

# Buckman Direct Diversion

## River Intake Sedimentation and Alternatives Overview

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December 4, 2025

# Sediment Transport 101

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- **Types of Sediment Transport:**

- **Suspended Load**

- Fine particles (silt, clay, fine sand) carried within the water column.
- Influenced by water velocity and turbulence.
- Measured as **Suspended Sediment Concentration (SSC)**.

- **Bedload**

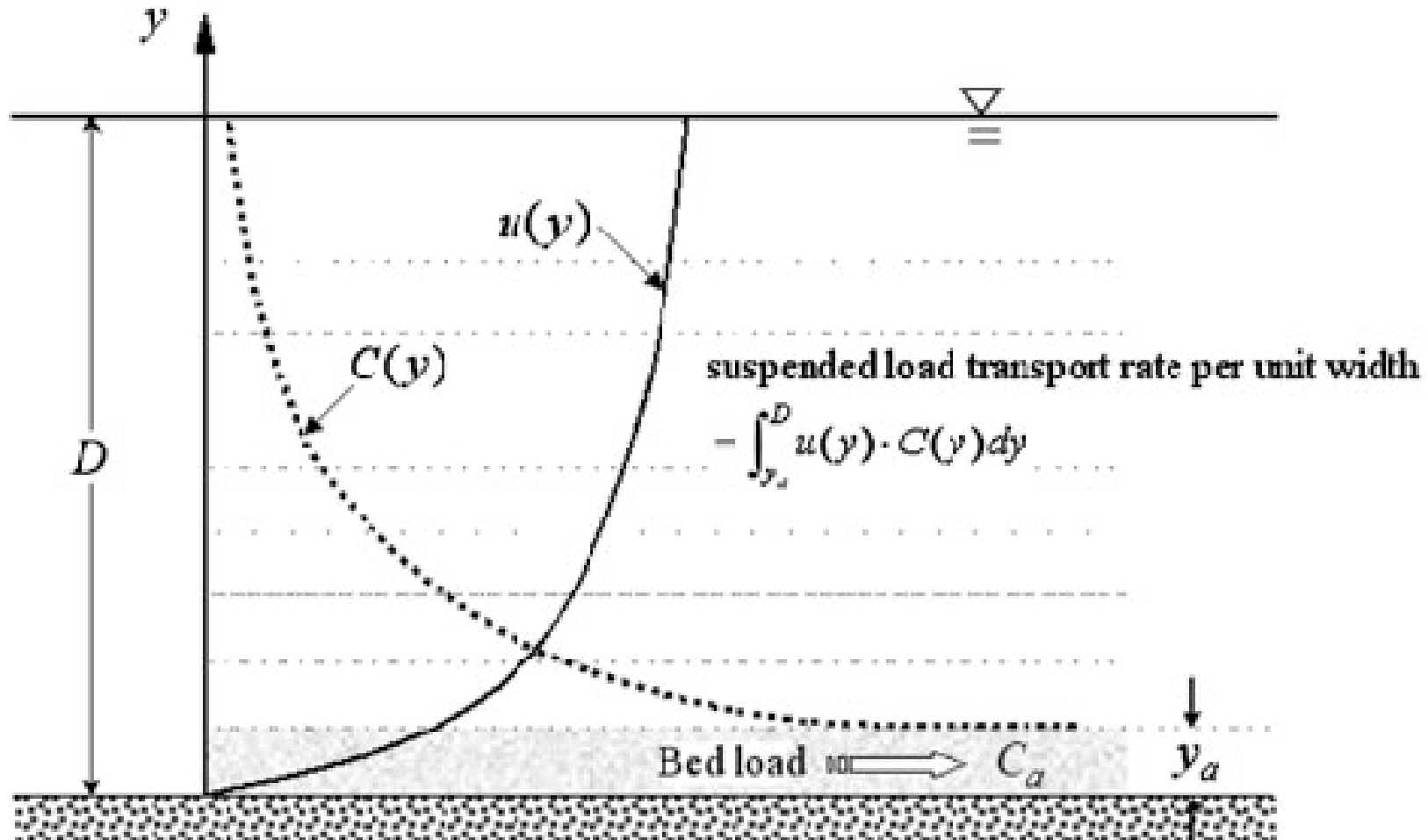
- Coarser particles (sand, gravel, cobbles) that roll, slide, or bounce (saltate) along the riverbed.
- Transported during higher flows.
- Not captured in standard SSC or turbidity measurements.

