POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

AIRPORT COMMUNITIES COALITION, Appellant, v. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY; and THE PORT OF SEATTLE, Respondents.	No. 01-133 DECLARATION OF AMANDA AZOUS IN SUPPORT OF ACC'S MOTION FOR STAY (Section 401 Certification No. 1996-4-02325 and CZMA concurrency statement, issued August 10, 2001, Related to Construction of a Third Runway and related projects at Seattle Tacoma International Airport)

Amanda Azous declares as follows:

1. I am over the age of 18, am competent to testify, and have personal knowledge of the facts stated herein.

2. I am an environmental scientist, principal of Azous Environmental Sciences and a professional wetland scientist (Society of Wetland Scientist No. 001067). I am co-editor and co-author of *Wetlands and Urbanization* (CRC/Lewis Press 2000), a 300-page text and reference book on how best to protect and manage wetlands in an urbanizing environment. This text grew out of research performed by the Puget Sound Wetlands and Stormwater Management Research Program Team, of which I was a part. The research program was funded by the Washington State Department of Ecology, U.S. Environmental Protection Agency, King County Department of Development and Environmental Services, King County Department of Natural Resources, King County Surface Water Management

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Division, and the University of Washington. I have a Masters degree in environmental engineering and science (1991) and a Bachelor of Arts in landscape architecture (1977), both from the University of Washington. I have worked as a scientific analyst for over 20 years and have specialized in natural resource science since 1991. Attached hereto as Exhibit A is my curriculum vitae.

3. Azous Environmental Sciences (AES) was asked, by the Airport Communities Coalition (ACC), to review the documentation provided by the Port of Seattle describing its proposed development at Sea-Tac airport for possible impacts to wetlands, streams and fisheries resources beginning in May 2000. The Port's Wetlands Delineation and Wetland Functional Assessment documents as well as the Natural Resources Mitigation Plans, the JARPA permit application and other documents related to activities affecting aquatic resources were evaluated in letters to the Department of Ecology and the U.S. Army Corps of Engineers dated August 16th and September 1st of 2000, and February 16th and July 6th 2001 (attached hereto as Exhibits B through E, respectively). In addition, I submitted detailed comments to Ecology and the Corps on the proposal to construct a temporary freeway interchange off of State Route 509 on May 24th and June 5th of 2000, and May 14th of 2001 (attached hereto as Exhibits F, G, and H, respectively). I have also reviewed the Port's July 2001 Low Flow Analysis/Flow Impact Offset Facility Proposal, Stormwater Management Plan as well as Ecology's recent CWA Section 401 certification decision dated August 10, 2001.

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4. I understand that the ACC has filed an appeal with the Pollution Control Hearing Board challenging the Section 401 Certification (No. 1996-4-02325) and the CZMA concurrency statement, issued August 10, 2001, to the Port of Seattle. ACC has requested a stay until the questions it has raised concerning compliance with the Clean Water Act have been resolved by the Pollution Control Hearings Board (PCHB). I am submitting this declaration in support of ACC's appeal and motion for stay because I am convinced that the Natural Resource Mitigation Plan (NRMP) and related measures proposed by the Port of Seattle are inadequate to compensate for the losses in wetlands and wetland functions, and that the Port's proposal will cause irreparable harm. Once the Port's proposed alterations of wetlands and stream systems occur, including filling of wetlands, it will be impossible to restore them to their former condition. If the Board rules in Petitioner's favor at the hearing on the merits, it will not be possible for the Port to unring the bell and restore the streams and wetland systems to their original condition. Grant of a stay will, therefore, prevent the Port from taking irrevocable steps which would significantly degrade the aquatic resources of the Miller, Walker and Des Moines Creek watersheds. In short, the issuance of a stay of the Section 401 Certification will prevent irreparable harm to these wetlands and streams and preserve the status quo while the merits of ACC's appeal are considered by the Board.

