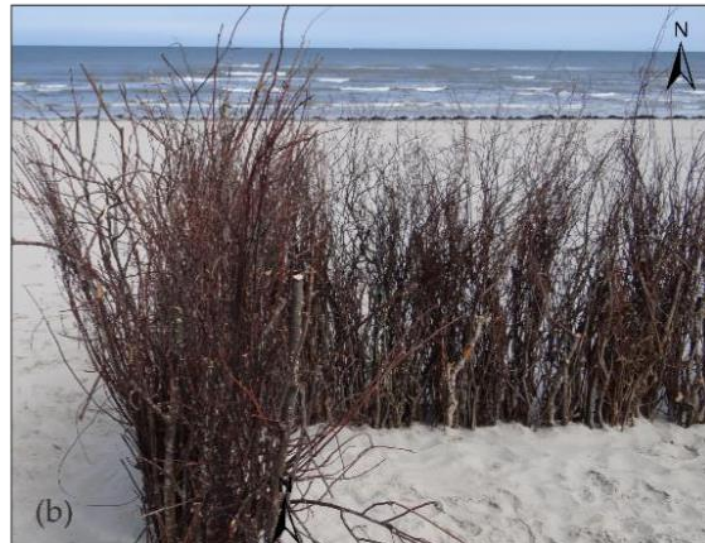
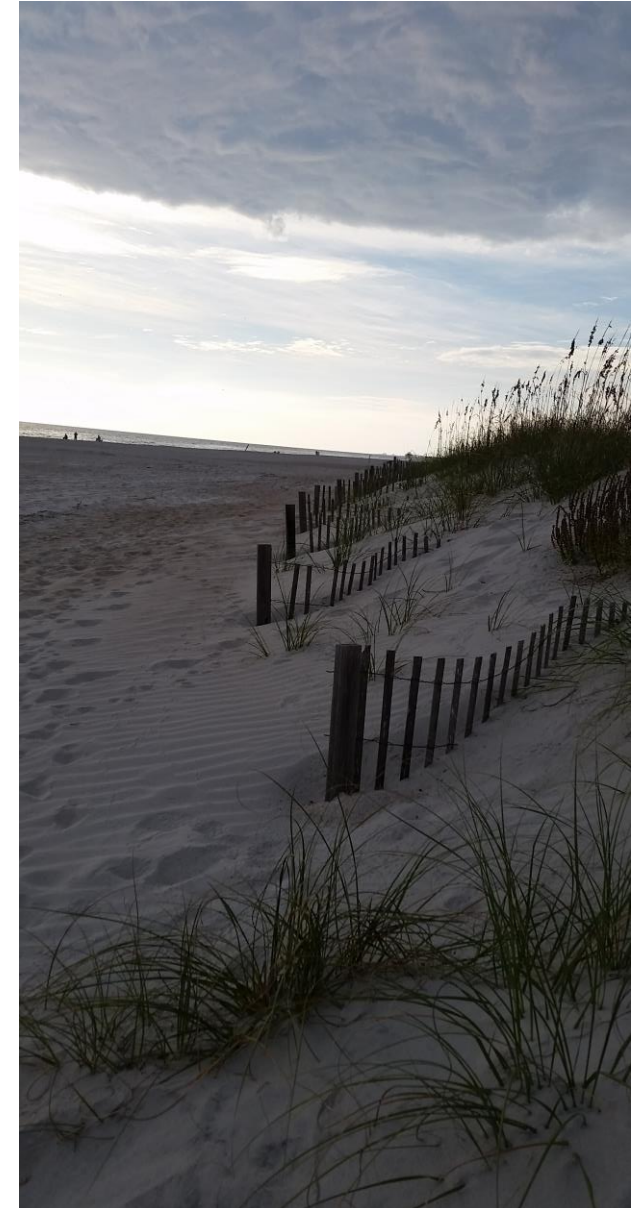


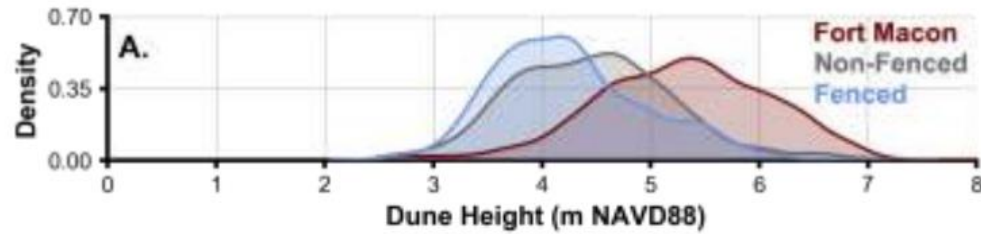
# Aeolis Short Course: ***Initial Approaches to Modeling Sand Fences***



