

Additional explanatory information regarding AB2021-743

“Resolution eliminating the barriers to removing excess gravel from the Dry Uplands meander zone of the Nooksack River”

The objective of this proposal is to fund a science-based path to expand flood water storage and enhance salmon habitat capacity within our existing designated flood plains. The techniques proposed are proven concepts, that the U.S. Army Corps of Engineers has previously used elsewhere in the country. Images from the Corps Clear Creek Texas flood mitigation project have been included to help demonstrate how this approach can both expand flood plain capacity and store water to enhance habitat at the same time. This would enable us to expand the flood plain while minimizing the impacts to farms, residences, roads, rail and public infrastructure.

The math is simple, every cubic yard of sand and gravel removed from the dry flood plain area will provide space for almost another cubic yard of water during a flood event.

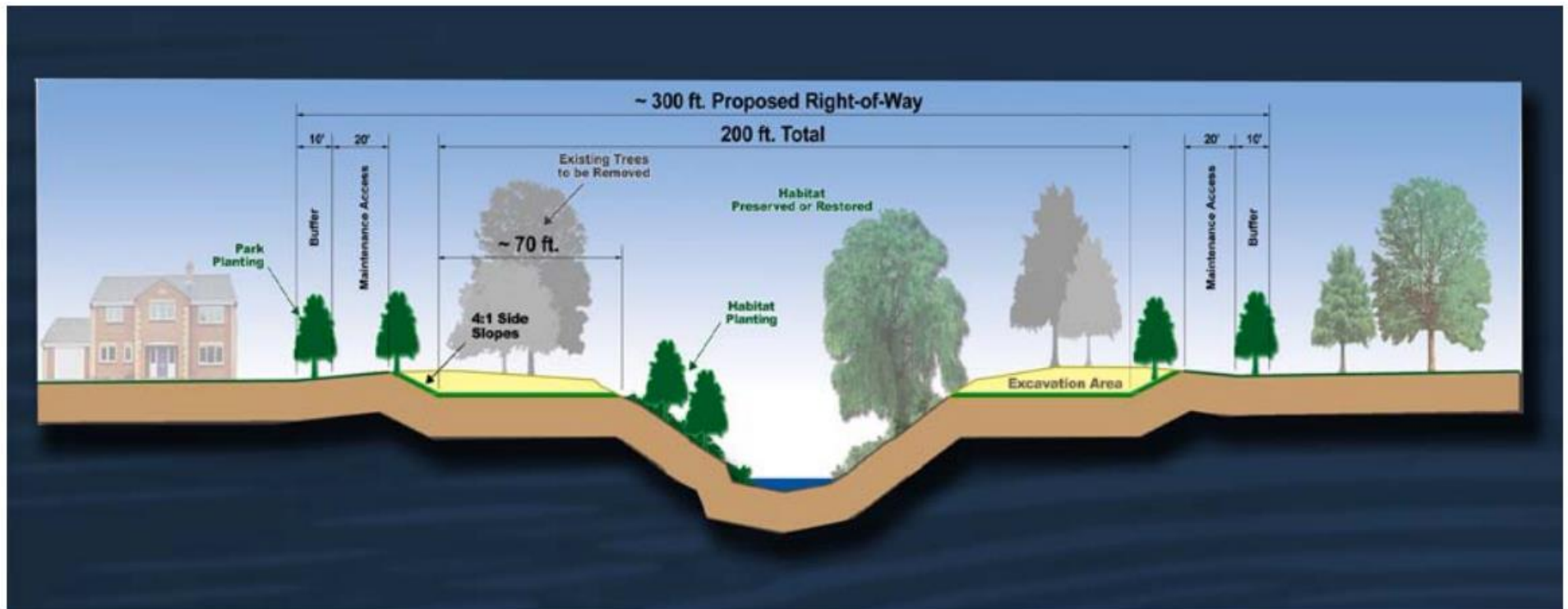
The resolution proposes to extract gravel ONLY from DRY upland areas well away from the subterranean boundaries of where young salmonids travel between wet gravel. Areas where the river used to run years ago and will likely return again at some point in the future.

In the images provided the Corps removed material to allow more room for flood waters to spread without impacting existing areas containing housing or other infrastructure. While the Corps report indicates Clear Creek was also straightened in some sections this is NOT being suggested for the Nooksack. The full report can be found at <https://www.pearlandtx.gov/home/showpublisheddocument/20748/636586232387070000>

Also, unlike the Clear Creek example, the material extracted (sand and gravel) from the dry meander zones in the Nooksack should be quite saleable. The target should be to find an export market, such as in Asia as the amount of material is likely more than local markets could absorb, and any local oversupply could adversely impact the long-term viability of our existing domestic suppliers.