5. It is universally accepted that wetlands are among the most productive ecosystems on the planet. The boundary zones (ecotones) between land and inland wetlands and streams are the principal routes for the transport of water, organic matter and

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nutrients within a watershed.[1] An emergent wetland typically will produce three or more times the organic carbon (the basis of the food web) than is produced by a similar area of upland shrub and forest land (1000 g C/m^3 versus 270).[2] The condition of plants growing in water or saturated soil provides a steady supply of water and nutrients that have the potential to support high productivity. The typically anoxic soil makes a suitable environment for nitrogen-fixing bacteria associated with the plant roots. As a result of these processes, wetland communities have a profound influence on the food web, water flow conditions and habitat available in a watershed.

6. The Port plans to fill 18.37 acres of wetlands in the Miller, Walker and Des Moines Creek watersheds, permanently impact an additional 2.05 acres of wetlands along Miller Creek and alter the location of a portion of Miller Creek to accommodate the Third Runway. To mitigate wetland functions lost within the affected watersheds, the Port offers in-basin wetland mitigation that is dominated by enhancement of upland buffers. Sixty-seven acres (62% of the in-basin mitigation) will be enhanced upland buffer area. Just under nineteen acres (28%) of the Port's proposed in-basin mitigation acres will be enhancement of existing wetlands. An incomplete restoration is proposed for 6.6 acres of prior converted cropland (comprising 10% of the in-basin mitigation acres). **No**

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[1] Hillbricht-Ilkowska, Phosphorus and Nitrogen Retention in Ecotones of Lowland Temperate Lakes and Rivers, HYDROBIOLOGIA, 1993, Vol. 251, No. 1-3.

[2] Barnes and Mann, Fundamentals of Aquatic Ecosystems. Tables 4.1 and 11.1.

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compensatory in-basin wetlands creation is proposed. Table 1 shows the distribution of mitigation activities in-basin, out-of-basin and in total.

Table 1. Distribution of mitigation activities proposed for Third Runway impacts to wetland functions.[3] This table does not include the 2.05 acres of permanently impacted wetlands newly acknowledged in the 401 conditions.

	Mitigation Activity (acres)			
Location	Wetland Creation	Wetland Restoration	Wetland Enhancement	Upland Buffer Enhancement
In-Basin	0	6.6	18.61	67.01
Out-of-Basin	29.98	0	19.5	15.9
Total Mitigation	29.98	6.6	38.11	82.91

7. All wetland creation, the only mitigation activity that will directly provide all wetland functions, (29.98 acres and 22% of the of the total proposed mitigation acres in-basin and out-of basin), will be out-of-basin. With the exception of the partial restoration of an in-basin wetland proposed by the Port, all wetland functions mitigated will be located in an area near Auburn, adjacent to the Green River, well outside the watersheds sustaining the loss.

8. Therefore, it is critical that no impacts occur to the wetlands of Miller, Walker and Des Moines creeks until the Board has had the chance to review the 401 decision. It is critical because the mitigation plan proposed by the Port is fundamentally flawed, does not

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[3] *Natural Resource Mitigation Plan (NRMP)*; Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc. page 4-10. (Note that Table 4.1-3 in the Dec NRMP summarizing wetland mitigation activities contains an error. It reports the total mitigation area as 134.39 acres but the actual numbers add up to 132.39 acres.)

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meet the State's water quality standards and thwarts the state mandate to protect aquatic resources. Ecology's regulatory responsibility under WAC 173-201A-070 requires that "existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." The 401 decision fails to comply with this antidegradation policy, which is what underlies the basis of Ecology's process for wetland mitigation sequencing and for assessing the adequacy of a compensatory wetland mitigation location and design.

9. There are currently approximately 37.42 acres of wetlands that are hydrologically connected to Miller Creek remaining in Miller Creek Watershed.[4] Of that set, 26.02 acres of wetlands are located in the upper Miller Creek watershed. Of those remaining, hydrologically connected wetlands, 7.05 acres will be eliminated by the Port's proposal, which is 21 percent of the wetlands remaining in the entire watershed and 27 percent remaining in the upper watershed. Eliminating such a high percentage of remaining wetlands within a fragile but viable watershed will impair, not protect, water quality, aquatic ecosystem diversity, productivity and stability resulting in significant harm, among them changes in water chemistry, reduced food web support, and alterations to invertebrate communities. The 401 Certification does not require mitigation of wetland functions within-basin. It ignores the need for reasonable assurance prior to approval that

[4] This number was derived from the Port's data identifying wetlands that are immediately adjacent or hydrologically connected to Miller Creek and from the wetland inventories provided by the Cities of Des Moines, Burien and Normandy Park. It does not include ponds or lakes.