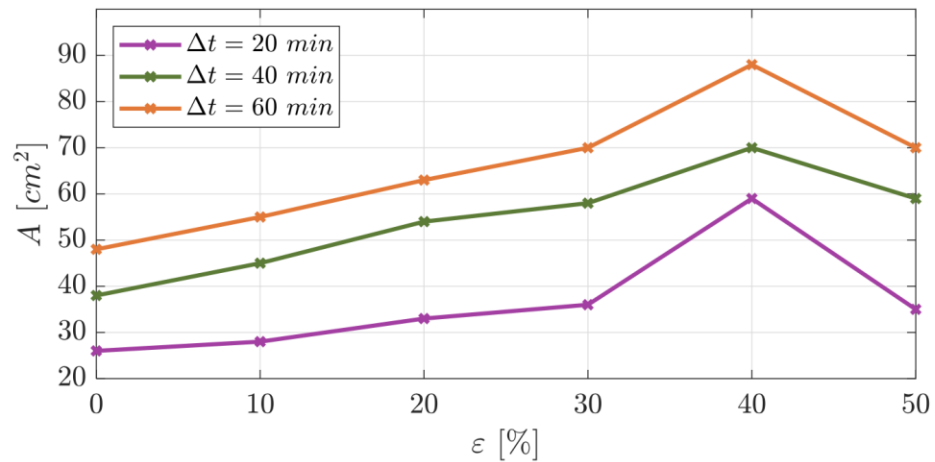


# BACKGROUND





Itzkin et al., 2020

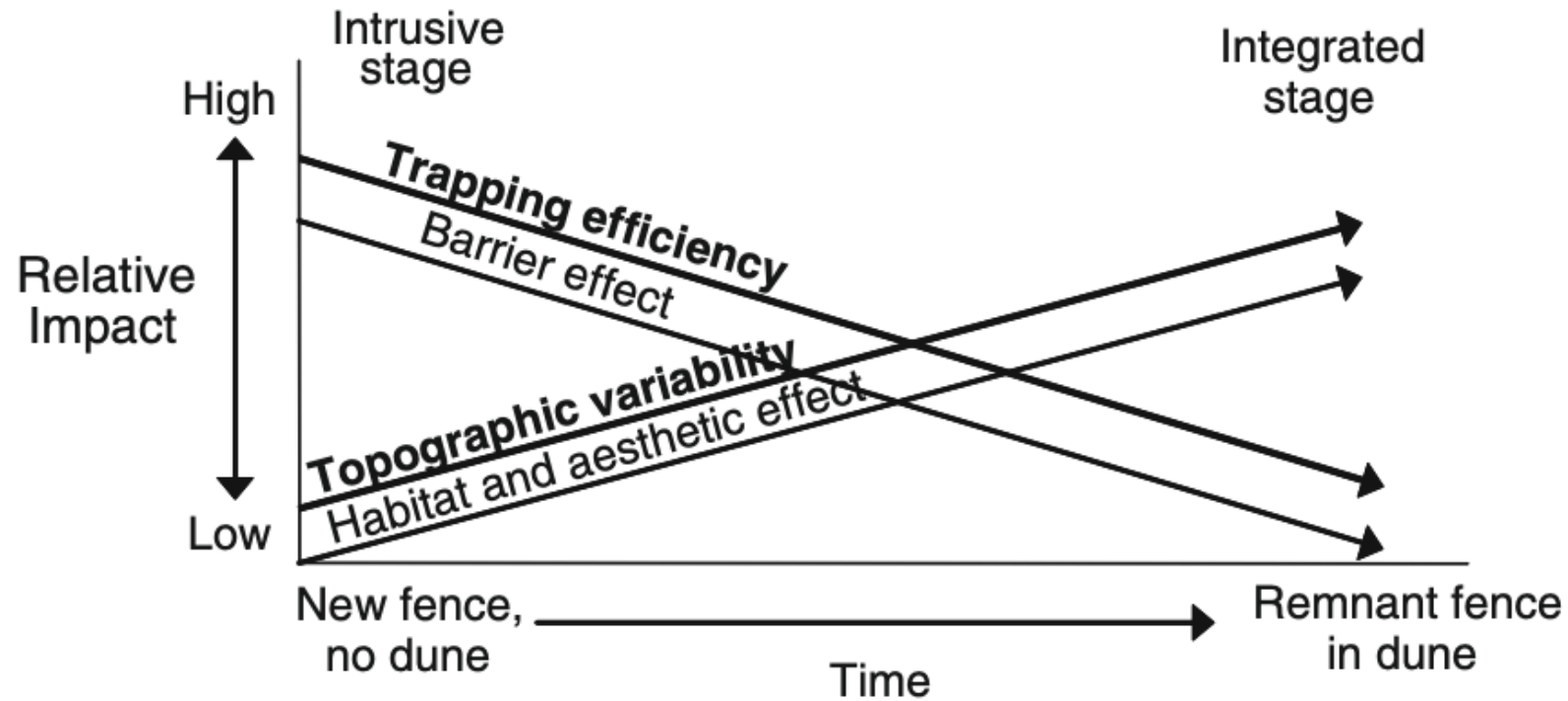


**Figure 8.** Sand-trapping efficiency expressed as cross-sectional area of dune for fences with different porosity values over time (adapted from [17,22]).

