

DREDGING FOR FLOOD MITIGATION: BALANCING COSTS AND BENEFITS

Why Do We Dredge Waterways?

Dredging is the process of removing accumulated sediment from the bottom or banks of bodies of water, including rivers, lakes or streams. It is used to remove obstructions that would block boat traffic.

Dredging rivers is often proposed as a way to reduce flooding. However, research shows that this method cannot significantly impact flood risk. Instead, it often provides short-term benefits while introducing long-term ecological and hydrological downsides. The consensus among scientists and engineers is that watershed-based and nature-based approaches are more effective for sustainable flood management.

Why Dredging Fails to Prevent Flooding

Scientific research shows the following reasons why dredging often fails to prevent flooding:

- Flooding is driven by watershed-scale processes, not just channel capacity.
- Sediment re-accumulates rapidly after dredging.
- Dredging can disrupt natural floodplain storage that would disperse flood waters.
- Increased flow velocity may raise downstream flood risks.

TALKING POINTS

Flooding is Driven by Watershed-Scale Processes, Not Just Channel Depth

- Flooding occurs when too much water arrives too quickly for the river channel and floodplain to handle.
- Dredging focuses on deepening or widening the main river channel, but most floodwaters come from runoff in the surrounding watershed (from rain, snowmelt, etc.).
- Unless you reduce upstream runoff (through land management, wetlands, etc.), dredging offers minimal relief during peak flows.

Sediment Re-accumulates Quickly

- Rivers naturally carry sediment. When you dredge, the river re-deposits sediment in the same areas during high flows.
- In order to maintain channel depth, dredging would need to happen after every major storm event.

Channel Deepening Has a Limited Impact on High-Magnitude Floods

- During major floods, water overtops the banks and spreads across the floodplain. At that point, the channel depth doesn't matter — the river is already bypassing it.
- A few feet of dredging in the main channel does not create enough extra volume to hold back millions of gallons of floodwater.

Disruption of Natural Floodplain Function

- Healthy rivers use their floodplains to store excess water. Dredging often comes with bank armoring or levees that disconnect the river from its floodplain, reducing its natural ability to buffer floods.
- Ironically, dredging can increase flood heights downstream, by sending water through the system faster and reducing upstream water retention.

Increased Flow Speed Can Shift Flood Risk

- A deeper or straighter channel allows water to move faster. This might reduce localized flooding, but it increases downstream flooding because the water arrives more quickly downstream.

Dredging is Expensive

- A recent project on the Lower Mississippi River cost an estimated \$1.8 million dollars per mile of river dredged.
- Deepening a river channel undermines existing footers for infrastructure like bridges and pipelines crossing the waterway, meaning there will be added cost to upgrading or replacing those structures if you don't want them to fail.

FLOOD MITIGATION STRATEGIES

Slow it Down. Soak it Up.

The river channel has limited capacity to absorb the runoff from extreme storm events, but we can help control flood levels by capturing rainwater BEFORE it reaches the river. By increasing the landscape's natural ability to soak up and slow down stormwater, communities can reduce flooding. Some strategies include:

- Building wetlands
- Green stormwater detention basins like green sinks
- Planting urban trees
- Restoring riparian buffers along waterways
- Replacing impervious surfaces with permeable pavers or green roofs
- Planting rain gardens and bioswales

Build Smart

Extreme weather events and flooding will continue to occur across the Commonwealth. The best strategy to avert damage to property and loss of life is to know your flood zone and avoid developing in those areas. Visit the [Kentucky Flood Hazard Portal](https://www.ky.gov/flood-hazard-portal) to find your flood zone.