

DRAFT

COLUMBIA NEAR-SHORE BENEFICIAL USE DEMONSTRATION PROJECT

Developed by the Columbia Near-Shore Collaborative Working Group
Demonstration Project Committee

December 22, 2003

At its first meeting in October of this year, the Columbia Near-Shore Beneficial Use Collaborative Working Group agreed that addressing the depletion of sands in the near-shore environment off the south jetty of the Columbia River was an urgent priority. Moreover, the group felt that the first priority was to develop a demonstration project for 2004 which would begin to answer the questions necessary to design longer-term solutions.

A sub-committee, including representatives from the Corps of Engineers, planning agencies, and regulatory agencies was assigned to develop this draft Demonstration Project, to be presented for approval at the next meeting (January 2004) of the Collaborative Working Group.

Assumptions

1. A Demonstration Project is needed as an important first step in guiding future, long-term actions to address depletion of sands in the near-shore environment off the South Jetty of the Columbia River.
2. In order to begin implementation of a Demonstration Project in 2004, time is of the essence. The project needs to be designed and begin regulatory review by the end of January.
3. A balance must be achieved between designing the Demonstration Project to produce *meaningful* information, and also have environmental impacts that will be negligible enough to minimize the time needed for proper regulatory review.
4. Ultimately, cost and funding sources will need to be addressed and taken into consideration in the design of the Demonstration Project. It is assumed that monitoring results from the demonstration could be used to impact the Corps of Engineers budget for 2007-08.

Purpose (What is it, exactly, we are trying to “demonstrate”?)

The purpose of the project is to demonstrate and evaluate the technical feasibility, effectiveness, and environmental impacts of various dispersal methods that are likely to be used in the longer-term efforts to mitigate the erosion of near-shore sands off the south jetty of the Columbia.

Timing and Phasing

The Demonstration Project should be conducted over a **2-year period**, with the first phase **beginning in September 2004**.

The rationale for a 2-year Demonstration Project is two-fold. First, it enables us to obtain greater certainty in the results, because some evaluation data can be gathered over 2 years rather than one. Secondly, there may be some activities which require greater regulatory scrutiny prior to approval. Having a 2-year process allows us, at the very least, to begin testing the least-impactful activities and therefore gain a year's worth of data.

The rationale for conducting the Demonstration Project beginning in September, is that it follows the closing of the Dungeness Crab fishery on August 15. Trawlers who fish the area for starry flounder (among other species) stated that they would not have concerns if the Demonstration Project were to be conducted “in late September”.

However, it should be noted that no time-frame is without its concerns. There are weather and safety concerns as you get into the fall season, and the closing of the crab fishery is due in part to the fact that it is molting season. These concerns, and others, will need to be examined before beginning the demonstration project to minimize environmental impacts and safety hazards.

Location of the Demonstration Project

The area targeted for the Demonstration Project will be the near-shore area off the South Jetty of the Columbia. The area would be approximately 9000 feet by 7000 feet, and would be approximately one mile off shore.

Determining exactly how far off-shore requires another balancing act: on one hand navigational safety requires that there be a minimum water depth of 30 feet. On the other hand, the further out you go, the less likely it is that sand will stay in the littoral cell. Maximum depth should be no more than 60 feet, and optimum depth is probably between 35 and 40 feet. We should try to get “as close as possible” to that 35-foot depth.

Methods of Dispersal to be Demonstrated

There are two distinct methodologies for depositing the dredged material in the near-shore environment, “dumping” and “broadcasting” (pumping/spraying).

The method for “dumping” to be tested has been referred to as “enhanced” dumping, which simply means the dredge is moving at a greater speed, enlarging the footprint.

The pumping method can be done through both “side-casting” and “rainbow-spraying”, but the result is the same, and the pumps used are the same, taking about 45 minutes to spray a load of sediment. The Essayons will need to be retro-fitted to include pumping capacity, and that retro-fitting will be done in winter 2005. Contract dredges currently have the capability for pumping/spraying, but contract timing would require environmental clearance by February, which renders that option unavailable for 2004.

Therefore it is recommended that the first year of the demonstration project test “Enhanced Dumping” and the second year of the demonstration test pumping/spraying.

Creating a Test Berm

In addition to demonstrating dispersal methods, a test berm will be created to test impacts (i.e. corroborate modeling results) on wave actions and determine sediment migration patterns.

The size of the berm will be less than 3 feet in height, and consist of no more than 150,000 cubic yards of material. Monitoring the wave action created by the berm will be used to minimize any safety concerns about a longer term effort to replenish the sands off the south jetty. In addition, the berm will be helpful in determining sediment migration patterns.

It is recommended that the berm be constructed in the first year of the demonstration, and monitored for both years.