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the management of stormwater runoff in the embankment wall and re-plumbed watersheds will afford protection to seasonal water levels in remaining wetlands and creeks. The 401 Certification permits unreasonable risks to water quality and watershed resources. Therefore no filling of wetlands should be allowed while the merits of ACC's appeal are reviewed by the Board.

If filling of wetlands is allowed now, the wetlands will be permanently altered resulting in significant degradation of these urban watersheds. Filling wetlands will result in the clearing of habitat, compaction and disturbance of the native hydric soils, elimination of chemical functions afforded by the mixing of soil and water and the destruction of hydrologic functions so critical to maintaining baseflows in the creeks. Restoring these functions after fill activities have occurred is unlikely to be successful.

10. A recent study by the National Academy of Science (NAS) found that the time for reaching equivalency for soil, plant and animal components in wetland restoration projects ranged from more than three to 30 years for soils, 10 years or more for below ground biomass and more than five to 10 years for establishing a target species composition with the *higher time frames representing wetlands with greater damage.*[5] Re-establishing pre-disturbance conditions by removing stockpiled fill material, once it is deposited, will not restore wetland functions within a reasonable time frame. The wetlands which the Port proposes to fill, and to utilize for temporary roads, erosion control, staging and stockpiling

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will be heavily damaged by these activities which severely compact and disturb soil, interrupt drainage patterns and eliminate habitat functions. According to the NAS study, these high disturbance activities will significantly reduce the success of any restoration effort. In addition, restoration will requires many years to reach equivalency resulting in a significant temporal loss of wetland functions within the watershed -- effectively a permanent loss.

11. The Port has also failed to monitor and establish pre-disturbance water levels in the wetlands that will be affected by the Third Runway construction, making it impossible to effectively recreate predisturbance hydrology, the primary determinant of wetland functions. Water levels were recorded only once in 2000 and three times in 2001, and then only in some but not all of the wetlands to be filled. Monitoring was too sparsely sampled to be representative of conditions or seasonal changes making it unusable to define pre-construction hydrology. Sampling occurred almost exclusively during a low rainfall year and is therefore not representative of normal conditions.

12. The Port should not benefit from this failure to establish accurate pre-construction conditions for wetland hydrology, which would inhibit the ability to repair injury if a stay were not granted and the 401 decision later overturned. Even before the 401 was issued, the Port had eliminated some groundwater flows and cleared vegetation in apparent anticipation of approval. It has also stockpiled huge quantities of imported fill

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[5] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating

around and near numerous wetlands, altering their hydrology and microclimate. The Port's delay in establishing essential data while it altered the pre-construction landscape makes it impossible to rely on the sparse data belatedly gathered as accurately representing pre-construction wetland hydrologic conditions.

13. In effect, the Port's failure to establish a baseline for the wetlands it plans to eliminate would make it doubly impossible to return to the status quo if a stay were not granted, but the Section 401 Certification were later overturned. The degree of disturbance that comes with filling wetlands and the paucity and inadequacy of pre-disturbance hydrologic data render a successful restoration virtually unattainable once fill activities have begun. If the Port is allowed to pursue fill operations in wetlands there will be immediate and irreparable harm to these wetlands.

14. Turning to the merits of the 401 decision issued by DOE, it is clear that the Port's mitigation proposal will fail to compensate for wetland functional losses in the Miller, Walker and Des Moines Creek watersheds because impacts to wetlands are underestimated both in area and in the value of wetland functions provided. The Port has proposed a mitigation package that is unresponsive to the impacts that will occur.

15. I first reported discrepancies in the Port's wetland impact area accounting practices in a comment letter sent to Ecology dated over one year ago, August 16, 2000, followed by comment letters stressing the same concern in September 2000, and February

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Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy. P. 36 Table 2.2.