Furthermore, finding an export market removes the need to purchase land to relocate the material (a major expense of the Clear Creek project), while a portion of the income generated could help supplement the local funding component which is often required in order to qualify for federal grant funding.

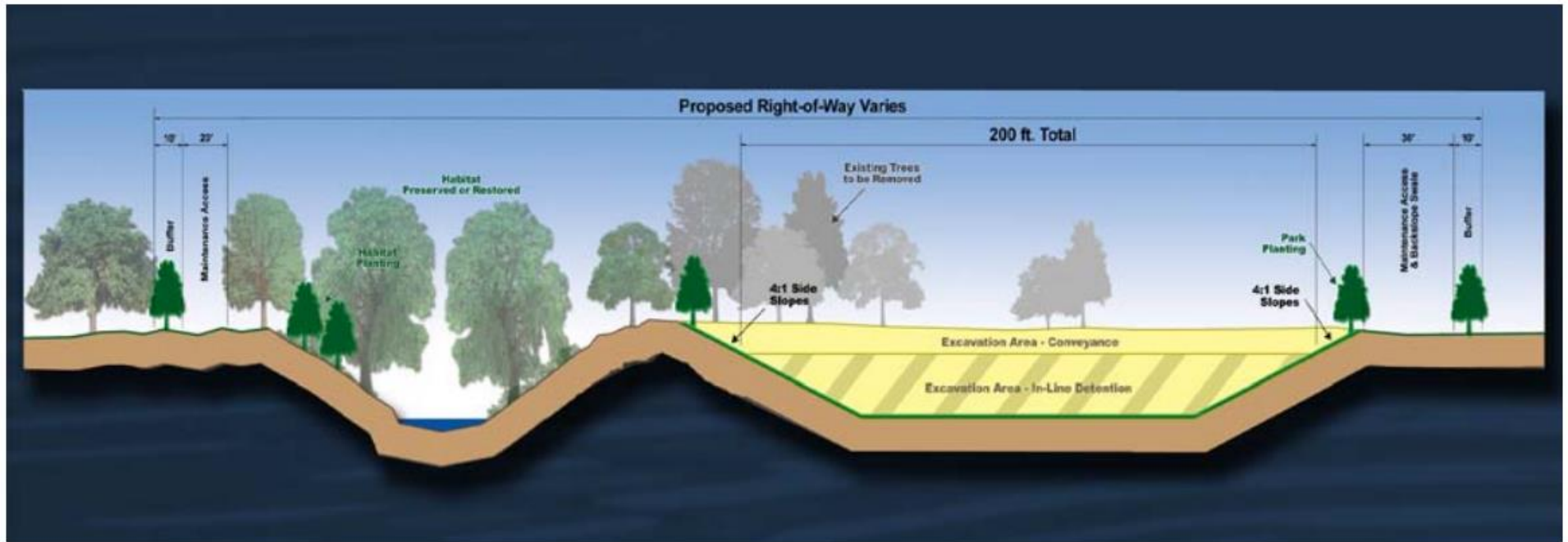
Diagram demonstrating how the Army Corps removed material to expand the flood plain capacity



This diagram shows how the Corps removed material in dry meander zones adjacent to the creek to expand the flood plain capacity. Material was removed and the land was lowered to a depth that was still above the normal high-water mark and replanted with native vegetation. This area then floods during unseasonably high-water events, the lowered base level increases the capacity of the existing flood plain area, while the saturated soils later release the water into the creek as the flood waters recedes

This resolution asks that we explore doing something similar along the Nooksack, to lower the level of gravel in the normally dry areas of the meander zones that have since become dry uplands areas along the river. The goal would be to remove the gravel to lower the landscape to a level likely also above the normal high-water mark and replant it with native vegetation.

Diagram demonstrating how the Army Corps removed material to create inline flood water detention capacity



This diagram shows how the Corps removed material in areas adjacent to the creek to provide inline detention of high flood waters.

Material was removed and the land was lowered to a depth in line with the normal water level, this engineered basin is filled by a channel that acts as a conveyance during high flood waters into the basin. As the bottom of the basin is equal to the depth of the normal water level it therefore helps supplement instream flows via ground water seepage back into the river during the summer months.

This resolution asks that we explore doing something similar along the Nooksack, to excavate gravel in the dry uplands' areas along the river to create inline detention basins. Included further on are photos from alongside the Willamette River that show how this may look from the air when the inline detention basins are close to being full.

The proposal seeks the full cooperation and participation of industry, landowners and the Tribes, while these projects could be done with equal effect on either private, government or tribal owned land the most likely logical place start is to invite the Nooksack tribe to expand the existing uplands gravel operation that exists on tribal land (see below).