- **Total Sediment Load**

- Sum of **suspended load + bedload**.
- Important for understanding long-term channel change and sediment deposition.

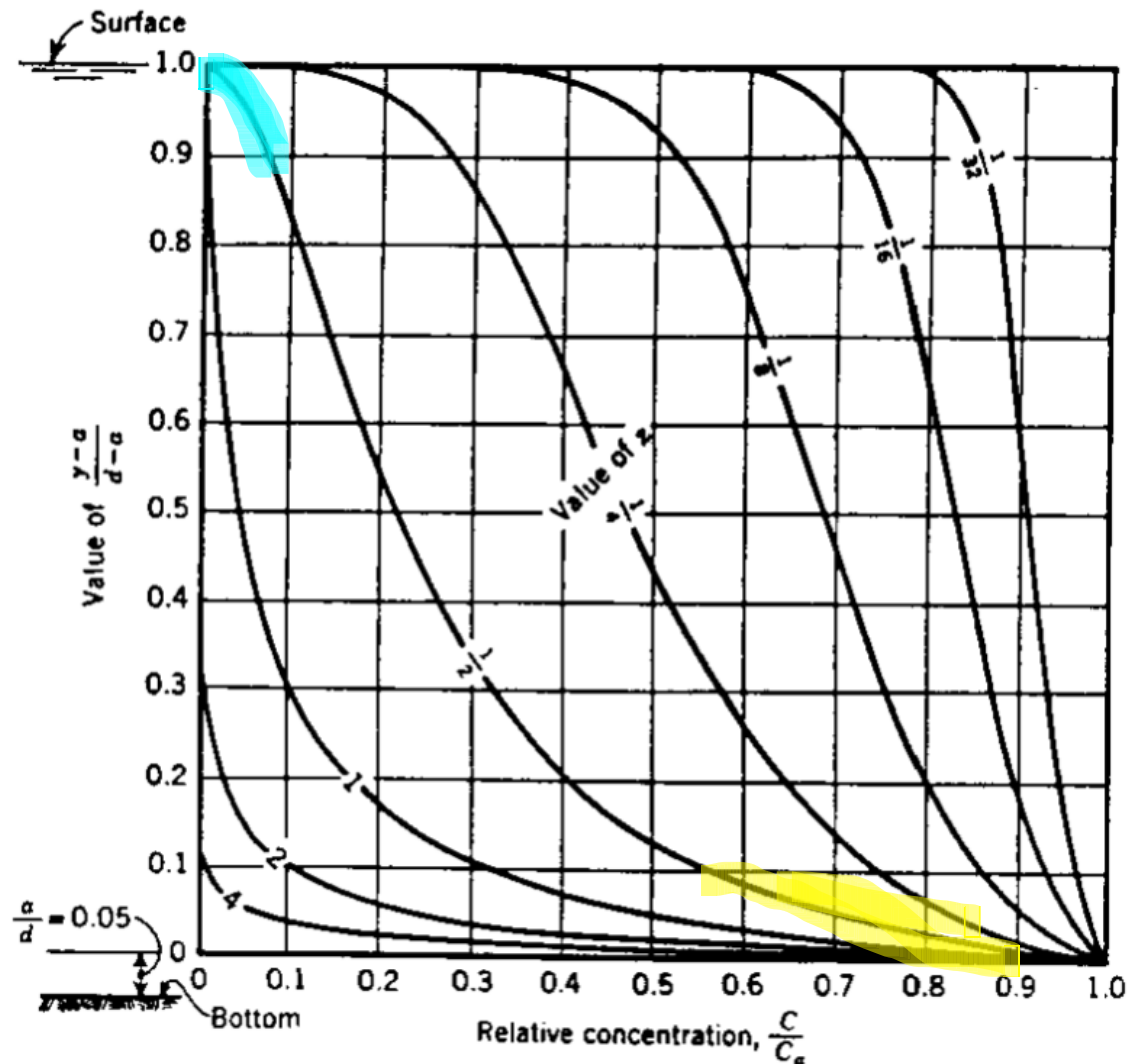
# Sediment Transport 101

## Suspended Sediment Concentration Profile



# Sediment Transport 101

## Suspended Sediment Concentration Profile



Discharge