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and July of 2001. For example, I found irregularities in the Port's determinations of the area comprising temporary versus permanent impacts. According to the Port, "temporary" impacts from the project include the construction and use of temporary access roads, temporary sediment and erosion control ponds, staging areas and stockpiling areas in wetlands.[6] These are all activities that severely compact and disturb soil, interrupt drainage patterns and adversely impact habitat functions. Furthermore construction activities in these wetlands are planned to occur over several years and clearly cannot be appropriately categorized as temporary.

16. I also disagreed with the Port's assumption that filling only part of a wetland will leave the remnant portions intact with all original functions, just located in a smaller area. For example, the Port, in its March 19th, 2001 response to the Corps' question about this issue, argued that "reductions in wetland size will result in little or no impact to wetland functions" and claimed that small remnants, such as the 0.04 acres remaining of Wetland R1, the 0.03 acres remaining of Wetland A12, should not be included in tallies of permanent impacts. The Port argued that such wetlands will continue to provide one for one area replacement of all functions found in the original wetland.[7]

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[6] Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02, p. 63.

[7] *Response to 2000 Public Notice Comments [Draft] Azous Environmental Sciences, March 19, 2001.* Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 5 Item 15.

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17. The Port and Ecology failed to address this issue for over a year until the 401 decision was actually issued in August 2001. That decision acknowledged for the first time that these "temporary" losses in wetland area would be permanent, but then, incredibly, deferred the mitigation plan for these losses to a future negotiation. The need for additional wetland mitigation was raised well before the 401 was issued and should have been addressed in the mitigation requirements prior to approving the 401. These unreported and unmitigated wetlands losses add to the already multiple sources of risk to the watershed resources of Miller and Walker Creeks

18. The Port's mitigation package is far removed from Ecology's longstanding guidelines for appropriate mitigation activities and ratios.[8, 9] The majority of the Port's proposed mitigation is out of kind and out of watershed. It is unrelated to the functions eliminated or the needs of the watersheds affected. This approach cannot be scientifically supported as protecting beneficial uses within the watershed nor does it even replace them in-kind within the Water Resource Inventory Area (WRIA). No wetlands creation is proposed in the affected watersheds, only enhanced planting of buffers and some wetland areas.

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[8] *How Ecology Regulates Wetlands*, Washington State Department of Ecology, Publication 97-112 (Revised April 1998). See discussion on Compensatory mitigation regarding adequacy of mitigation methods.

[9] *Wetland Mitigation Ratios: Defining Equivalency*, Shorelands and Coastal Zone Management Program, Washington State Department of Ecology Publication Number 92-8, February 1992. See discussions on recommended mitigation ratios.

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19. A review of the mitigation activities proposed by the Port shows that with the exception of the 6.6 acre prior converted wetland "restoration" (called Vacca Farm) located in the Miller Creek watershed the remaining 60.4 acres of in-watershed mitigation is enhancement; 41.8 acres of enhanced buffer and 18.61 acres of enhanced wetland. The failure of enhancement activities to compensate for loss of actual wetlands is well documented in the scientific literature[10, 11] yet the Port is arguing and DOE has accepted enhancement of an upland buffer and remaining wetlands as an equivalent functional exchange for permanently eliminating the functions provided by 20.42 acres of existing wetlands. Here, the riparian and slope wetlands targeted for elimination by the Port have far superior water quality and water storage functions in comparison to the upland buffer the Port would restore as compensation.[12, 13] Moreover enhancement of the Miller Creek riparian buffer and remaining wetlands could actually reduce those areas' effectiveness for water quality and storage functions because of disturbance to the soil.[14] Such an exchange of functions is not based on sound science and does not represent true mitigation.

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[10] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy.

[11] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000. DOE found only 14% of enhancement projects met performance standards for the mitigation.

[12] Dunne and Black 1970. *Partial area contributions to storm runoff production in permeable soils.* Water Resources Research 6:1296-1311.

[13] Dunne and Leopold 1978. Water in Environmental Planning. San Francisco, W. H. Freeman.