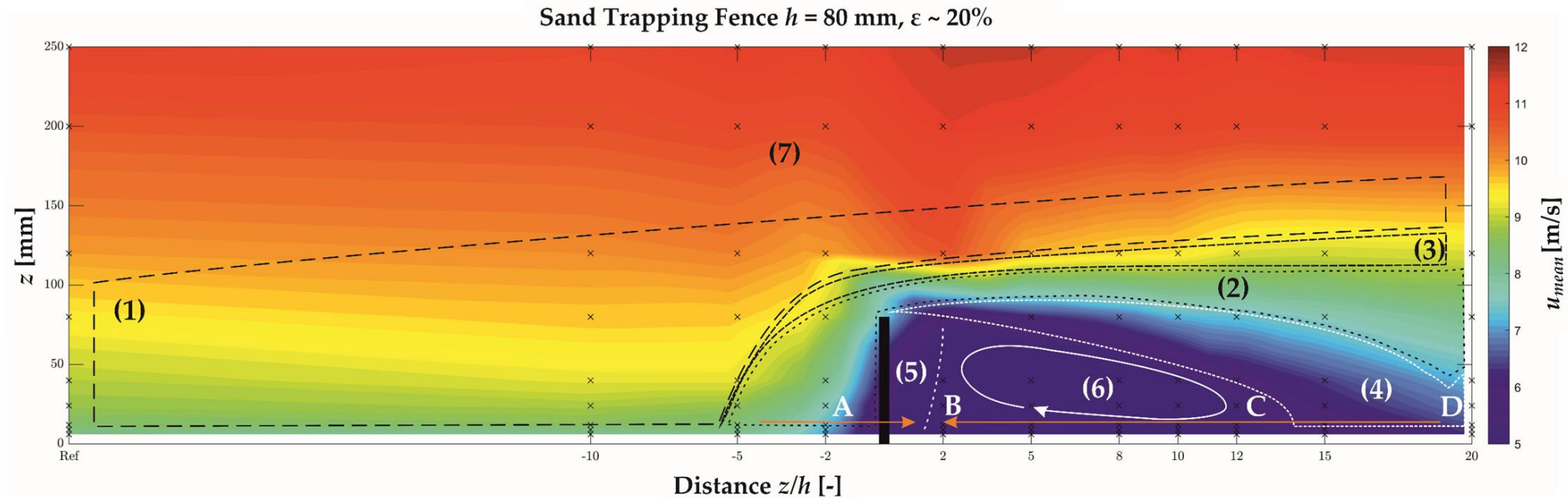
Eiichmanns et al., 2021

- Sand fences influence sediment deposition patterns in coastal systems




- Details of sand fence geometry and porosity matter







## Legend

-  Air Flow Direction
-  Sand Movement Direction
-  Porous Fence

## Air Flow Regimes

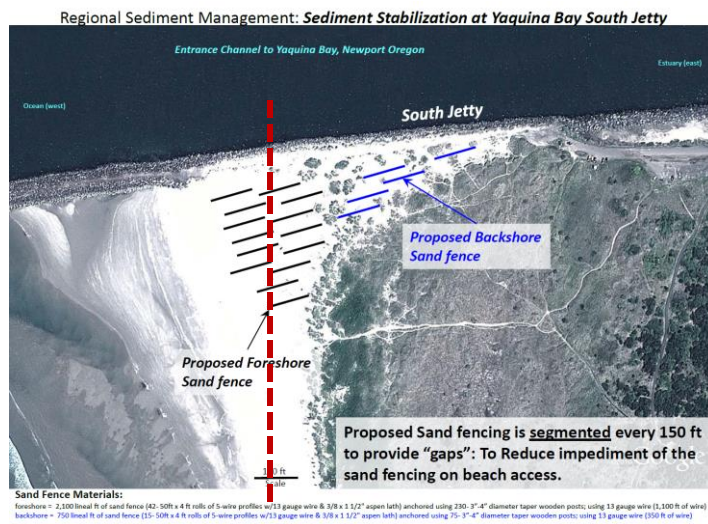
- (1) Undisturbed boundary layer
- (2) Region of hill influence (middle layer)
- (3) Blending region between middle and outer layer
- (4) Blending region between inner and middle layer
- (5) Breeding flow zone
- (6) Vertical eddy (recirculation bubble) zone
- (7) Potential outer flow

## Sand Movement Regimes

- A: First forward-movement regime
- B: First oscillating-movement regime
- C: Backward-movement regime
- D: Second oscillating regime