Furthermore, as tribal fishing is being increasingly impacted by the pollution being carried down river, we would all be well served to seek the tribes experience with salmon recovery, another reason they should have the first opportunity to earn income from the sale of gravel extracted from the meander zones.

The proposal is to fund research, a one-time expense, NOT a recurring annual subsidy.

This is NOT intended to enable people to build new structures in County hazard areas where they are currently prohibited.

The intent is to prevent recurring damage (including the huge environmental impacts) to those living in areas traditionally most impacted by floods, areas which for the most part have been occupied for 100 years or more, including the Lummi peninsula, and the cities of Nooksack, Everson and Sumas. This is only intended to be a partial solution to flooding, that will reduce, but not eliminate the amount of flood water and damage we can anticipate as climate change unfolds.

If we do nothing different, we will see a continuation of extreme flooding, which will displace hundreds from their homes, result in more and more garbage, chemicals, human and animal waste being dumped into the river, fishing grounds and shellfish beds.

The ONLY way to reduce the environmental damage caused when we get 5 inches of rain in a very short period of time hitting occupied areas – is to give the water somewhere better to go. If there are other cheaper, quicker, better alternative to divert/store water that we can get started on before the 2022/2023 flood season hits us next year these should be presented.

The only other suggestions previously provided to council in recent years are:

1. Build much bigger stronger dikes in the existing locations. As with all dikes, at best it will work most of the time, ... but not all the time.
2. Move the dikes further away from the river and expand the flood plain to allow the river more room. It would require the relocation of roads and rail lines and other public and private infrastructure. It would require significant unidentified funding to purchase farms; buy and demolish homes; and when occupants do not want to participate, to consider acquiring these properties using the force of eminent domain laws (something the county has never done and is understandably reluctant to start now).

One thing we are certain of is in 2022 or 2023 the same citizens that were flooded out this year will demand to know what progress we have made after this year's floods.

Examples of what dry uplands inline storage in meander zones might look like

(Image is southeast of Eugene OR, on the Willamette river)



Examples of gravel extraction on dry uplands areas north of Eugene OR, on the Willamette river

Mining these areas has likely increased the flood water storage area in the winter which supplements the river during the summer