Magnitude of the Demonstration Project: How much sand?

Using the dredge Essayons, we can estimate 15-20 “runs” per day, over 4 days. This would allow approximately **150,000 cubic meters of material** to be deposited in each year of the demonstration. If a contract dredge is used in year 2, there would be potentially greater amounts of material. This is in addition to the 150,000 cubic meters of material that would be used for the test berm in year 1.

Evaluation Criteria and Methodologies

1. ***Wave and Current impacts.*** This evaluation criteria is important for two reasons: First, it is essential for safety and navigational considerations to understand wave impacts of the long-term program to replenish the near-shore sands. The Corps estimates the goal over a ten-year period to be adding 4-8 feet of sand to the near-shore environment.

Models currently exist to estimate the wave impacts of this build-up. However, the models need to be corroborated through field study. This will require building some sort of smaller berm that will mimic the shape of the eventual build up of the sands, to see what the impact will be on wave action (wave height, etc.).

It is also important to determine current impacts, and measure both how much sand stays in place, and determine where the sand will migrate. In part, we want to ensure that the sand is staying in the near-shore environment, and that it is not simply moving back into the shipping channel. This can be done by doing bathymetry surveys and also potentially by dyeing some sediments used in the demonstration.

We will also be measuring the impact of a berm on wave energy dispersal, to determine effectiveness in protecting the South Jetty from further wave damage.

Note: To ensure the monitoring results are useful it is *imperative* that a good baseline of information is established. This will mean that multibeam bathymetry will need to be done in the test area in summer of 2004, prior to any dispersal of sediments.

2. ***Ocean-Bottom impacts.*** There are two types of ocean-bottom evaluation criteria that will be looked, that have potential impact to aquatic life: burial (i.e. how high the material actually accumulates on the bottom for each pass) and surge (the outward, horizontal force of material once it hits the bottom).

These criteria will be measured using sediment profile imaging, multi-beam bathymetry, and an embedded accelerometer. The Corps estimates that the maximum vertical accumulation of each pass will be 2 inches, less than that for the pumping/spraying. However, it is important to test this, as there have been concerns expressed that anything above a 3-inch accumulation could impact Dungeness Crab. (see “Biological Impacts” discussion below)

3. ***Water Column Impacts.*** The broadcasting techniques will result in a larger footprint and thus less bottom accumulation. However, the trade-off will be greater water-column turbidity for a longer period. This could potentially have impacts on aquatic life, including salmonid species first entering the ocean, as

well as returning adult salmon. It should be noted that these extended periods (estimated to be approximately 30 minutes) were not addressed in the existing NEPA approvals for the Corps's ocean disposal.

Water column turbidity (intensity and time) will be measured through aerial photography.

4. **Biological Impacts.** There will need to be assessment of the impacts to both aquatic life and the benthic community. As has been noted by members of the group, the near-shore environment is naturally subjected to wave and current forces which are constantly creating turbidity, rapid accumulation - and loss - of sand. Any creatures living in this near-shore environment are adapted to these general conditions

However, if we are proposing a long-term program that could add an additional 4-8 feet of material, it is important that we monitor the biological effects of near-shore dispersal of sands, to ensure that any negative impacts will be minimal and enhance any positive impacts of re-establishing the near-shore sands.

This evaluation will have an added benefit: there is not currently a good baseline of biological information in the near-shore area. Any information gathered during the first two years of this Demonstration Project will be a significant addition to the scientific data base of this near-shore environment, and will be critical in guiding future efforts at replenishing the near-shore sands.

The major concern of the Oregon Department of Fish and Wildlife is for the commercial and recreational shellfish in the area (including razor clams). The concern is that the "rate of sediment accumulation is not greater than the ability of the shellfish to dig." One method to test this will be taking grab samples from the area both pre- and post- deposition.

Use of existing ODFW fish logs, coupled with interviews of commercial fishermen who fish the area can be used to measure any impact on the flatfish fishery.

To test for impacts to the benthic community will likely require grab samples taking during all four seasons.

It has been suggested that small trawls could be used to measure impacts to Dungeness Crab and salmonids.

U.S Fish and Wildlife Service has said that murrelets are not in the area during September, so there should be no impact on them. However Brown Pelicans are in the area, and there will need to be some monitoring to determine any impact on them.

Budget/cost concerns

The Corps of Engineers anticipates being able to utilize their existing budget for dispersal of material in the near-shore for the 2-year duration of the demonstration project. (Given the smaller amount of material)

However, the cost of pre-test monitoring to establish a good baseline, and the significant post-deposition monitoring required to produce meaningful information from the demonstration will be more costly than the Corps anticipates will be available in their current budget.