U.S. Army Corps of Engineers (USACE) Research and Development Center's *Evaluation of the San Jacinto Waste Pits Feasibility Study Remediation Alternatives;* August 2016

A Summary of the USACE Comparison: Enhancing the Armored Cap versus Removal

Site History

- The San Jacinto River Waste Pits Superfund Site is located in Channelview, Texas
  - It consists of two impoundments that were constructed in 1965 to contain paper mill waste, in a location approved by Harris County
- In 2011, the impoundments were the subject of a $9 million time critical removal action (TCRA) which included completely isolating the paper mill waste under an engineered armored cap (Armored Cap)
- At USEPA's request, the USACE evaluated capping and removal alternatives as the final remedy for the Site, and issued a 2015 draft report and 2016 final report

Summary of Key Findings from USACE Report

- An enhanced Armored Cap is expected to be ***stable and highly effective in controlling the transport of contaminants*** and reducing the exposure concentration of contaminants in the water column
- ***Fish contamination is exacerbated with the removal option***
- ***Removal of the Armored Cap and materials*** beneath it would create significant ***risk of substantial releases of waste materials*** to the San Jacinto River
- ***Risks will be exacerbated*** if significant storms occur during the extended construction period required for removal

Key Findings Regarding Removal: USACE's Final San Jacinto Site Report – *August 2016*

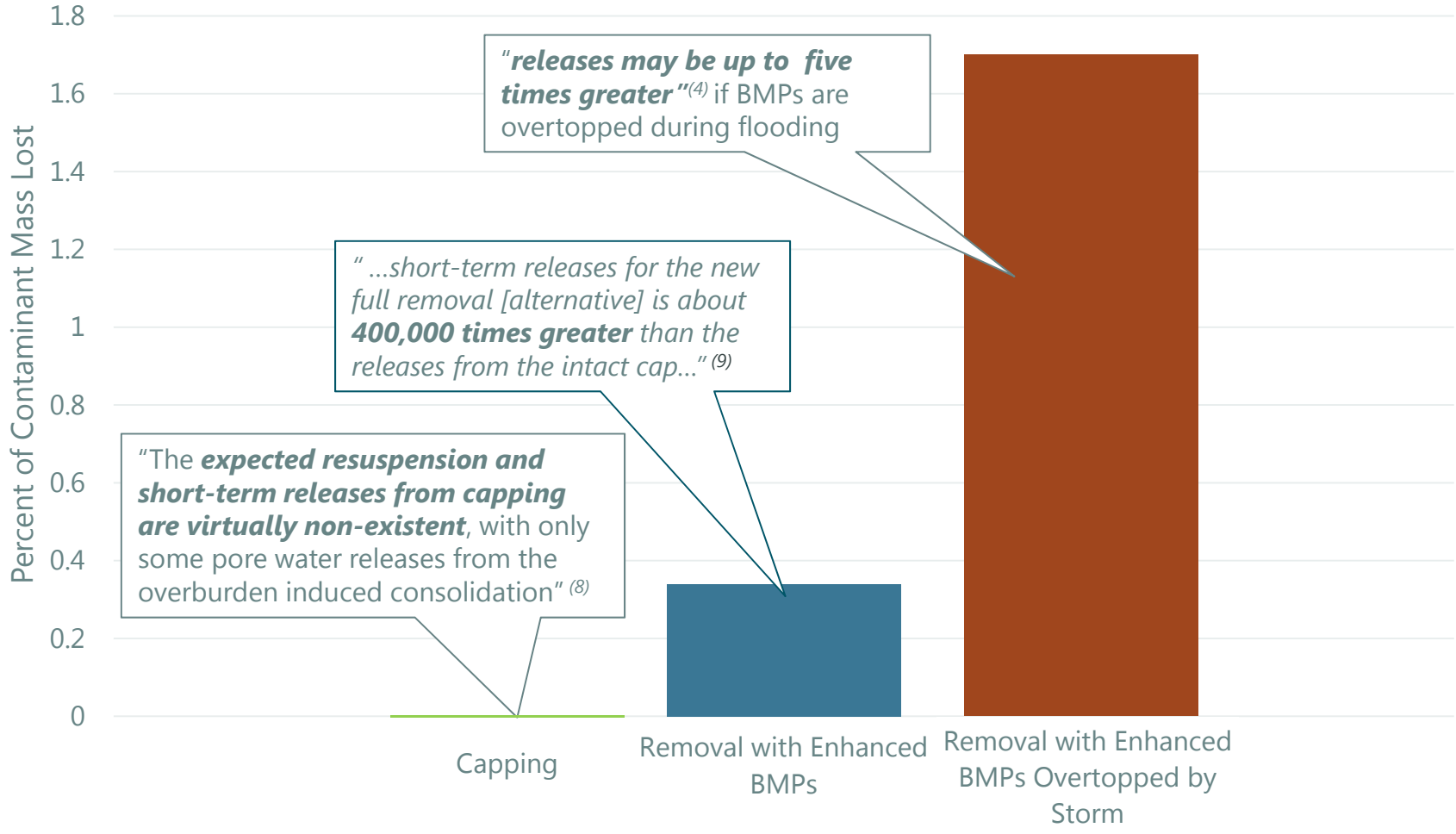
- ***The short-term losses from removal are more than 100 times the predicted losses from an intact cap over the 500 years following placement*** *(1)*
- "In comparison [to the cap], ***at least 0.1% of the contaminant mass and most likely at least 0.3% and possibly much more of the contaminant mass would be released by removal operations"*** *(2)*
- *"If a storm…occurred during the actual removal/dredging operation,* ***the likelihood of extremely significant releases of contaminated sediment occurring is very high****" (3)*
- Flooding during remedial construction ***would increase releases five times*** if BMPs are overtopped.*(4) The losses from removal represent a significant increase in exposure (more than an order of magnitude)*
- ***Fish tissue contaminant concentrations would be expected to be dozens to hundreds of times greater under a removal versus capping alternative for a number of years*** *(5)*

