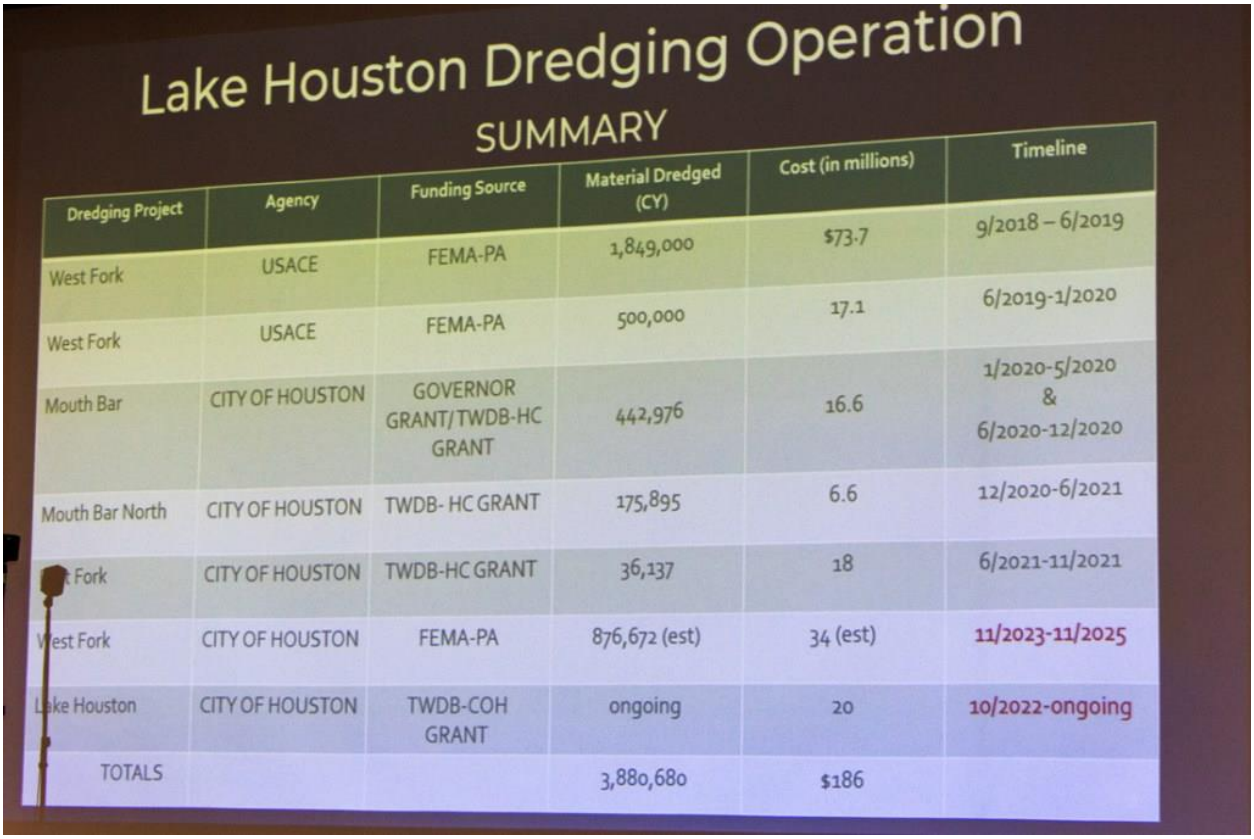
Sediment Pollution from Sand Mining: Impact on Flood Risk, Costs, Water Quality

Appendix to APO BMP List Proposal

Dredging costs for the City of Houston and Army Corps approached $200 million dollars in the five years leading up to October 2023. That's $40 million per year. Better BMPs for APOs would likely have reduced or delayed that expenditure of public funds.



