



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

29 DEC 2000

CECW-PM (10-1-7a)

SUBJECT: Duwamish/Green River Basin, King County, Washington

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on the study of environmental restoration for the Duwamish/Green River Basin, King County, Washington. It is accompanied by the report of the district and division engineers. These reports are in partial response to Section 209 of Public Law 87-874, Puget Sound and Adjacent Waters Study, and Section 309 of Public Law 101-640, Environmental Protection Mission.
2. Section 101(b)(26) of the Water Resources Development Act of 2000 authorized construction of the Duwamish/Green River Basin, King County, Washington, ecosystem restoration project at a total cost of \$112,860,000, substantially in accordance with the plans and subject to conditions recommended in a favorable report of the Chief of Engineers completed not later than 31 December 2000. This report constitutes the final report of the Chief of Engineers in response to this legislation.
3. Over the past 150 years, a series of significant actions have adversely affected the fish and wildlife habitat in the Green/Duwamish River Basin. For example, 97 percent of the estuary has been dredged or filled from channel construction and the flattening of Seattle; 70 percent of the watershed and flows have been diverted out of the basin; and about 90 percent of the floodplain is no longer connected to the river. To address these issues, King County requested a study to investigate ecosystem restoration options in the basin. The reporting officers recommend a plan that addresses the critical limiting factors to fish and wildlife resources production in the basin and promotes species recovery. This plan would provide a significant increase in habitat connectivity from the estuary to the upper watershed, restoring ecosystem functions and processes and promoting watershed integrity. This plan would enhance/restore over 1900 acres of habitat or migratory corridors of particular importance to fish and wildlife species. Specifically for the threatened and endangered salmon species, this plan would restore habitats for almost every life history stage of salmon as well as resident fish populations including rainbow and cutthroat trout. Additionally, threatened or endangered species which could also benefit from this plan include: gray wolf, bald eagle, marbled murrelet, northern spotted owl, and bull trout.

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4. The recommended plan is the national ecosystem restoration plan (NER), consisting of 45 project sites, to be implemented in 3 phases over a 10-year construction period. There are 45 individual project sites that range in size from fractions of an acre to hundreds of acres. Besides benefits associated at the individual project sites, there are benefits from "the synergy of the whole" that results when all of the project sites, acting as a unit, generate expanded basin-wide ecosystem restoration effects.

5. The 45 project sites consisting of a variety of restoration features to be implemented over a 10-year construction period include:

NE Auburn Creek	Riverton Creek	Meridian Valley Creek
Mainstem Greenriver LWD	Flaming Geyser Landslide	Mill Creek East
Volunteer Revegetation	Lones Levee Removal	Gilliam Creek
Sweeney Creek Culvert	Goedeke North Reach	Codiga Farms
Newaukum Creek	Horsehead Bend	Ray Creek
Turley Side Channel	Schuler Brothers Reach	Big Spring Creek
Hamakami Levee	Upper Springbrook Reach	Duwamish Site 1
Sunday Creek	Porter Levee Setback	Lake Meridian Outlet
Kaetch Side Channel	Wetland 5K Reach	Burns Creek
North East Creek Culvert	Riverside Estates Side Channel	Garrison Creek
Green River Park	Upper Green River Side Channels	Prentice Nursery Reach
Gale Creek Culvert	May Creek Culvert	Merlino Reach
Mullen Slough	Flaming Geyser Gorge	Elliott Bay Nearshore
Olson Creek	Side Channel	Black River Marsh
Lower Springbrook Reach	Brunner Slough	Mainstem Maintenance
Green River Gravel Replenishment		

6. The sites fall into the following categories: blockage removals, side channel construction and/or enhancement, levee modification, riparian revegetation, stream rehabilitation, large woody debris placement, side channel reconnection, tidal habitat construction, land slide rehabilitation, gravel replenishment, and system-wide plantings.

7. The project costs are all allocated to the environmental restoration project purpose. Based on October 2000 price levels, the total first cost of the project is approximately \$115,899,000, of which \$75,322,000 would be a Federal cost and \$40,577,000 would be a non-Federal cost. The criteria of environmental effectiveness and economic efficiency were used to evaluate 16 environmental restoration plan alternatives, including the no-action alternative. The ecosystem restoration benefits were analyzed using three habitat models: one that was developed as part of the feasibility study for aquatic habitat and two that were developed by the U.S. Army Corps of Engineers with input from a panel of regional experts.

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Cost effectiveness and incremental cost analysis techniques identified the plans that were the best investments for producing varying levels of aquatic and riparian habitats. Over a 50-year period of analysis, the recommended plan is estimated to create 1,903 acres of aquatic and riparian/floodplain habitat, providing additional 1,443 eco-units of project output.

8. A monitoring plan was developed to address project effectiveness. The total monitoring program could extend over a 10-year period. The cost shared monitoring would follow three separate approaches: (a) evaluation of the overall programmatic effectiveness, (b) evaluation of site specific effects, and (c) monitoring to determine the advisability of adaptive management actions as the project progresses (i.e., modifying project features based on their effectiveness in providing desired ecosystem restoration outputs and applying past experiences for future project sites). The initial site construction would be monitored up to 5 years. As project sites are added, the monitoring effort would be decreased and shortened. Based on the monitoring results, remaining elements (as well as operations) could be adapted for the purpose of more effective and efficient project performance. The total cost of the monitoring plan and adaptive management is estimated at \$8,240,000 at October 1999 price levels. Advancements in ecosystem restoration measures would occur as a result of preconstruction engineering and design, as well as lessons learned through monitoring.

9. Washington level review indicated that the plan recommended by the reporting officers is technically sound, environmentally justified, cost effective and socially acceptable. The plan conforms with essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other administration and legislative policies and guidelines. Also, the views of interested parties, including Federal, State and local agencies, have been considered.

10. I generally concur in the findings, conclusions, and recommendation of the reporting officers. Accordingly, I recommend implementation of the authorized project in accordance with the reporting officers' plan with such modifications as in the discretion of the Chief of Engineers may be necessary and advisable. I recommend that improvements for environmental restoration for the Duwamish/Green River Basin, King County, Washington, project be authorized subject to the cost sharing as required by Section 210 of the Water Resources Development Act of 1996. Cost sharing for environmental restoration under this act requires a non-Federal sponsor share of 35 percent and a Federal share of 65 percent of the project cost. Further, the non-Federal sponsor would be responsible for 100 percent of the cost of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the environmental restoration project. The annual operation and maintenance cost is currently estimated to be \$241,000. The total OMRR&R cost over a 50-year project life is estimated at \$12,050,000 for the completed project.

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11. Federal implementation of the authorized project would be subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, including the following requirements:

a. Provide 35 percent of the separable project costs allocated to environmental restoration as further specified below:

(1) Enter into an agreement which provides, prior to execution of a project cooperation agreement for the project, 25 percent of design costs;

(2) Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;

(3) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(4) Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(5) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of the separable project costs allocated to environmental restoration.

b. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

c. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land that the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

d. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

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e. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

f. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

g. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

h. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

i. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

j. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

k. Prevent obstructions of or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) which might reduce the ecosystem restoration, hinder its operation and maintenance, or interfere with its proper function, such as any new development on project lands or the addition of facilities which would degrade the benefits of the project.

l. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands,

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easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

m. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled, "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

n. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement.

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.



ROBERT B. FLOWERS
Lieutenant General, U.S. Army
Chief of Engineers