Key Findings Regarding Capping: USACE's Final San Jacinto Site Report – *August 2016*

- ***The Armored Cap is expected to be highly effective in controlling the transport of contaminants and reducing the exposure concentration of contaminants in the water column*** *(6)*
- ***The USACE concludes that reliability has been routinely achieved at other armored cap sites and facilities*** *(7)*
- ***The expected re-suspension and short-term releases from capping are virtually non-existent*** *(8)*

USACE 2016 Removal Conclusions

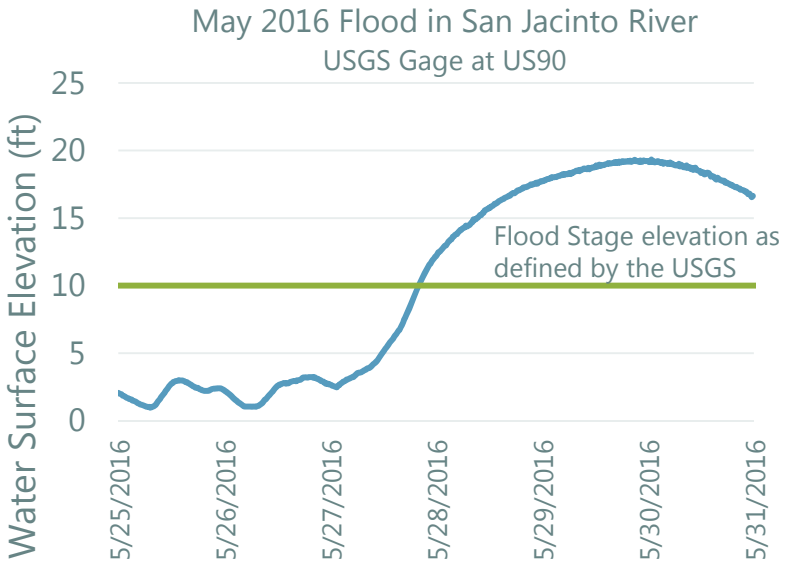
Removal ***Will*** Cause Significant Releases to the San Jacinto River Compared to Capping



Flooding During Removal Will Further Exacerbate Releases of Dioxins

- "***…releases may be up to five times greater…"***[4] if BMPs are overtopped
  - In 2016 alone there have been at least two events that exceeded the 10-year flood in the San Jacinto River, one of which approached the 50-year flood
  - The river rises rapidly during flooding

