Overview of Laboratory Studies

James Hart

Wide Flume: Overview

- 20 metres long
- 1 metre wide
- Re-circulating flume
- Variable flow depth, 15 cm flow depth for tests
- Variable discharge
- Looking and longitudinal and transverse processes

Wide Flume: Species Tested

Artificial Vegetation (Sparse / Dense)

Typha - Winter

Typha - Summer

Carex - Summer

Wide Flume: Objectives

Primary motivation for lab work - CFD Parameterisation and validation

Objectives to Investigate:
- Longitudinal mixing
- Longitudinal velocity
- Transverse mixing
- Transverse velocity

Full veg. case

Partial veg. case
Wide Flume: Data Collection

Wide Flume: Full Veg. Results

Upstream site
Downstream site

Wide Flume: Partial Veg. Results

Deep Flume: Overview

- 20 metres long
- 35 cm wide
- Recirculating flume
- 15 cm – 1 metre flow depth
- Variable discharge
- Looking at longitudinal and vertical processes
Deep Flume: Species

Artificial Vegetation (Uniform / Non-uniform)

Pond Weed (Potamogeton Crispus)  Rigid hornwort (Ceratophyllum Demersum)

Deep Flume: Tests Conducted

Objectives to Investigate:
- Longitudinal mixing
- Longitudinal velocity
- Vertical mixing
- Vertical velocity

Deep Flume: Initial Results

Upstream site  Downstream site

Vertical profiles  Horizontal profiles

Summary of Data Collected

Longitudinal and transverse mixing and velocity parameters for 5 discharges (Full vegetation tests – Deep Flume):
- Dense, uniform, artificial
- Sparse, uniform, artificial
- Typha – Winter
- Carex – Summer
- Typha - Summer

Transverse mixing across a shear interface (partial vegetation tests – Wide Flume):
- Dense, uniform, artificial
- Sparse, uniform, artificial
- Typha – Winter
- Carex – Summer
- Typha - Summer

Longitudinal and vertical mixing and velocity parameters for 3 discharges (Full vegetation tests – Deep Flume):
- Dense, uniform, artificial
- Dense, non-uniform, artificial – To be collected To be collected – July 16
- Pond Weed (Potamogeton Crispus) To be collected – July 16
- Rigid hornwort (Ceratophyllum Demersum) To be collected – if time allows
THANK YOU