and Sediment Transport measurements from Otowi Bridge.

### Channel Conditions

Discharge: 2,240 cfs

Mean Velocity: 4.23 ft/s

Depth: 4.69 ft

Mean Suspended Sands: **1,770 mg/l**

Total Suspended Sediment: **1,860 mg/l**

### Suspended Sediment Analysis

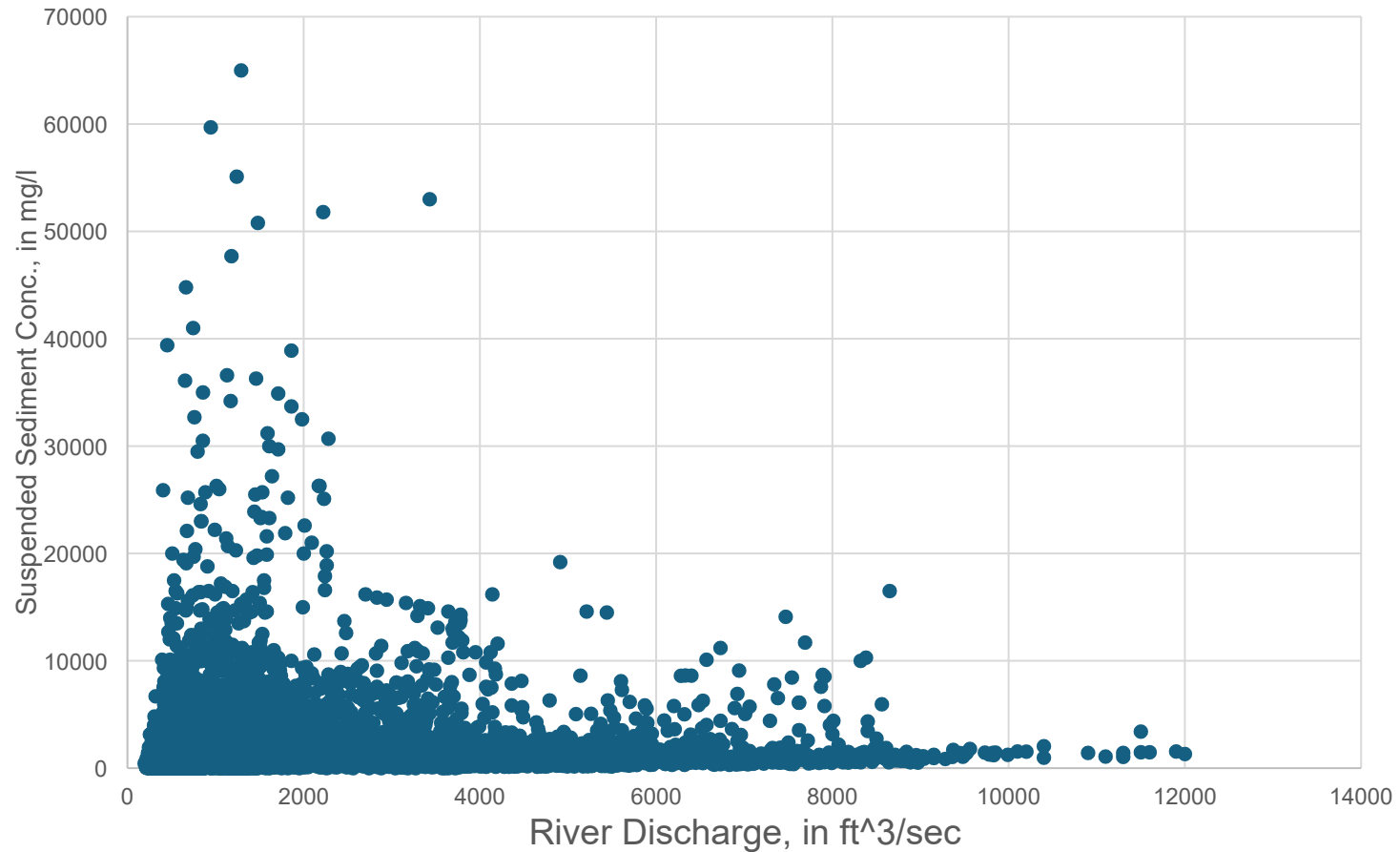
**Bottom 6 inches Suspended Sand: 3,646 mg/l**