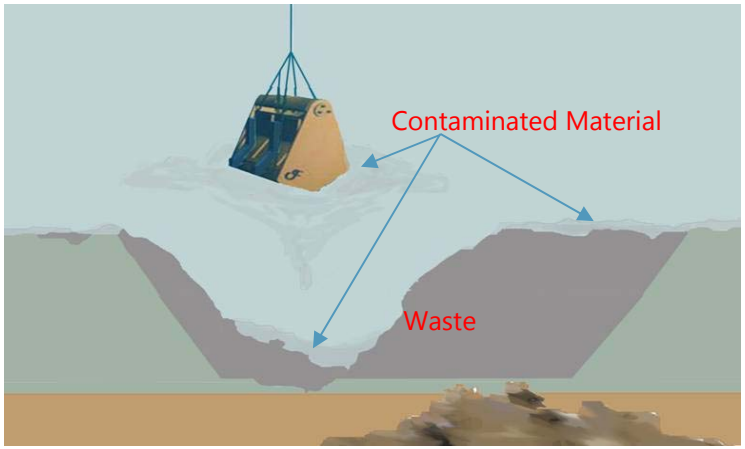
Lower San Jacinto River



Removal Will Leave Dioxins at the Site

- Contaminated materials will remain at the Site after removal occurs

> *"**...short-term releases*** (of contaminated materials)***...would subsequently be available for redistribution during erosion events from high flows or storm events."***(10)



- ***USACE assumes a new armored cap would be placed over the excavated area to protect remaining contaminated materials from erosion***

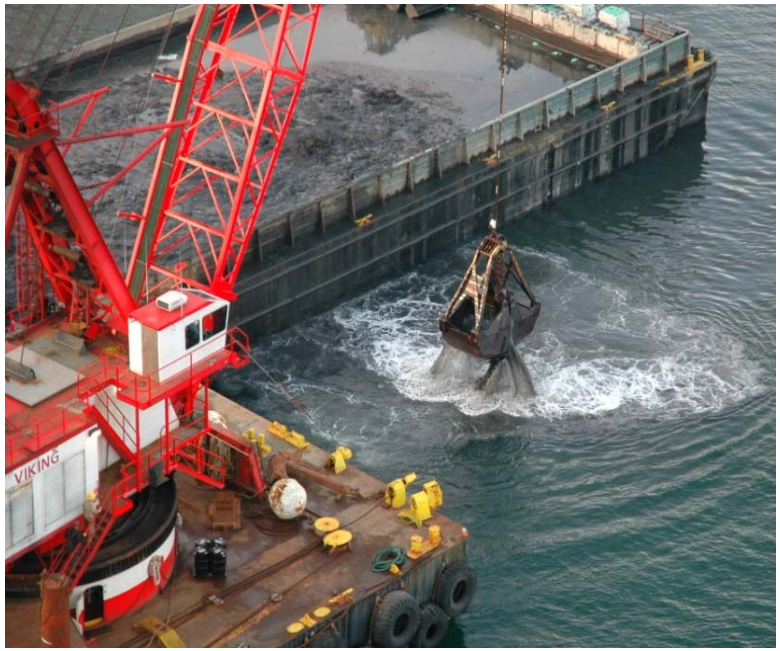
Removal Will Cause Heightened Fish Exposures to Dioxins

- USACE states that fish tissue contaminant concentrations are considered to be directly related to releases to the water column
- USACE states that for several years after removal, fish tissue contamination will be:
  - **Dozens of times greater** than under current conditions with removal using enhanced BMPs[5]
  - **Hundreds of times greater** than under current conditions with removal without using enhanced BMPs[5]

Removal Will Result in Releases

*"Modeling…clearly demonstrated that sediment residuals are predicted to be eroded from the areas that would be dredged… **even during non-storm, i.e. normal, conditions**…"*(11)

