Overview of Water Injection Dredging (WID)

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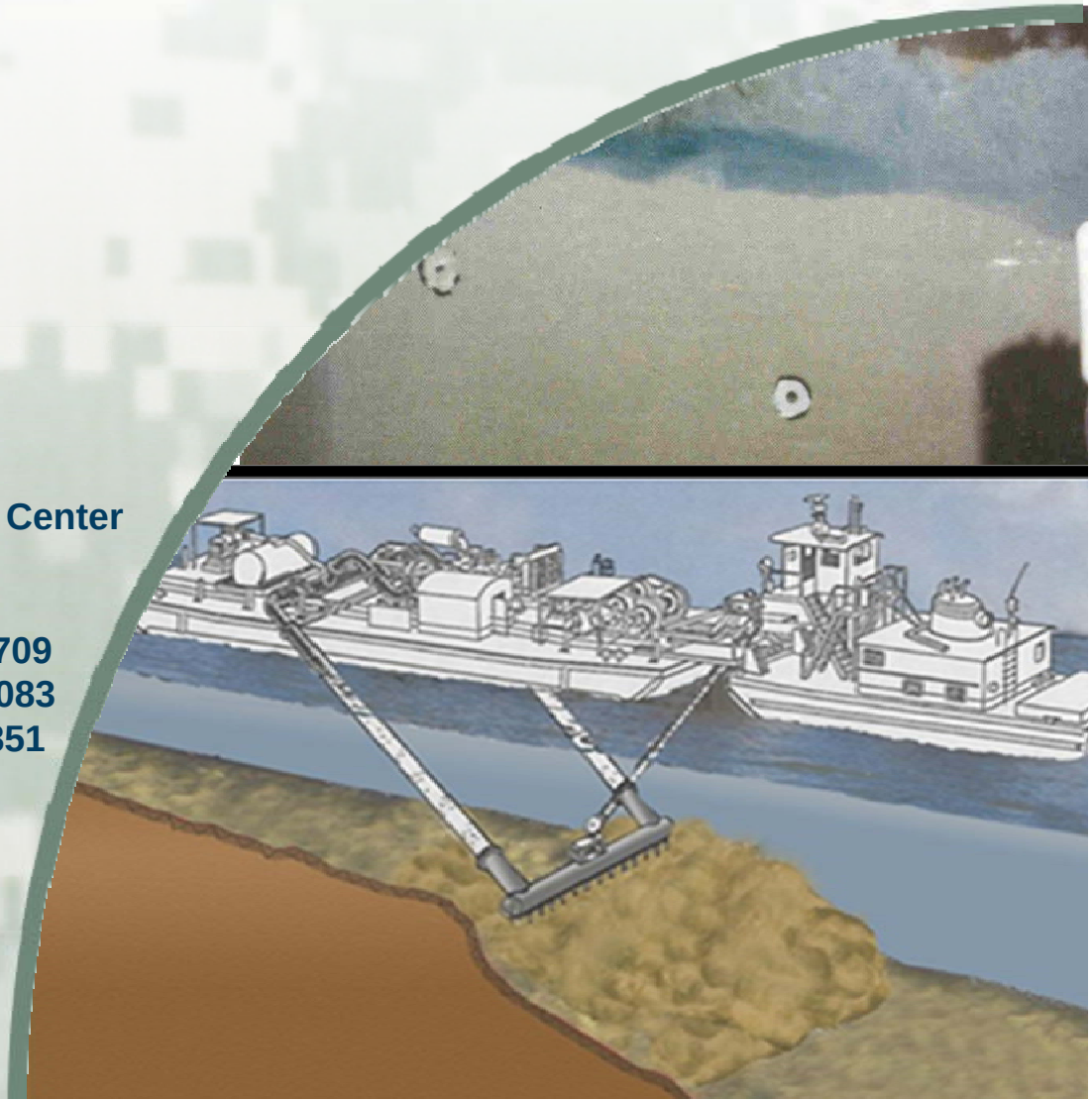
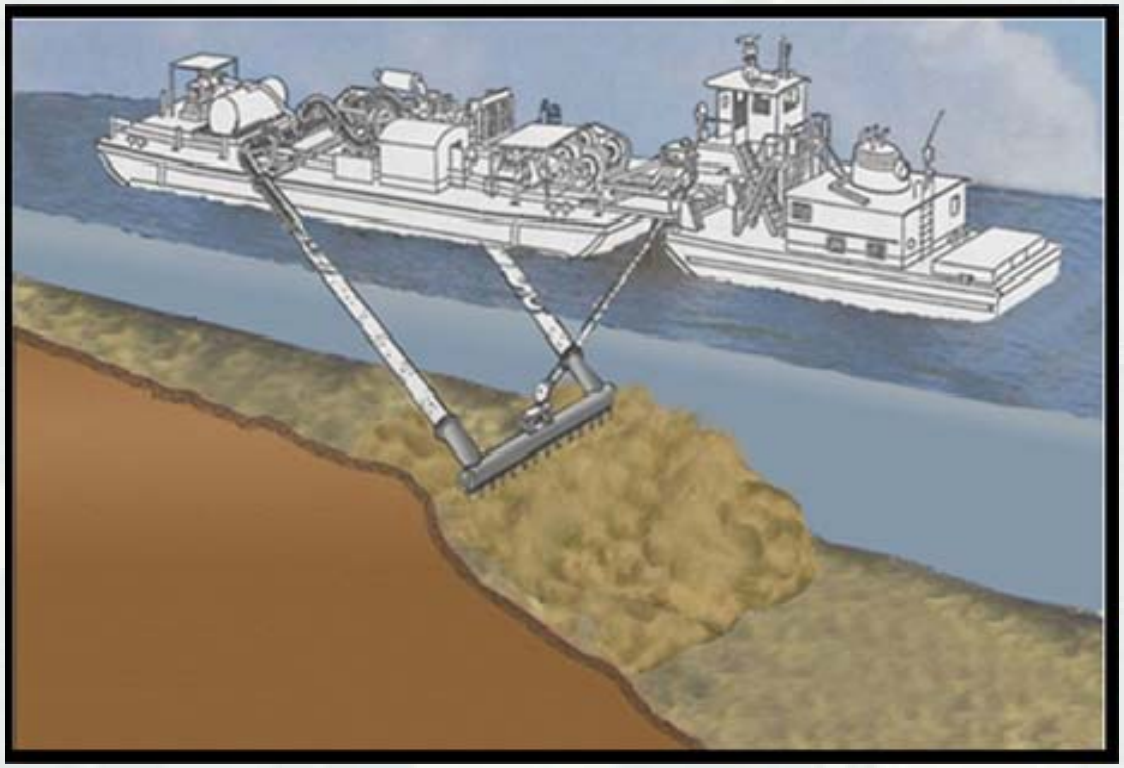
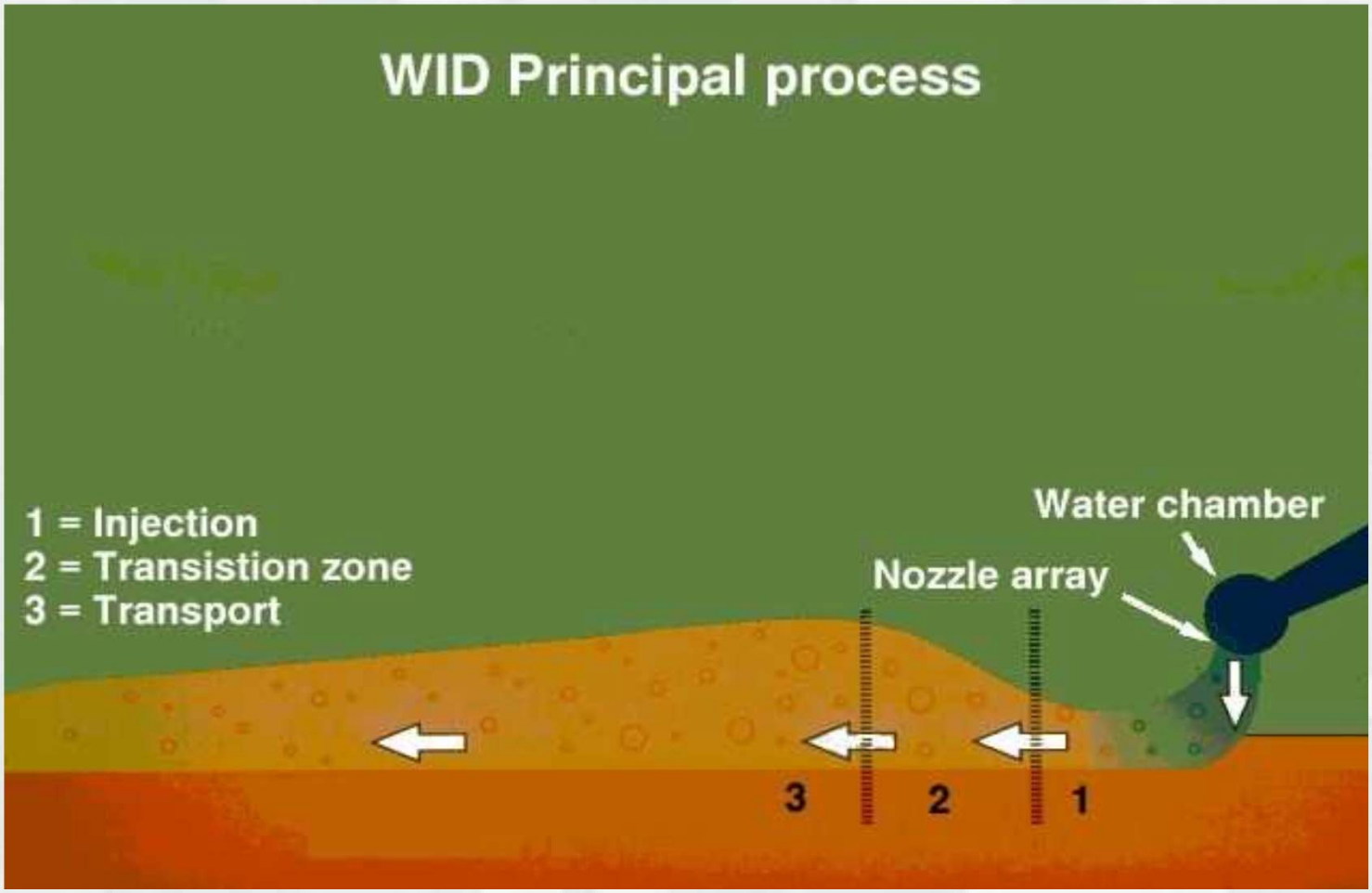