**Top 6 inches Suspended Sand : 234 mg/l**

# Sediment Transport 101

## Rio Grande Suspended Sediment Concentration

Rio Grande at Otowi Bridge  
08313000



# Sediment Transport 101

## Data from Rio Grande at Otowi:

- 5/14/1973

- Discharge ~7,010 cfs
- Sediment Flux 69,600 tons/day
- SSC 2990 mg/l
- % < 0.0625 mm 55% (45% Sand)\*

- 6/1/1977

- Discharge ~297 cfs
- Sediment Flux 7.2 tons/day
- SSC 21 mg/l
- % < 0.0625 mm 93% (7% Sand)

- 1/30/1992

- Discharge 959 cfs
- Sediment Flux 183 tons/day
- SSC 70 mg/l
- % < 0.0625 mm 24% (76% Sand)

\* Fall Diameter

- 8/28/1996

- Discharge 359 cfs
- Sediment Flux 487 tons/day
- SSC 502 mg/L
- % < 0.0625 mm 85% (15% Sand)

- 7/16/2014

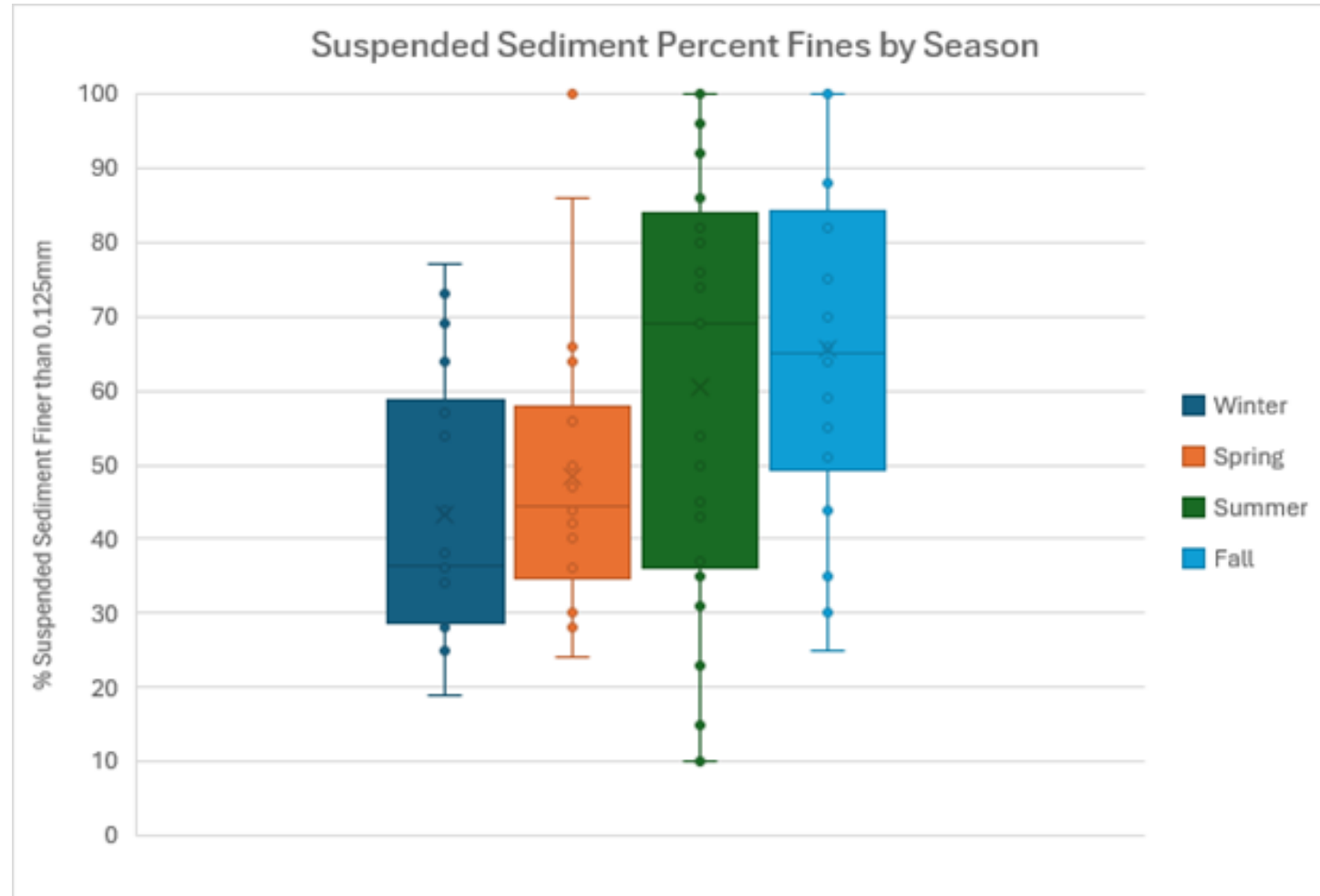
- Discharge 1,320 cfs
- Sediment Flux 59,500 tons/day
- SSC 15,000 mg/L
- % < 0.0625 mm 82% (18% Sand)

- 4/25/2023

- Discharge 3,700 cfs
- Sediment Flux 12,100 tons/day
- SSC 1,230 mg/L
- % < 0.0625 mm 16% (84% Sand)

# Sediment Transport 101

## Rio Grande Suspended Fine Sediment Concentration



# River Intake Design

# Intake Design Features

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- Location and Configurations
