Improving Sand-Mining Best Management Practices

Introduction

Texas sand mines do not follow many best management practices (BMPs) adopted in the rest of the country and the world. If practiced, they could help increase margins of safety, reduce risks associated with future flooding, and reduce the costs associated with cleanup.

Recommendations

1. ***Locate mines outside of floodways.***

Texas is the only state that does not mandate minimum setbacks from rivers for sand mines. As a result, many mines are built inside floodways of major rivers. (A floodway is the main channel of the river during a flood.) All but one sand mine (out of about 20) on the San Jacinto lie at least partially within one or more floodways. A minor flood after a 5" rain on December 7, 2018, breached one sand mine dike three times in one week.

Cleaning up sediment washed downstream from such mines will cost *taxpayers* hundreds of millions of dollars. Mines externalize cleanup costs while profiting from risky behavior. Prohibiting mines from operating in floodways will reduce flood risk and downstream damages. It could also prolong the life of Lake Houston, the water source for 2 million people.

2. ***Establish performance bonds to cover the cost of cleanup.***

Giant sand dunes deposited during Harvey exacerbate flooding by constraining the conveyance of downstream drainage ditches and the San Jacinto river. Completely dredging the San Jacinto River will likely never happen because of cost and political complexity. This perpetually exposes downstream populations to heightened flood risk and reduces their property values.

Performance bonds could ensure cleanup and repairs after floods in a timely way and force those who caused damage to bear the cost of remediation.

3. ***Increase the width of dikes.***

Texas has no minimum setbacks from rivers and does not recognize erosion hazard zones. Some mines operate so close to the river that floodwaters breach their dikes repeatedly. Wider dikes:

- Make stronger dikes that are less likely to fail and that improve safety.
- If forested, can slow currents as they enter and leave mines.
- Reduce the amount of sediment picked up and carried downstream.
- Reduce the danger of river capture due to river migration.

4. ***Decrease the slope of dikes.***

Angled surfaces deflect and diffuse incoming energy. Other states and countries recommend gently *sloping* dikes to strengthen their resistance and accommodate the growth of vegetation, which reduces erosion.

The near-vertical slope of many dikes on the San Jacinto means they receive direct, rather than glancing blows from floodwater, can't sustain vegetation in many cases, and frequently fail.

5. ***Reduce erosion with vegetation.***

Planting dikes and unmined surfaces with grass and/or native trees can bind the soil, slow floodwater, reduce erosion, trap sand, and help retain sand within mine boundaries.

Virtually all states and countries recommend planting native grasses and trees to help bind soil. Revegetating *after* plants have been removed can take years. Therefore, the best, cheapest and simplest practice is to leave native vegetation in place and not remove it wherever possible when constructing mines

6. ***Replant areas not actively being mined.***

Mining exposes 20 square miles of sand surface to erosion immediately upstream from Lake Houston. Not all of that area is actively being mined. Loose sand, exposed to floodwaters, exposes downstream communities to unnecessary risk. Replanting with native grasses and trees can bind soil, reduce water velocity during floods and reduce erosion. TCEQ reports that native grasses are 98% effective in reducing erosion. Keeping soil in place is the best way to keep it out of rivers.

7. ***Avoid clearing areas that will not soon be mined.***

Delay clearing land until the last possible moment to reduce erosion risk from floodwaters. A large part of a sand mine on the East Fork was cleared, then went through three so-called "500-year storms" in the next three years – *before any mining took place*. Thirty acres of park land downstream were covered with sand dunes up to 15 feet tall after Harvey. More than 1,100 East Fork homes also flooded, partially as a result of reduced river conveyance.

8. ***Protect stockpiles from flooding.***

Loose sand in stockpiles is especially vulnerable during floods. During Harvey, sand mines adjacent to Kingwood lost four of six stockpiles completely. Another eroded severely. Only one escaped with little loss, the one on the highest ground, protected by a large swath of trees. Mines that locate stockpiles in floodways risk losing their entire inventory and contribute disproportionately to downstream sedimentation.

9. ***Mine only above the thalweg.***

Thalweg is a geological term for the deepest part of a river. San Jacinto sand mines remove sand to depths far below the thalweg. The greater the difference between river bottom and pit bottom, the greater the likelihood of dike collapse and pit capture during floods.

Mining below the thalweg also reduces groundwater levels in adjacent areas. It does so by inducing river- and groundwater from surrounding areas to migrate into the pit. When the water table drops below the level of roots, surface vegetation dies back, contributing to more erosion.

10. Establish performance bonds to guarantee remediation of breaches and repurposing of mined areas once mining is complete.

Reclamation of sand mines and repair of breaches should also be covered by performance bonds. Satellite images show dike breaches that have remained open for as long as 3 to 6 years. Even worse, obtaining a permit to mine in Texas requires a remediation plan, but it does not obligate mines to act on that plan when mining is complete. Some unscrupulous operators simply walk away from pits, creating safety hazards, eyesores, and economic development headaches for communities.

Conclusion:

Harvey exposed gaping holes in Texas regulations. It underscored the importance of adopting better best management practices to help improve public safety, reduce damage to infrastructure, and avoid widespread flood damage to homes and businesses.

The consequences of ignoring these recommendations potentially include:

- Destruction of downstream communities through increased flooding
- Illegal “taking” of private property
- More loss of life
- Unfair imposition of remediation costs on taxpayers
- Hidden “subsidies” that distort the true cost of cement and its usage
- Loss of faith in the ethical standards of businesses and the free enterprise system
- Loss of faith in government institutions to protect people and property
- Loss of home and business values
- Reduction of property tax income to city and county governments
- Making Texas a less desirable place to live.

Destruction like we experienced during Harvey is rarely caused by one thing. Multiple failures on multiple levels compound each other. To the extent that sand mines contributed to the problem, they can help solve it by modifying business practices as described above.

For an expanded and annotated discussion of these points, follow this link.