Water Injection Dredge (WID)



Density Current

Source: PIANC



https://www.youtube.com/watch?v=JfVK5rLYXiM

Worldwide WID

Worldwide WID

The Marine Group “150 m^3/hr in soft material

Water Injection Dredge (WID)
Weeks Marine BT 773

WEEKS MARINE
Barge BT 773
Length:120’
Breadth:32’
Draft:8’
Injection Pipe:30” dia. w/23 –2.4” nozzles
Pump Size:24” x 30” (Goulds Pump 3420)
Engine:CAT 398 (825 HP)
Pump Capacity:23,000 GPM
Max. Dredging Depth:70’
Min. Dredging Depth:5’
Towing Vessel:1,200 HP minimum

US WID Dredging Projects

Traditional Operations
Private Dock Work
Mississippi River
- Grain Dock –Convent, LA
- Refinery –Baton Rouge, LA
- Refinery –Sunshine, LA
- Grain Dock –Destrehan, LA
- Chemical –Plaquemines, LA
- Refinery –St. James, LA
- Barge Dock -Jefferson, LA
- Refinery –St. James, LA
- Refinery –Jefferson, LA
- Refining Facility –Baton Rouge, LA
- Agricultural –Jefferson, LA

Atchafalaya River
- Refinery –Krotz Springs, LA

Federal Navigation

New Orleans District
- New Orleans Harbor
- Michoud Canal
- Miss. River Gulf Outlet
- E & W Calumet Floodgates
- Tiger Pass Channel