# EXAMPLE



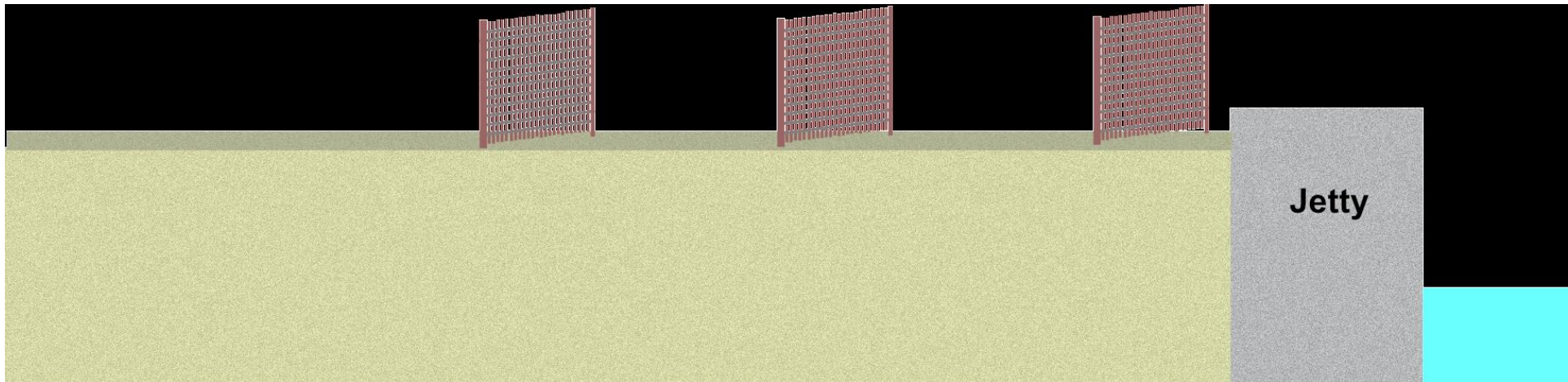
$$WSRF = 0.7 - 0.013 \frac{x}{H}$$

Distance Behind Fence

Fence Height

Wind Speed Reduction Factor

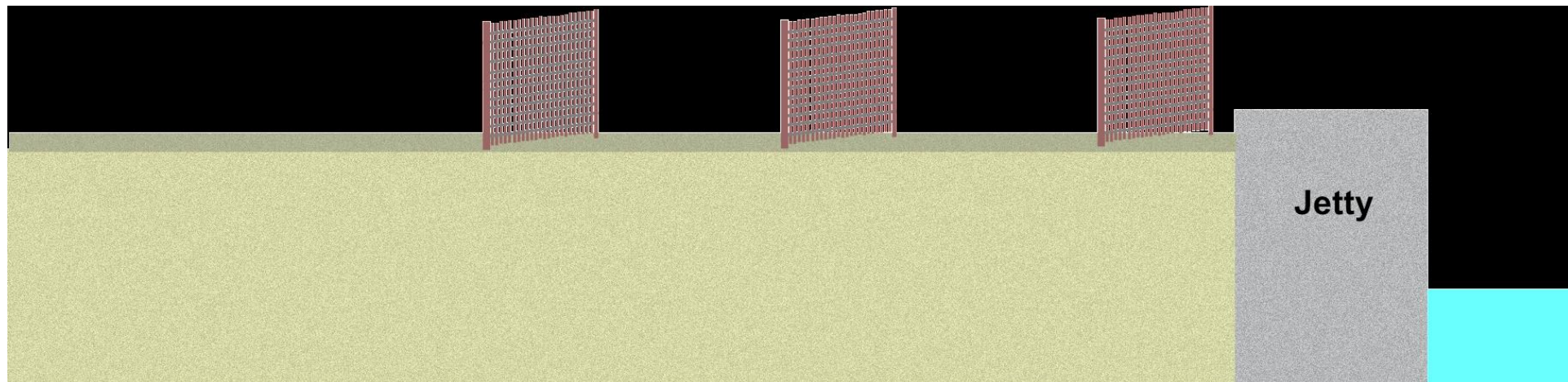
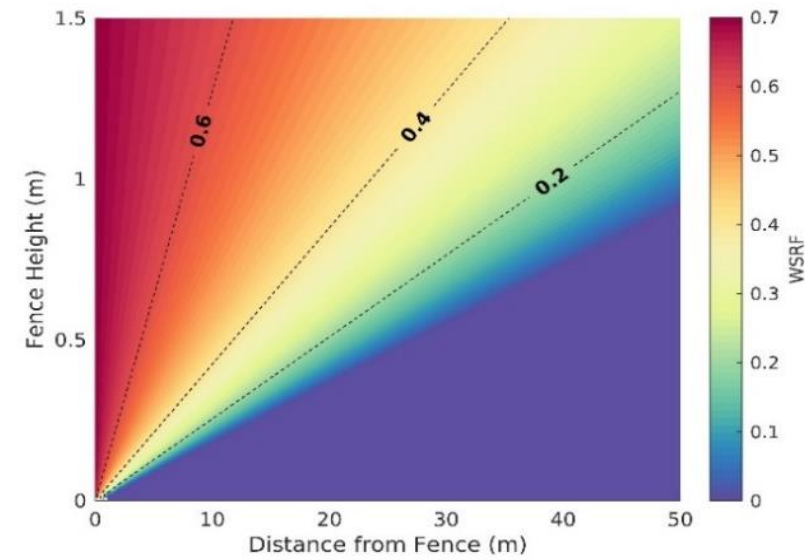
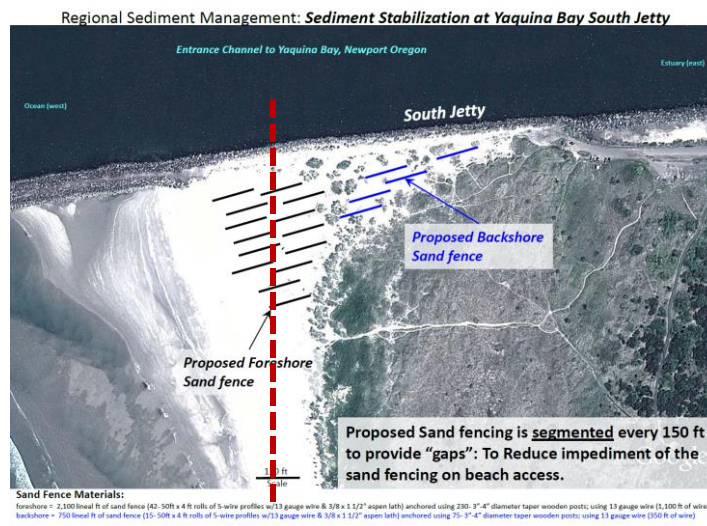
Simplified from work of Wilson (1987)