- Fish/Aquatic Species Exclusion
- Debris Management
- In-Channel Features
- Intake Gate Type
- Sediment Removal

# River Intake Alternatives

# Location and Configurations

- In-channel
- Off-channel
- Off-channel with forebay
- Bank intake
- Ranney Well
- Infiltration gallery/Riverbank filtration
- Submerged Suction Bell Intake



# Fish/Aquatic Species Exclusion

- Vertical / cylindrical screens
- Coanda screens
- Flat Plate Screens (Existing BDD)
- Modular Inclined Screens
- Bio-Acoustic Fish Fence (BAFF)



# Debris Management

- Trash Racks
- Automated rakes
- Floating Boom/log Boom
- Debris Deflector Bar
- Bollards
- Traveling screens



# In-Channel Features

- Rock or boulder vanes, Spur dikes, etc.
- Iowa Vanes (Sediment Vanes)
- Engineered Riffle/Boulder Grade Control
- River Grade Control (Fixed Weir/Obermeyer Inflatable Gates)

(a)



(b)



# Intake Gate Type

- Obermeyer gate
- Hinged crest gate
- Slide gate (Downward opening)



# Sediment Removal

- Settling Basin
- Plate or Tube Settlers
- Low Pressure Membrane Filtration
- Media or dual media filters
- Hydrocyclones (Lakos)
- Sediment flushing sluice



# Questions