Galveston District
- Houston Ship Channel
- Bayport Ship Channel

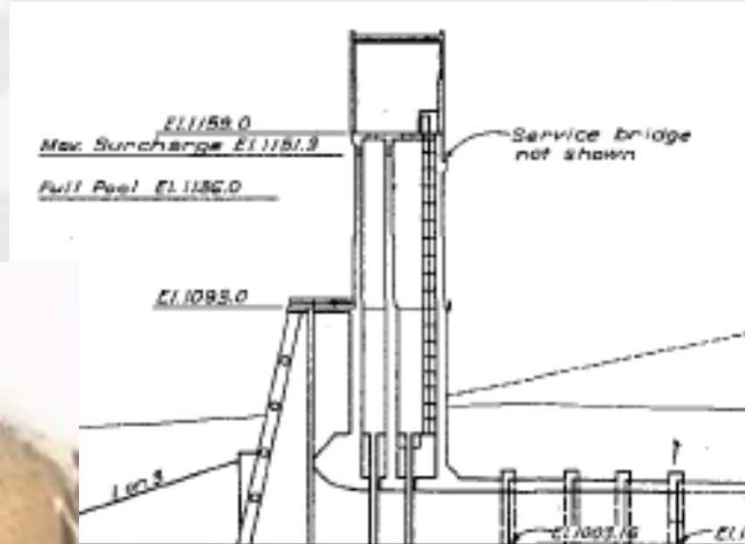
Mobile District
- Horn Island

Source: WEEKS MARINE

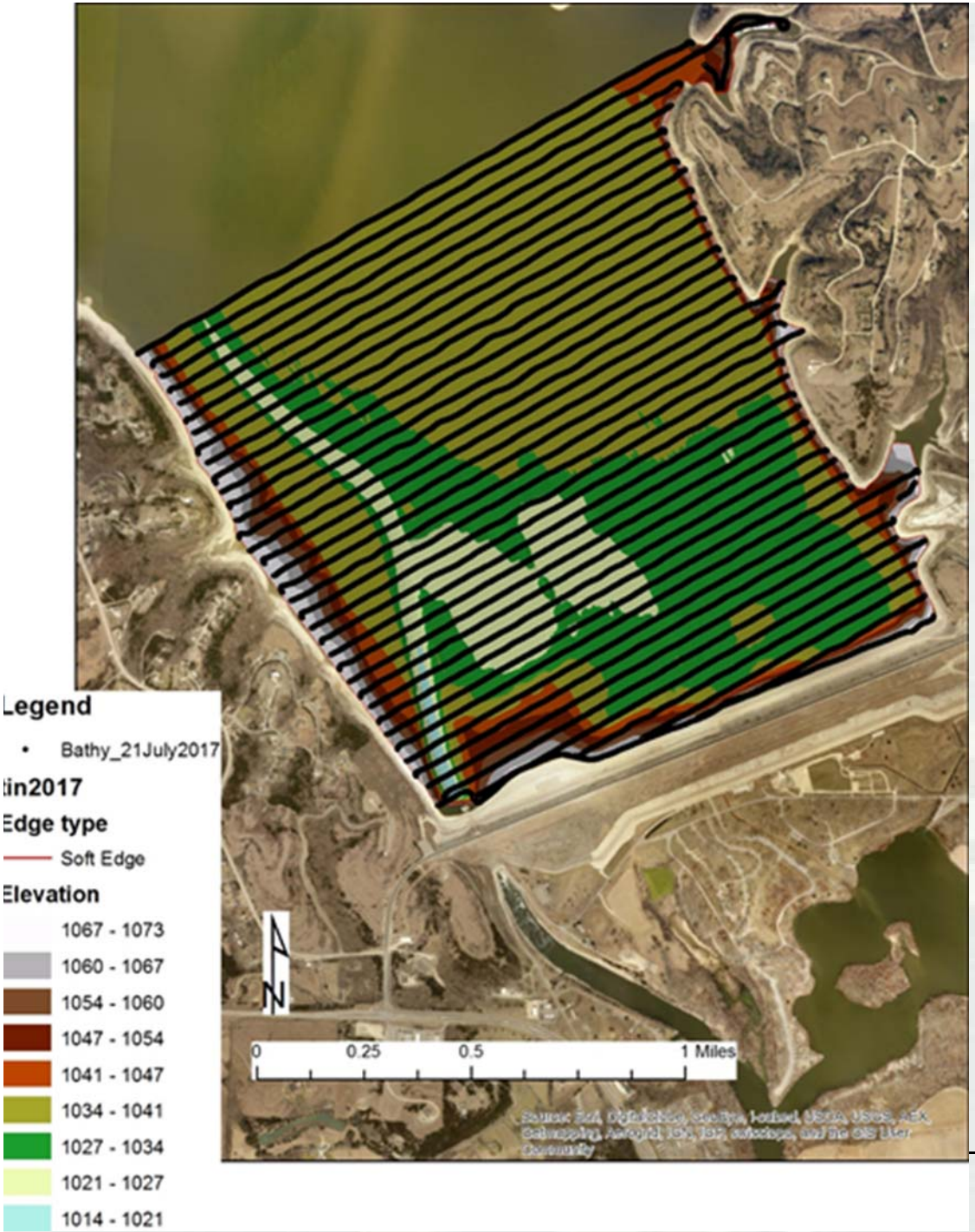
WID and Tuttle Creek Lake

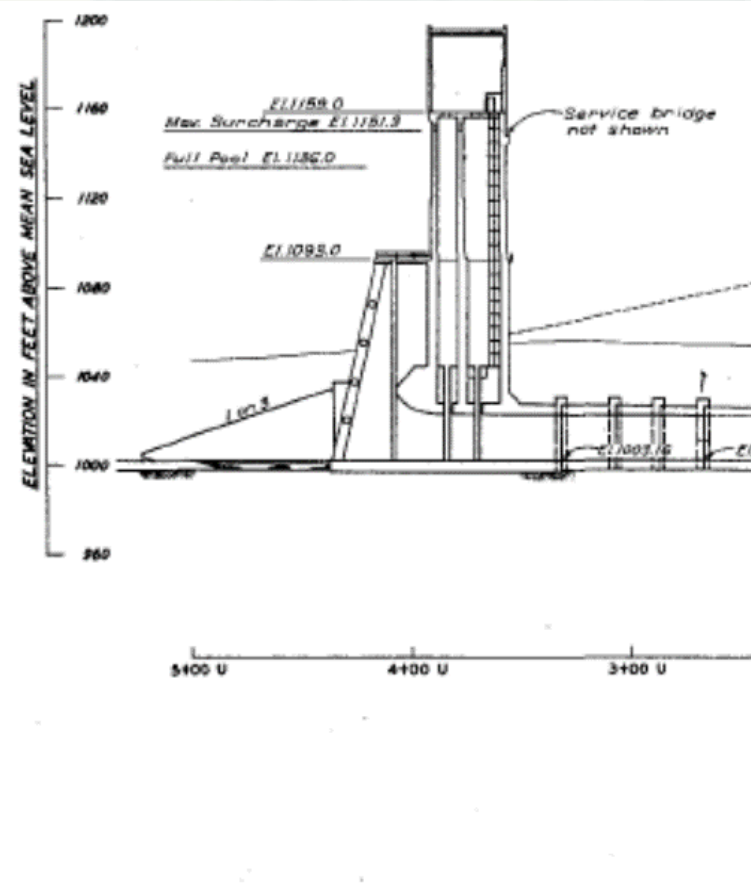
Preliminary review of Tuttle Creek Lake indicates that it has potential to be a candidate for a WID demonstration.

- Low Level Outlet: Tuttle Creek dam has this operational capability
- Tuttle Creek Lake studies show that sediment near the dam is fine-grained
- Studies also show that these sediments are uncontaminated.