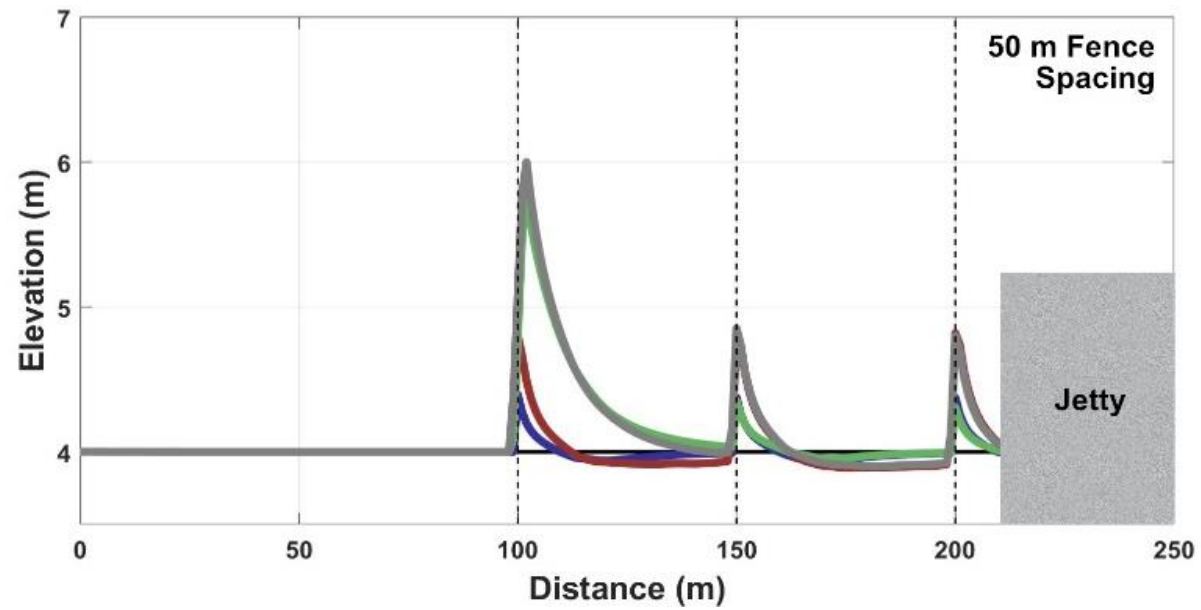


# EXAMPLE





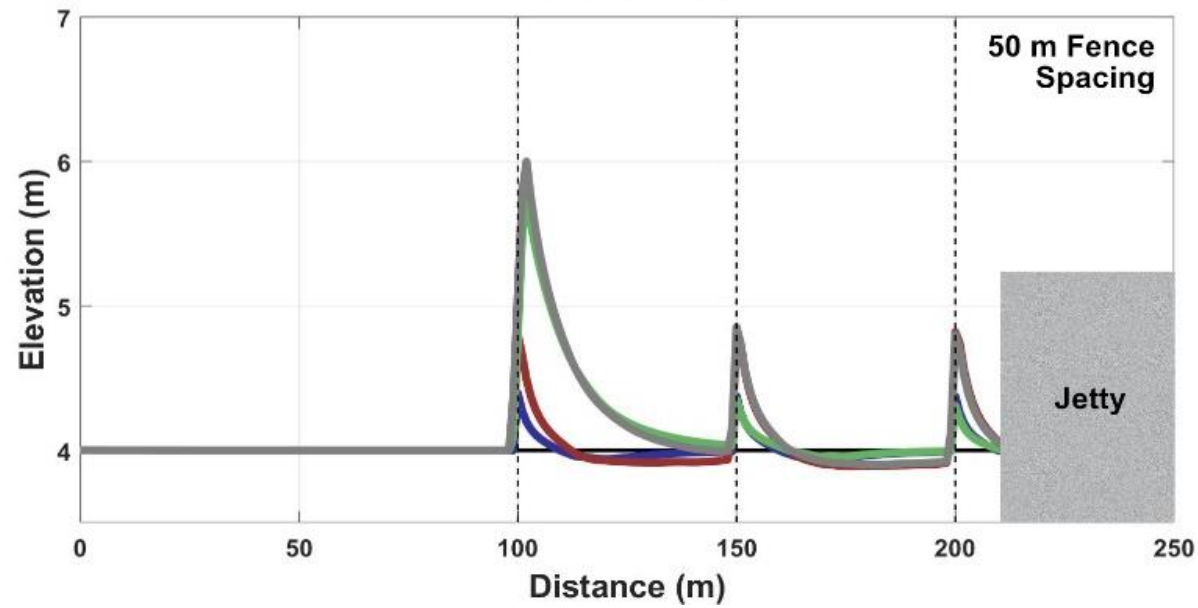
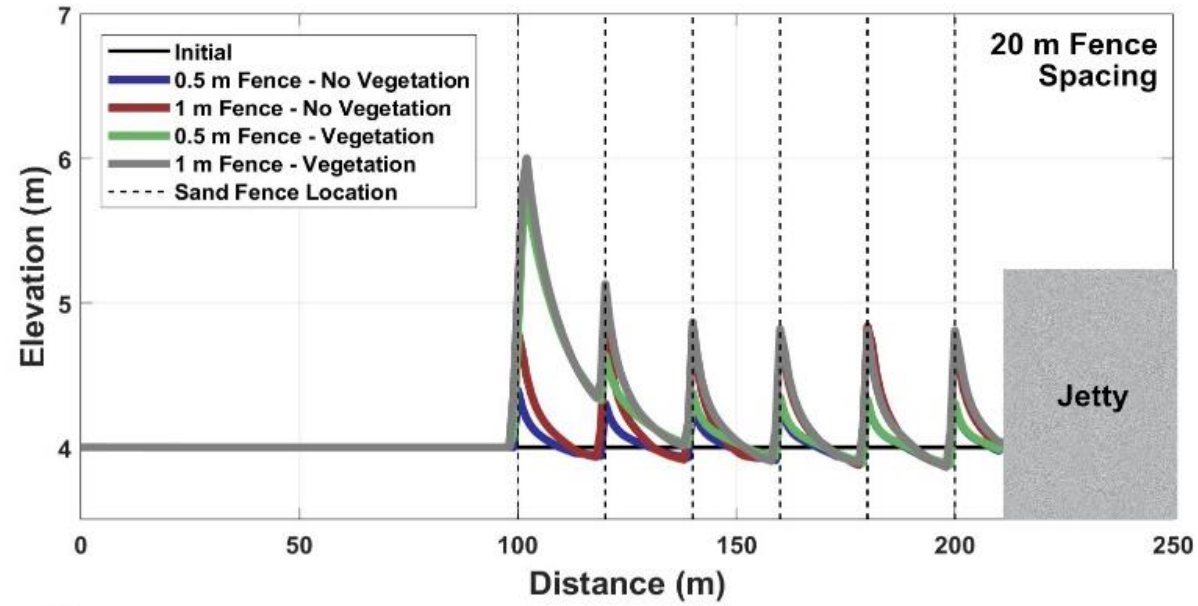
# EXAMPLE