Lake Houston Dredging Operation

SUMMARY

Dredging Project	Agency	Funding Source	Material Dredged (CY)	Cost (in millions)	Timeline
West Fork	USACE	FEMA-PA	1,849,000	$73.7	9/2018 – 6/2019
West Fork	USACE	FEMA-PA	500,000	17.1	6/2019-1/2020
Mouth Bar	CITY OF HOUSTON	GOVERNOR GRANT/TWDB-HC GRANT	442,976	16.6	1/2020-5/2020 & 6/2020-12/2020
Mouth Bar North	CITY OF HOUSTON	TWDB- HC GRANT	175,895	6.6	12/2020-6/2021
t Fork	CITY OF HOUSTON	TWDB-HC GRANT	36,137	18	6/2021-11/2021
West Fork	CITY OF HOUSTON	FEMA-PA	876,672 (est)	34 (est)	11/2023-11/2025
Lake Houston	CITY OF HOUSTON	TWDB-COH GRANT	ongoing	20	10/2022-ongoing
TOTALS			3,880,680	$186	

At an October 2023 town hall meeting in Kingwood, Houston Mayor Pro Tem Dave Martin presented this summary showing dredging costs totaling $186 million.

But those costs paled in comparison to more than a billion dollars in damages to 13,000 homes and businesses that flooded in the Lake Houston Area during Hurricane Harvey. They flooded behind giant sand bars that formed sediment dams at the mouths of the East and West Forks of the San Jacinto.

Nor do those costs reflect extra water filtration at the City's Northeast Water Purification plant.

To be fair, nature causes some erosion. The question is whether local mining practices accelerate it. See the pictures below that show sediment discharges related to pit capture and frequent flooding in sand mines.

Confluence of San Jacinto West Fork (right) and Spring Creek near US59 Bridge. This is a frequent sight. Twenty square miles of mines are upstream on the right in a 20-mile reach of the river.

San Jacinto East Fork capturing a mine in Plum Grove.

Effluent from the Hallett settling pond on San Jacinto West Fork escaping into adjacent property owned by others.

Close up of same effluent from same pond shows source of leakage.

Dike of abandoned Williams Brothers Mine (upper right) eroded by the San Jacinto West Fork (lower left).

In the next flood, about three months later…

… Hurricane Beryl eroded what was left of the wall and flowed through the pit.

A little upstream, Hallett sold a sand pit (below left) on the San Jacinto West Fork to a real estate developer, Riverwalk Porter LLC. Within months, the river captured the pit.

The West Fork now flows into the pit at the north end…

…and flows out at the south end.