[14] Shaffer, P. W and T. L Ernst. 1999. Distribution of soil organic matter in freshwater emergent/open water wetlands in the Portland, Oregon Metropolitan Area. Wetlands 19:505-516.

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20. The Society of Wetland Scientists (SWS) published a paper defining the meaning of wetland restoration in August 2000. The Society's objective was to remove the current ambiguity in the use of the word, which has lead to a broad range of inappropriate projects proposed under the restoration umbrella. Wetland restoration is defined by professional wetland scientists as "actions taken in a converted or degraded natural wetland that result in the establishment of ecological process, functions and biotic/abiotic linkages and lead to a persistent resilient system integrated within its landscape". The objective of a restoration should be a persistent resilient system integrated with the surrounding landscape that results in the reinstatement of driving ecological processes (these include hydrology, biological processes such as decomposition and predation and biochemical processes like nutrient cycling.

21. In contrast to this scientific position, the in-basin wetland restoration planned for Vacca Farm purposefully lacks habitat for biological processes due to aircraft safety concerns. Further, the "restoration" will remove much of the peat soils (that, along with water, provide biochemical processes) in order to create flood storage, although, typically peat soils are valued and conserved in a wetland restoration-- not eliminated. The resulting wetland "restoration" will lack adequate hydrology to fully restore its functions, because Vacca Farm is designed such that the majority of the wetland will receive water only during extreme storm events such as a 100-year flood, effectively reducing the wetland's value for biological support. The grading plan shows the wetland will be excavated so that any water is quickly discharged via an approximately 200 foot wide shallow swale to Miller

Creek. The "restored" wetland will not convey water sufficient to maintain wetland functions.

22. The Port's functional assessment of the wetlands it plans to fill identifies important wetland functions provided under current conditions (see Figure 1 on next page). The highest-ranking wetland functions being eliminated from the watershed in the greatest proportion are wetland acres that provide nutrient sediment trapping (76%), groundwater discharge/recharge (71%), habitat for small mammals (70%), and passerine bird habitat (68% of the wetland acres). Fifty percent are highly valued for export of organic material, forty-eight percent are ranked moderate-to-high for providing amphibian habitat, and forty-three percent of the wetland acres being eliminated are ranked moderate-to-high for anadromous fish habitat.

23. Significantly, *92 percent* of the eliminated wetlands are low-to-moderate for waterfowl habitat, and *80 percent* are low-to-moderate for flood storage. These are proportionally the *lowest*-ranking functions among all the wetlands being eliminated, yet waterfowl habitat and flood storage are the primary wetland functions targeted for replacement in the Port's Natural Resource Management Plan (NRMP).[15] This grossly misplaced emphasis serves to create the impression of mitigation where no effective mitigation in fact exists. The mitigation proposal appears to be tailored to the needs of the project rather than the requirements of the Clean Water Act.

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[15] NRMP Table 1.3-1 and pages 1-1 and 1-2.

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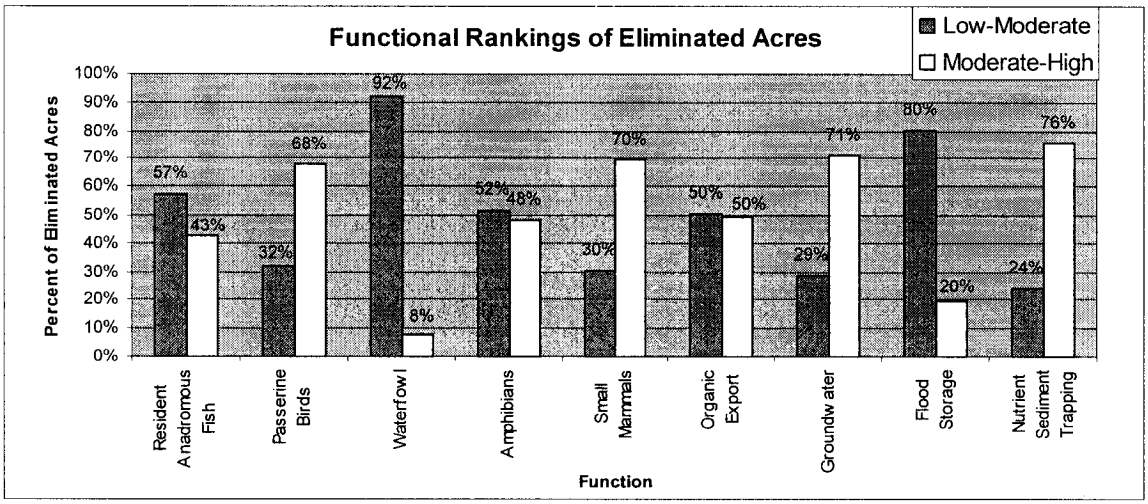