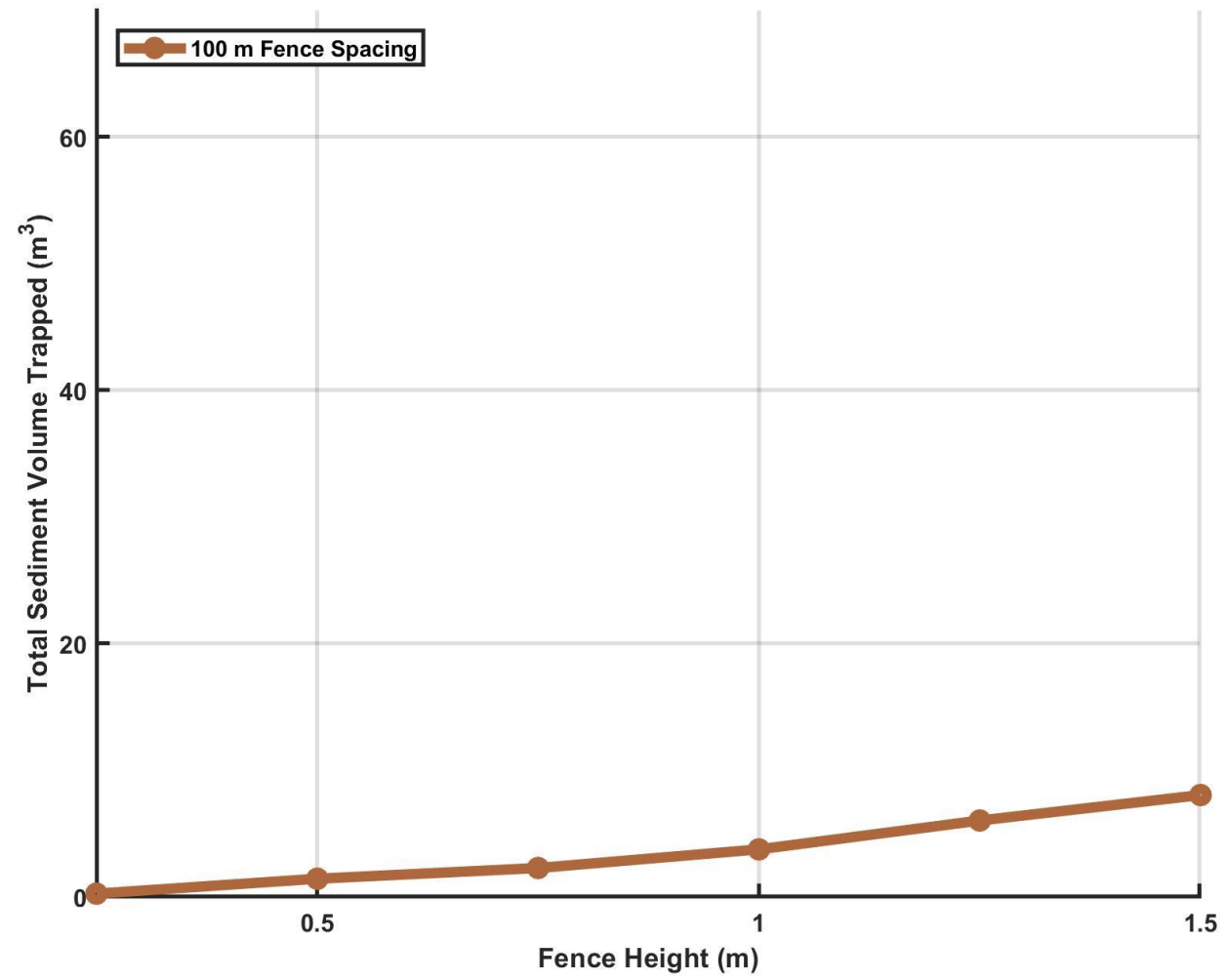


# EXAMPLE



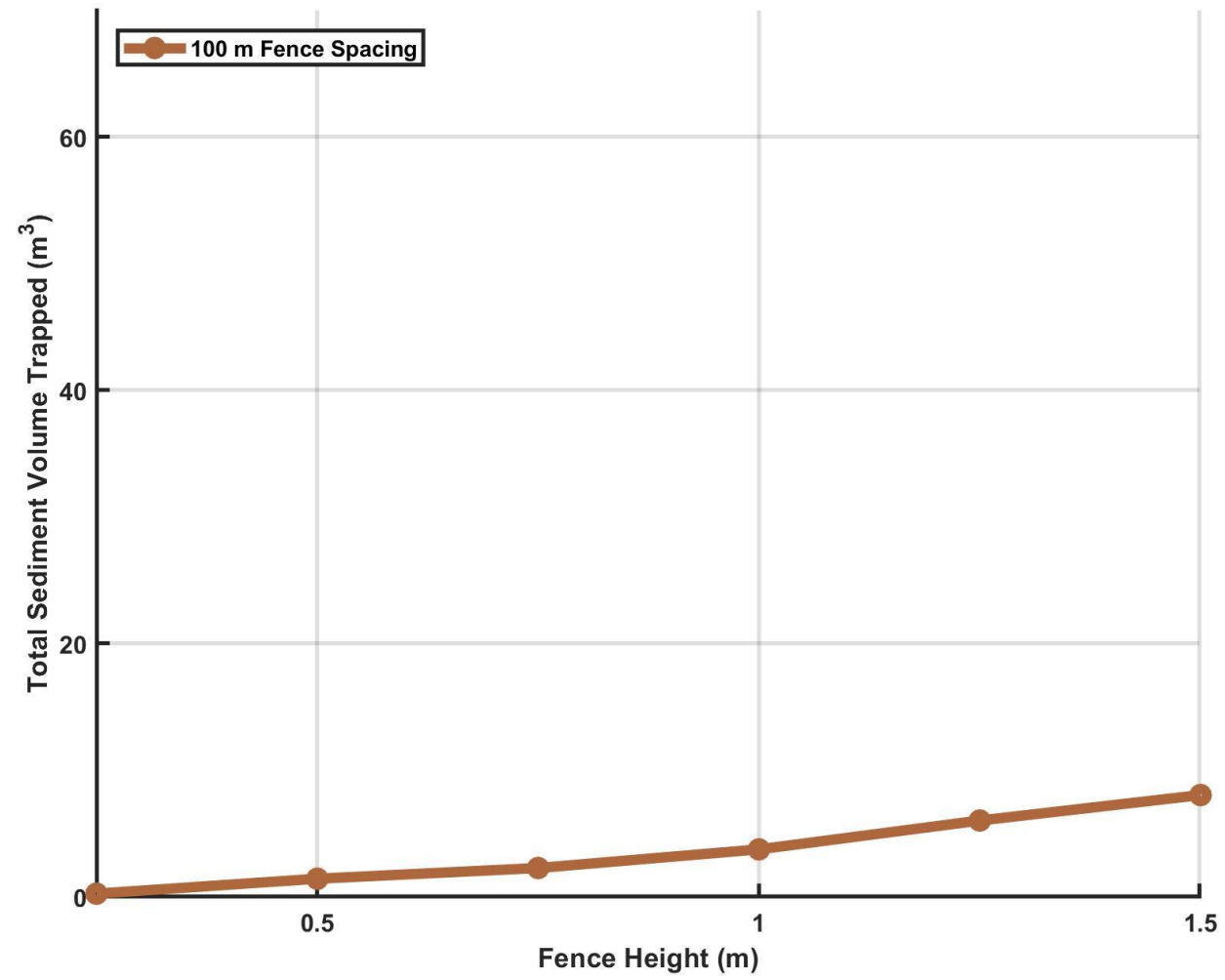


# EXAMPLE