Whiteley Landing

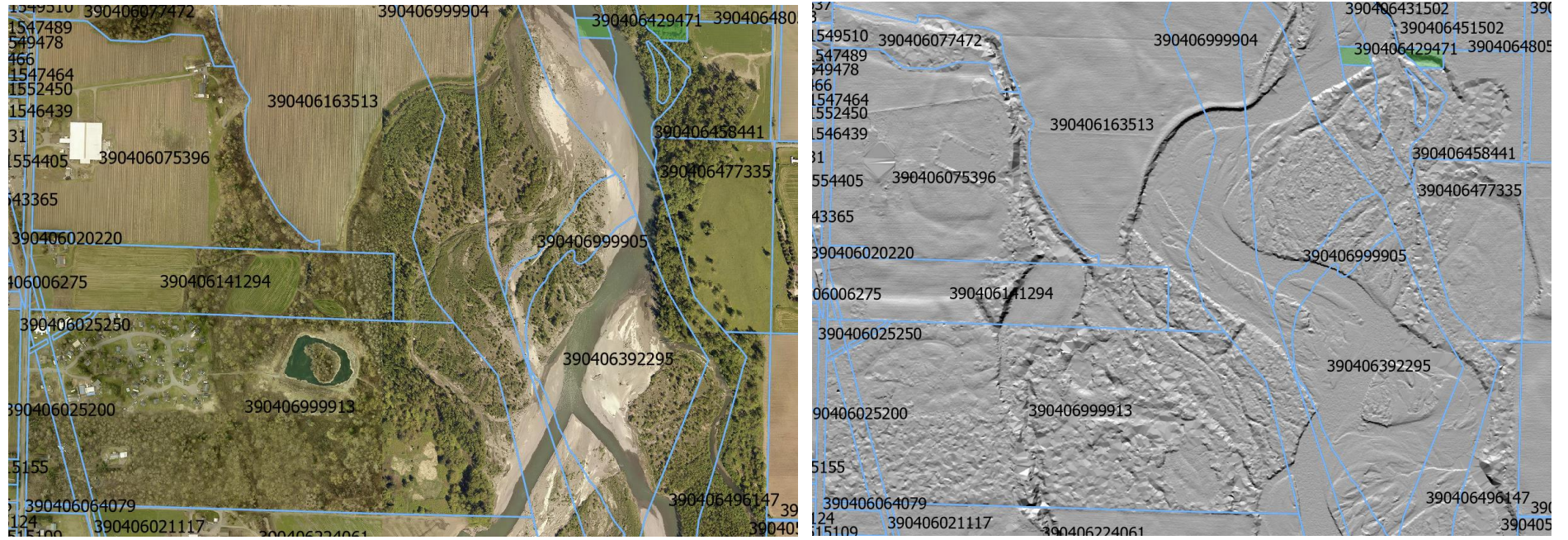
Willamette River

Willamette

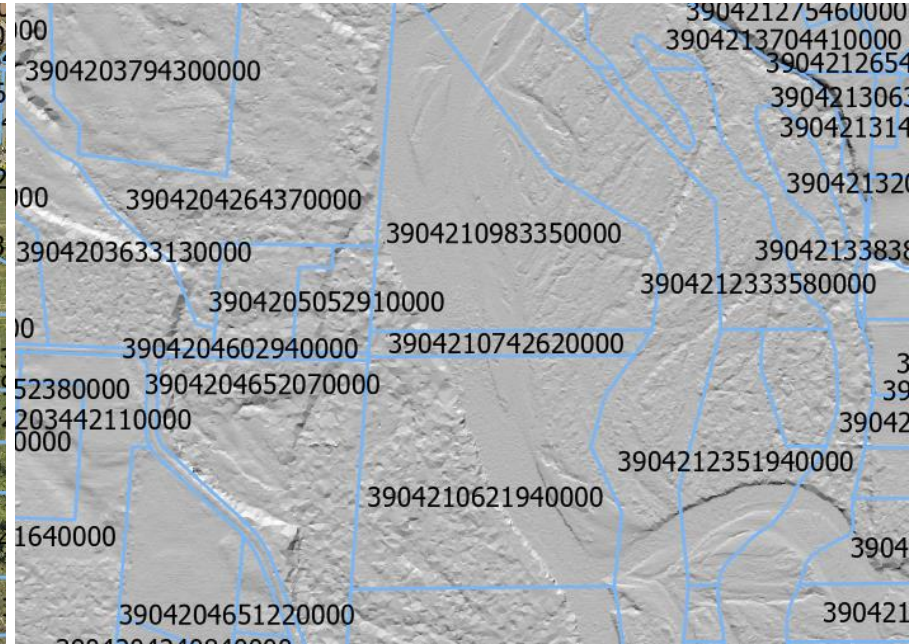
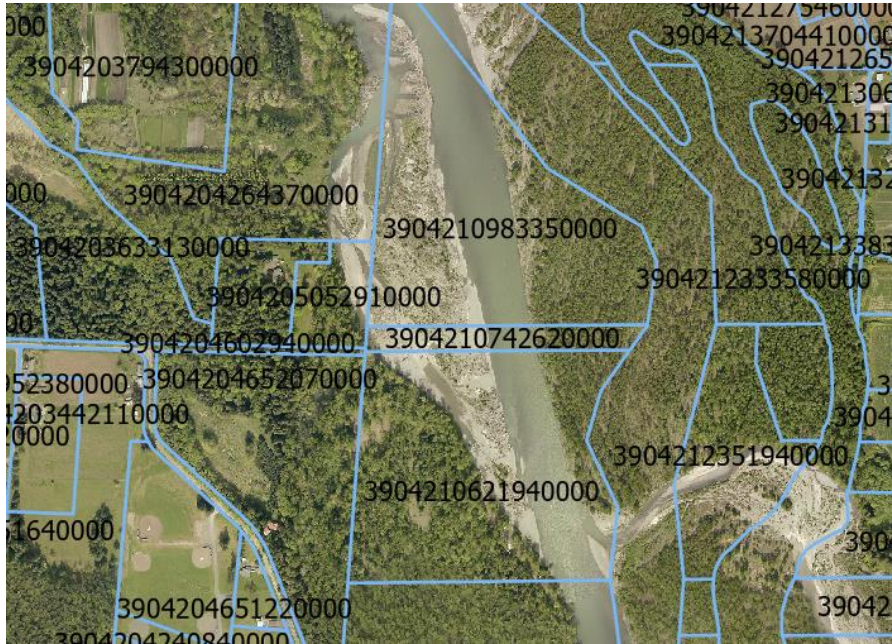
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Arial photos vs. Lidar images showing uplands gravel accretion and historic vs. current river channel

Example 1 - East of Mission / East Pole Rd intersection. Mix of Tribal and private ownership



Example 2 - East end of Goshen Rd. Mix of private, county government, gravel industry owned dry uplands



Nooksack Tribal dry uplands already been used for gravel extraction - Located on Mission Rd North of Central Rd



About 500 acres of the traditional meander zone potentially suitable for gravel removal (Nooksack Tribal Trust land)

Arial vs. Lidar showing uplands gravel accretion and historic vs. current river channel