Figure 1. Functional rankings of wetlands eliminated.

24. The Port has repeatedly stated in its documentation that the wetlands affected by the Third Runway project are largely of low quality and severely degraded. Figure 2 shows the Department of Ecology's ratings of wetlands, reported by the Port, in the Miller and Des Moines Creek watersheds. Starting at the left of each chart in Figure 2, the first bar shows the proportion of wetlands being eliminated for each of the three pertinent DOE ratings. The second bar shows the percent of wetland acres in the Port's entire project area that have that rating and are being eliminated. For example, the Miller Creek Basin chart in Figure 2 shows that 58 percent of the wetlands eliminated by the Third Runway project in the Miller Creek watershed are rated Class II. It also shows that fully 45 percent of all the Class II wetlands identified within the Miller Creek watershed project area will be

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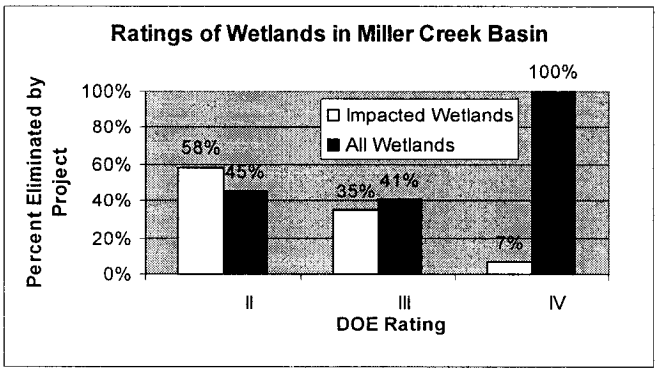
eliminated.[16] The bar charts in Figure 2 illustrate that the majority of wetland acres being eliminated for the Third Runway project in the Miller Creek watershed are more highly rated Class II wetlands, rather than lower quality Class III and IV wetlands. This evidence directly contradicts the repeated statements made in the Port's NRMP and Wetland Functional Assessment that the wetlands to be eliminated are degraded to the extent that they provide few valuable functions.[17]



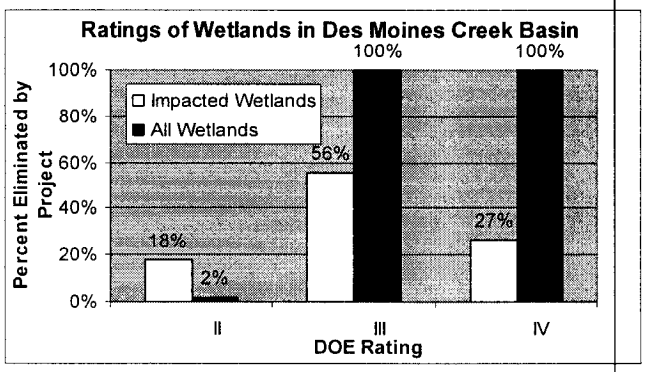


Figure 2. Department of Ecology (DOE) ratings for wetland acres eliminated.[18]

25. The Port's own data (shown in Figures 1 and 2) clearly show the importance of the wetlands within the Miller and Des Moines Creek watersheds for improving water quality, particularly their role in reducing nitrogen export, for habitat, for their role in

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[16] Ideally the second bar would show the percent of wetlands being eliminated *in the watershed* by DOE rating but that data was not available.

[17] NRMP Section 2 and Wetland Functional Assessment Section 4.