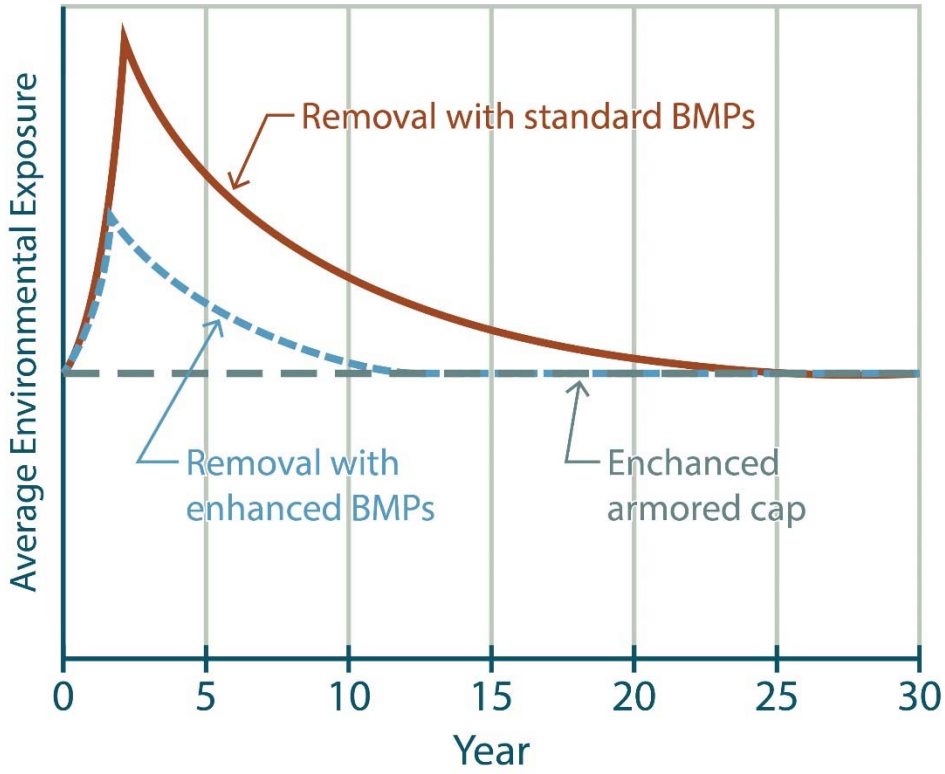
*"…full removal…would be expected to **significantly increase** short-term exposures to contaminants."*(12)



*"If a storm…occurred during the actual removal/dredging operation, **the likelihood of extremely significant releases of contaminated sediment occurring is very high**."* (3)

Removal Will Delay Environmental Recovery

- Natural recovery would be delayed 10 to 20 years as a result of removal, even assuming enhanced BMPs *(13)*
- *" …fish tissue concentrations would be expected to be **dozens [of] times… and perhaps hundreds [of] times greater** than existing concentrations for several years…" (5)*



A flood during construction would lengthen the recovery period

USACE 2016 Capping Conclusions

The Enhanced Armored Cap Will Permanently Prevent Releases

- The enhanced Armored Cap would include:
  - Upgrading the blended filter in the Northwestern Area
  - Upgrading the armor rock size to prevent movement during very severe hydrologic and hydrodynamic events
  - Thickening the Armored Cap to at least 24 to 30 inches
- *"The **expected resuspension and short-term releases from capping are virtually non-existent**..."* *(8)*

The Enhanced Armored Cap Will be Reliable

- The enhanced Armored Cap would also include:
  - Slope improvements for better slope stability
  - The installation of pilings to protect the cap from barge strikes
- The USACE concludes *"…**that reliability has been routinely achieved at other armored cap sites and facilities"*** *(7)*
- ***"After an extensive literature review, there appear to be no documented cases of any armored cap or armored confined disposal facility (CDF) breaches"*** *(14)*

The Enhanced Armored Cap Will be Effective

- The effectiveness evaluation of the enhanced Armored Cap showed ***"the cap is expected to be highly effective in controlling the flux*** (transport) ***of contaminants and reducing the exposure concentration of contaminants in the water column.***" *(6)*

Summary

- Removal is ***in direct conflict*** with the conclusions of the USACE report
  - There will be releases of dioxins to the San Jacinto River during and after removal
  - These releases will be exacerbated if significant storms occur during the construction period required for removal
- In contrast, releases from an enhanced Armored Cap will be virtually non-existent; the cap is expected to be stable and highly effective in controlling the transport of contaminants and reducing the exposure concentration of contaminants in the water column based on the USACE report
- ***USEPA should follow the conclusions of the USACE report and select the enhanced Armored Cap as the final remedy to permanently prevent releases of dioxins from the Site***

References

U.S. Army Corps of Engineers Research and Development Center, *Evaluation of the San Jacinto Waste Pits Feasibility Study Remediation Alternatives, August 2016*.

(1) Page 6, 1st paragraph

(2) Page 4, 1st paragraph

(3) Page 185, 2nd paragraph

(4) Page 7, 2nd paragraph

(5) Page 6, 1st paragraph

(6) Page 6, 1st paragraph

(7) Page 3, 3rd paragraph

(8) Page 4, 1st paragraph

(9) Page 6, 1st paragraph

(10) Page 166, 2nd paragraph

(11) Page 185, 2nd paragraph

(12) Page 5, 2nd paragraph

(13) Page 5, 2nd paragraph

(14) Page 82, 2nd paragraph