BUILDING STRONG®





ERDC

Innovative solutions for a safer, better world

Tuttle Creek Testing

- Fluidization
- Settling
- Rheology

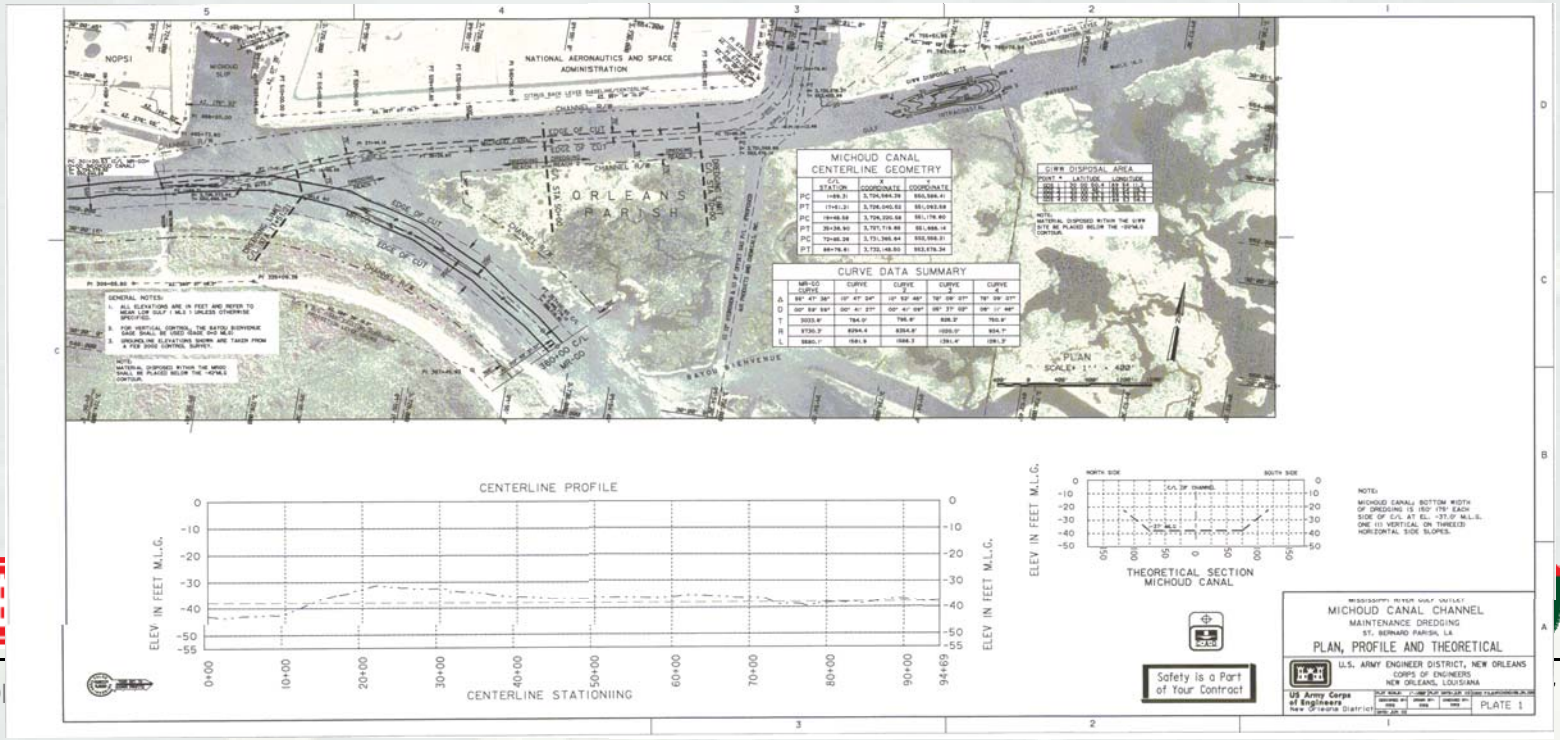
Fluidization Testing

https://kwo.ks.gov/projects/water-injection-dredging-(wid)-study-demonstration-at-tuttle-creek-lake

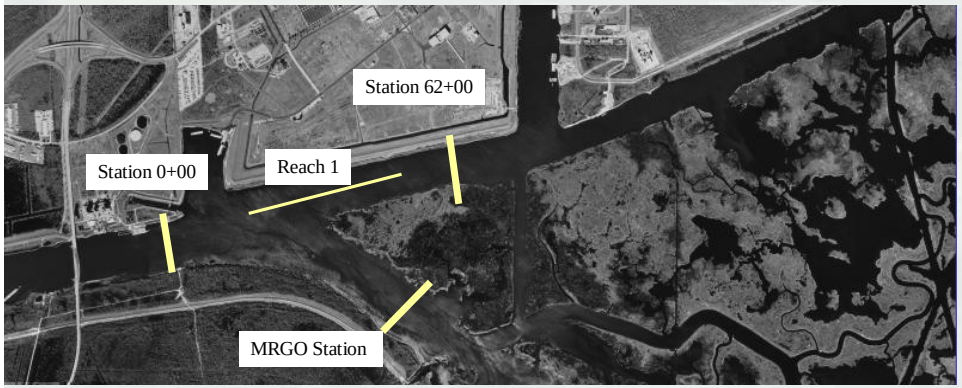
https://www.youtube.com/watch?v=VU3eExJjAsM

WID Monitoring
Michoud Canal

- WID worked 6-10 August 2002
- ERDC monitored 7 August 2002
- Focused on near and intermediate field density current characteristics