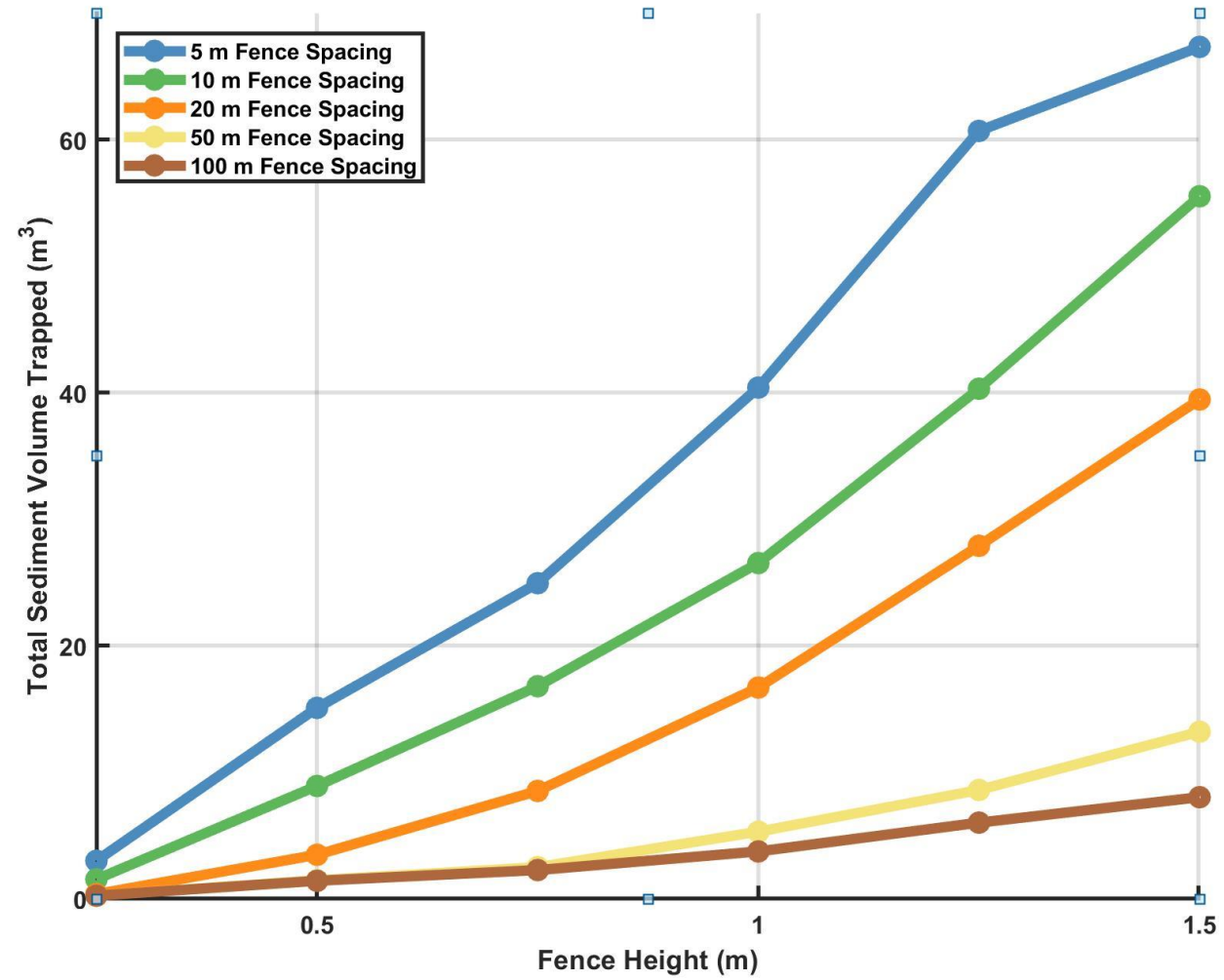
# EXAMPLE





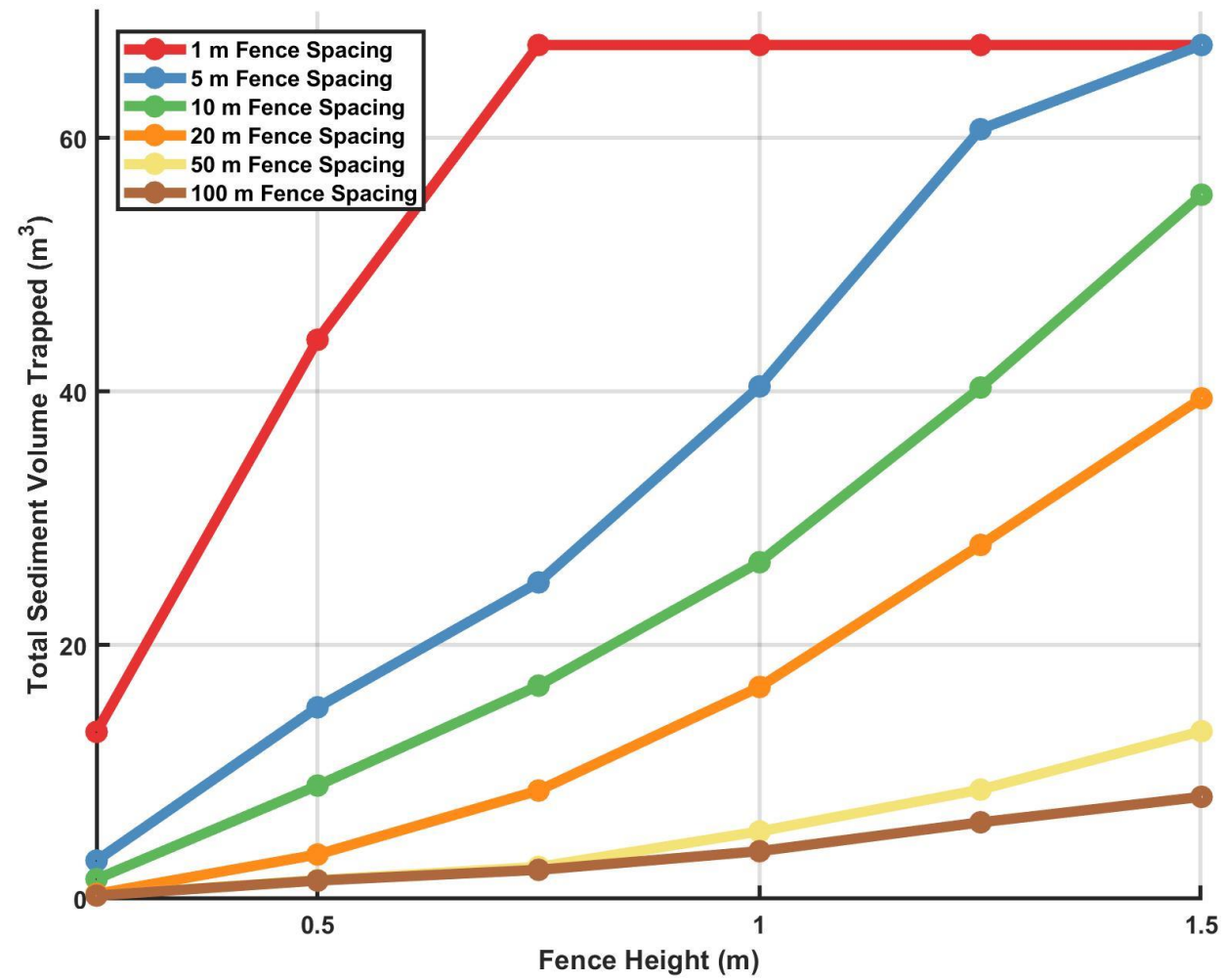


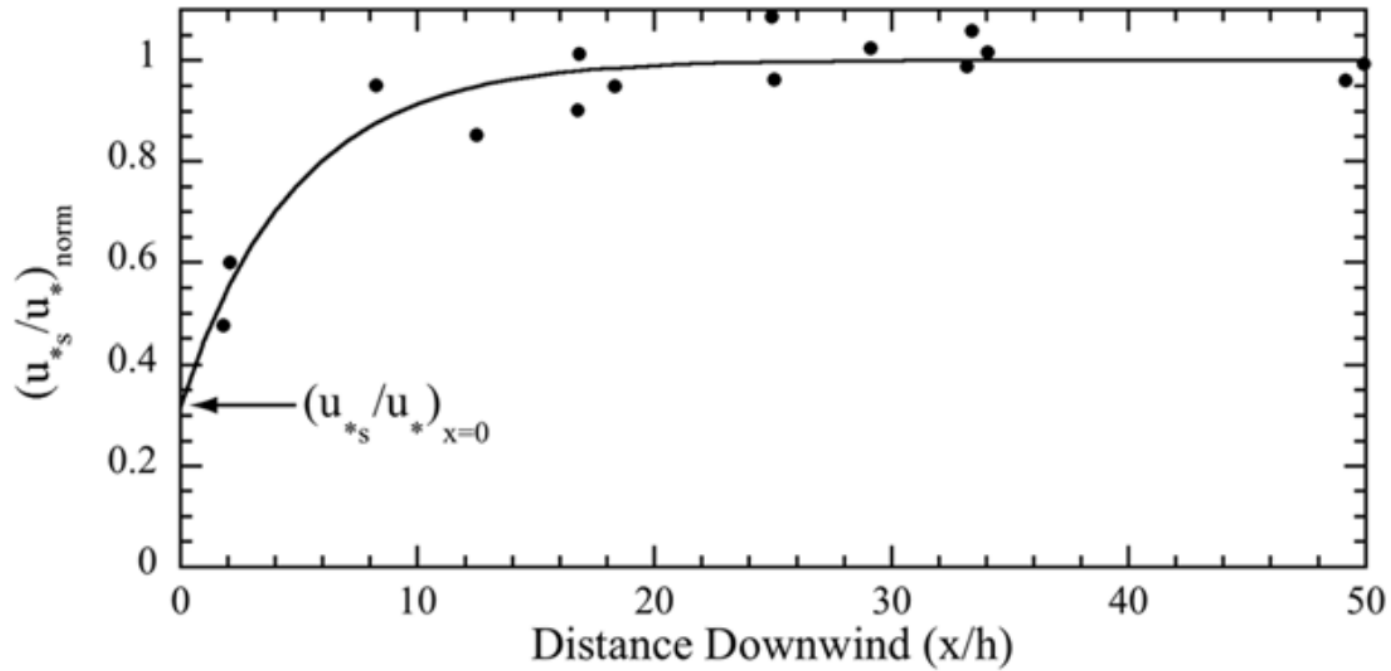
# EXAMPLE





# EXAMPLE





$$(u_{*s}/u_*) = (u_{*s}/u_*)_{x=0} + [1 - (u_{*s}/u_*)_{x=0}][1 + \text{Exp}(-xc_1/h)],$$