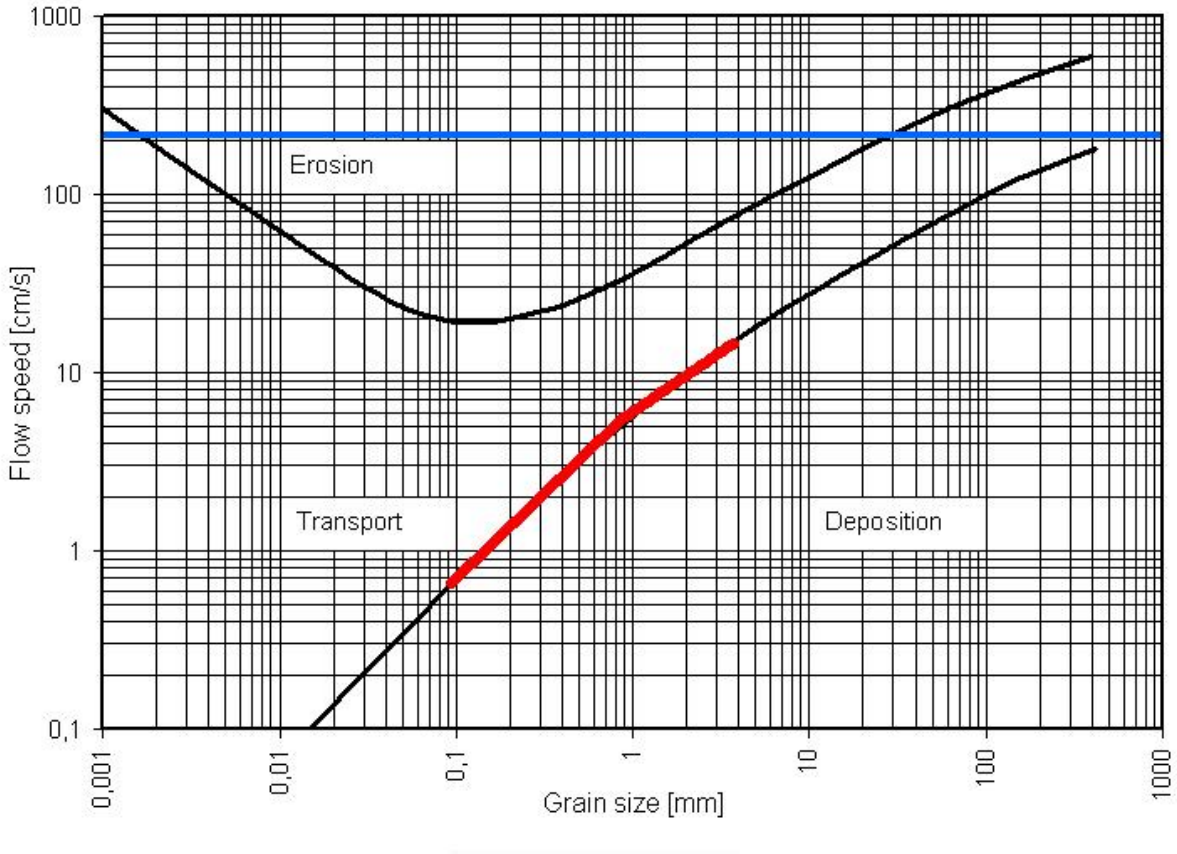
Wider shot of same pit (to the right of the S-turn) shows both the entry breach (lower right) and exit breach (upper right) in the dikes.

Miners claim their pits actually capture sand and keep it from floating downstream. That may be true at certain times during a flood, for instance, as it recedes. However, at the peak of the May 2024 flood, the speed of floodwater was sufficient to entrain sand in pits and carry it downstream.

A drone followed logs floating through this captured West Fork pit at 5 MPH.

5 MPH is more than fast enough to scoop up and carry off the largest grains of sand and other sediment.

See Hjulström curve below.



Industry-standard graph shows the speed necessary to erode, transport and deposit sand/sediment of different particle sizes. Blue line indicates ***measured*** *speed of water.*
Red indicates range of typical sand sizes. Speed was greater than necessary to erode and transport all sand sizes, and even some gravel.

Another West Fork pit capture at the Hallett Mine after floodwaters receded. Notice how natural channel of the river has been virtually cut off.

Effluent from the Hallett Mine (upstream in upper right) polluting the West Fork at the Northpark/Oakhurst Ditch (middle foreground). Water flows right to left. Facing West.

Reverse angle (facing east) shows proximity of pollution to homes in Northpark Woods subdivision. That's the Oakhurst Ditch, which empties into the West Fork behind camera position. Water flows left to right. Hallett mine is upstream on left.

Same ditch blocked by sand increases flood risk for homes (visible in top right).

Farther downstream, the Kingwood Diversion Ditch (top middle) also became blocked by sediment. A Harris County Flood Control District study found that the Diversion Ditch was one of the two most dangerous flooding problems in Kingwood.

The entrance to this ditch had just recently been dredged by the Army Corps.

Broken dike at the Triple PG sand mine in Porter. Industrial wastewater is flowing out of the mine into White Oak Creek which joins Caney Creek and the San Jacinto East Fork before flowing into Lake Houston.

These pictures demonstrate that flooding of sand mines is a huge environmental problem in the Lake Houston Area. We have industrial waste increasing flood risk and polluting the drinking water supply for 2 million people. And the TCEQ BMPs don't even address the problem.

Conclusion: Mines need to be positioned farther from rivers on higher ground. Natural vegetation needs to be left in the buffer zones to slow floodwaters and reduce erosion. The measures could help solve the problems shown above and help protect the health and safety of millions of people.

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