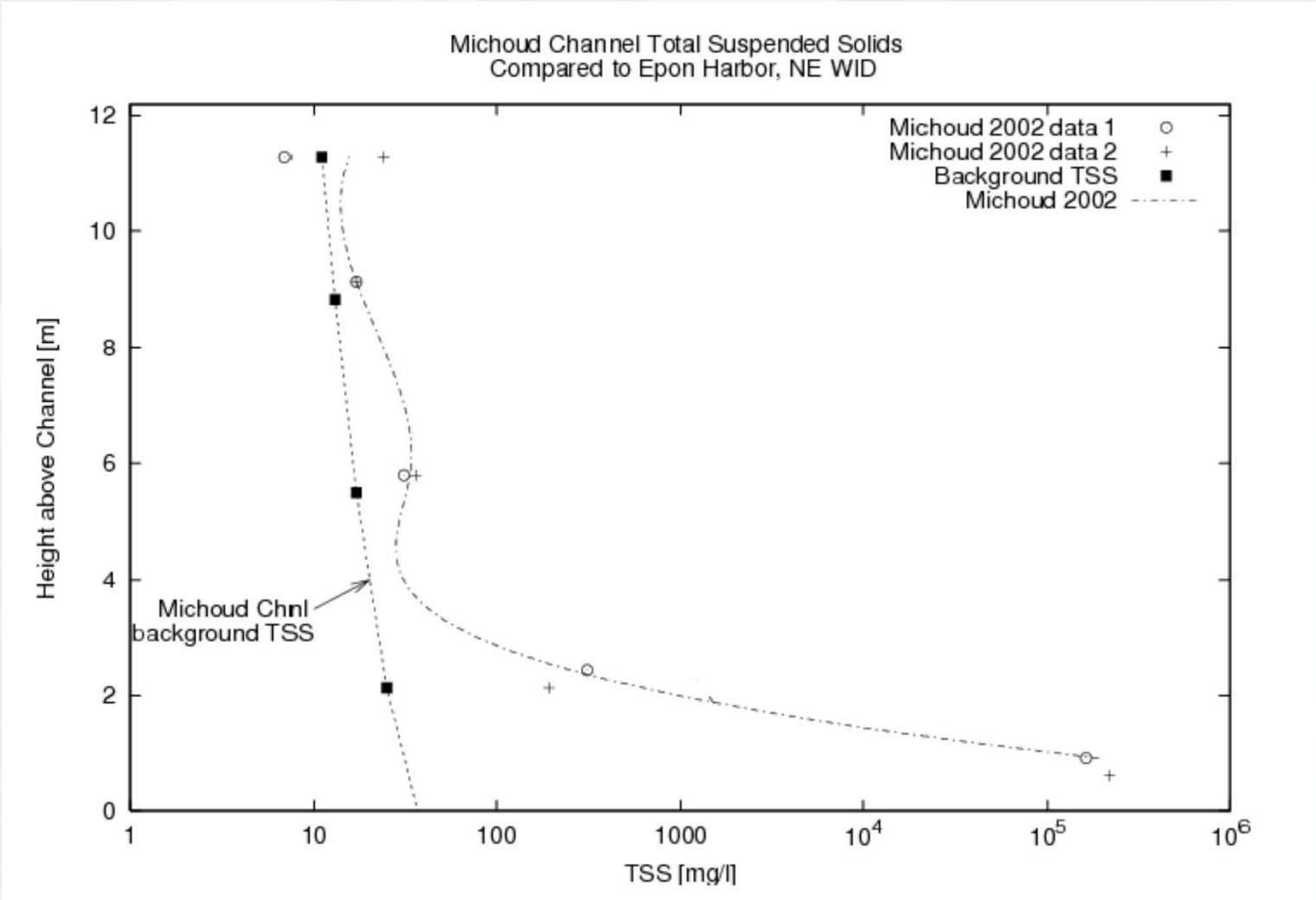


Density Current/Water Samples

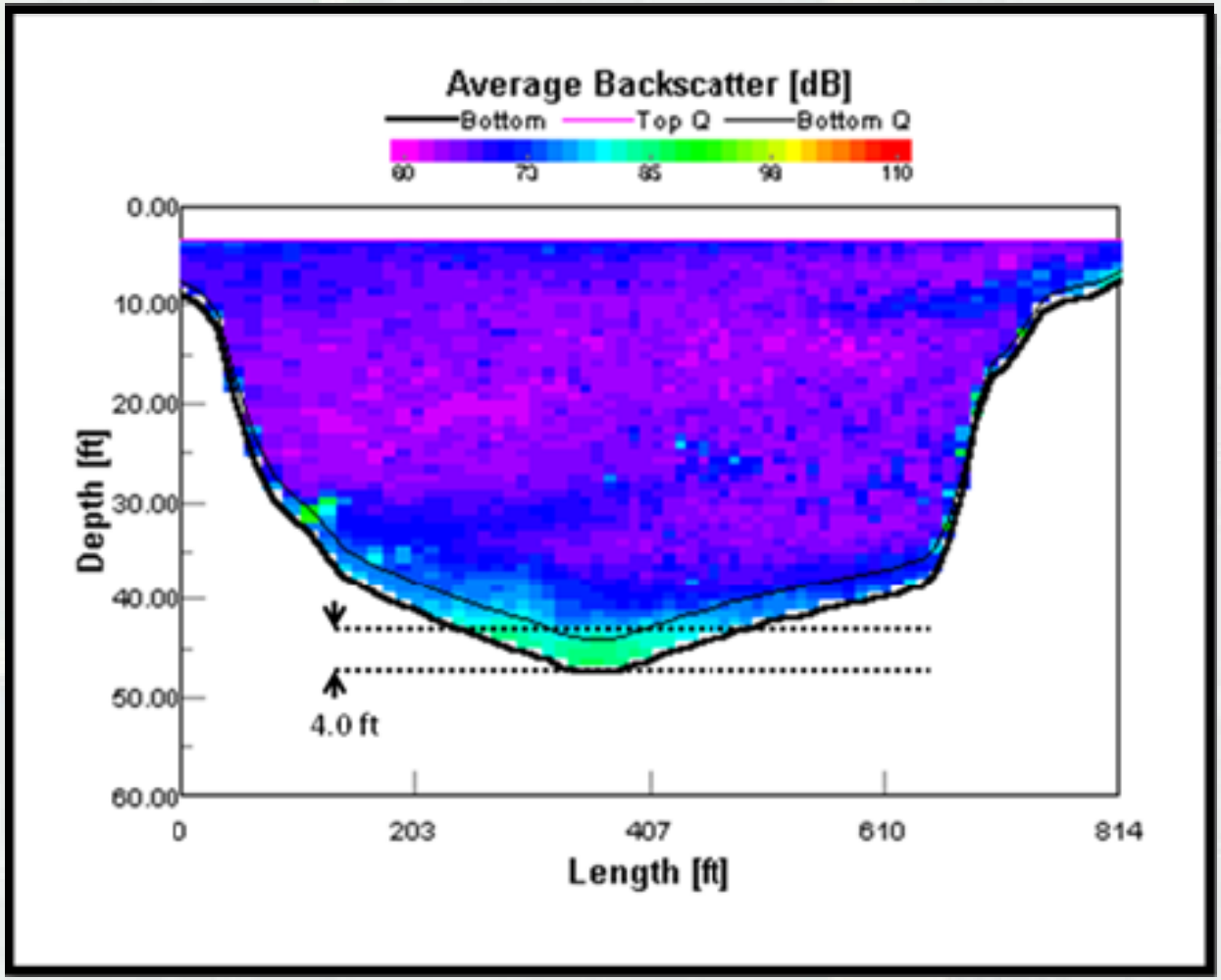


Total Suspended Solids (TSS) – mg/l

3 ft - 7	3 ft - 24
10 ft - 17	10 ft - 17
21 ft - 31	21 ft - 36
32 ft - 313	33 ft - 193
37 ft - 162641	38 ft - 219134


Michoud Channel Total Suspended Solids
Compared to Epon Harbor, NE WID
Michoud 2002 data 1
Michoud 2002 data 2
Background TSS
Michoud 2002
Michoud Chnl
background TSS
Height above Channel [m]
TSS [mg/l]
0
2
4
6
8
10
12
1
10
100
1000
10^4
10^5
10^6

Acoustic Backscatter



Michoud Canal Monitoring Conclusions

- Elevated TSS levels stayed in the lower 5 to 6 ft of the water column. Above about 33 ft, essentially no difference in TSS levels between the area in the vicinity of the dredge and background could be measured.
- Some distance away from the dredge head, all the resuspended sediments appeared to stay within about 3 ft of the bottom.
- Where it could be detected, the density current flows under the influence of gravity and underwater slopes toward the deeper laying parts.

Similar results when monitoring the Mississippi River Gulf Outlet project.

Tuttle Creek Lake

- How effective could Water Injection Dredging be at Tuttle Creek Lake?
- How will the downstream ecosystem react?
- Need a short-term test
- https://kwo.ks.gov/projects/water-injection-dredging-(wid)-study-demonstration-at-tuttle-creek-lake

QUESTIONS?