[18] NRMP Table 2-1.1 is source of data for charts.

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moderating seasonal water levels, and for production of organic carbon. Reducing remaining wetlands within these watersheds will alter stream hydrology in Miller, Walker and Des Moines creeks, permanently remove wetland habitat with no replacement, and will affect fish communities by altering the food web and increasing the supply of nitrogen to the estuary at the mouth of the creeks.[19]

26. This shift carries enormous consequences for both resident fisheries as well as for species that use the lower reaches of the affected creeks but may not be resident, such as Chinook. This is because detrital food sources are essential to the development of invertebrate communities on which salmonid fish species feed. Reductions in the area of the slope and riparian wetland systems located adjacent to the creeks are certain to affect productive capacity and therefore fish production.[20] The 401 Certification offers no effective mitigation for the loss of these wetland functions.

27. Fundamentally the 401 decision accepts a Port proposal to replace apples with lemons. There is no documented scientific basis for how the Port's proposal for buffer enhancement, wetland enhancement and a partial wetland restoration will compensate wetland functional losses within the affected watersheds.

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[19] Nitrogen is a limiting nutrient for phytoplankton production in coastal waters, the reduction of wetlands within the watershed could result in increased eutrophication in the shoreline environment.

[20] *Dissolved Organic Material and Trophic Dynamics, R. S. Wotton, BioScience, Vol. 38, No. 3.*

[21] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy, p 108.

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28. As noted earlier, the National Academy of Sciences (NAS) recently issued a comprehensive study evaluating the efficacy of wetland mitigation practices under the Clean Water Act. The study reaffirmed that the functions of a wetland proposed for fill need to be precisely characterized and quantified, as should the functions of the proposed compensatory mitigation.[21] The NAS study also concluded that mitigation is often focused on too few functions, leaving out functions that are critical to the watershed, such as hydrologic connectivity and hydrogeomorphic characteristics. Since hydrology is the important determinant of wetland functions, best available wetland science requires that restoration and mitigation in Miller and Des Moines Creek watersheds result in mitigation that re-establishes the wetland functions in a hydrogeomorphic context to improve the likelihood of actually mitigating the lost wetland functions.[22] Finally the NAS study identified that a watershed perspective is essential to understanding the cumulative effect of permitted decisions and that if functional tradeoffs in equivalency are permitted as part of a mitigation plan those tradeoffs must be quantified and understood to ensure the watersheds affected remain functioning at the highest level attainable.[23] There is no evaluation or quantification of the proposed wetland functional exchanges, such as recommended in the NAS study, in the Port documentation.

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[22] Shaffer, P. W., M. E. Kentula and S. E. Gwin. *Characterization of Wetland Hydrology Using Hydrogeomorphic Classification.* Wetlands, Vol. 19, No. 3, Sept. 99, pp. 490-504.

[23] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy, Page 127-128.

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29. The importance of quantifying functional exchanges cannot be emphasized enough because as permitted wetland alterations change the number, types and positions of wetlands on the landscape, maintaining the diversity of hydrologic regimes becomes more difficult and increasingly critical to preserving the diversity of functions provided by wetlands.[24, 25, 26, 27] The 401 Certification accepts a plan which does not provide assurance of actual mitigation for the loss of critical wetland functions, and is instead based on a Port proposal for largely ineffectual enhancement activities.[28] The tables and accompanying discussion in the Port's NRMP claim that individual listed activities will mitigate for other listed losses, but the Port does not demonstrate through quantitative analysis or scientific references that the activities proposed will, in fact, mitigate for the wetland functions eliminated.

30. The NAS study also confirms that an evaluation of whether the mitigation adequately offsets the impacts cannot be completed without an analysis of the cumulative losses of wetland functions within the watersheds. These cumulative losses include

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[24] Kentula, M. E., R. E. Brooks, S. E. Gwinn, C. C. Holland, A. D. Sherman, and J. C. Sifneos. 1992. An approach to Decision Making in Wetland Creation and Restoration. Island Press, Washington DC, USA.

[25] Holland, C. C., J. E. Honea, S. E. Gwinn and M. E. Kentula. 1995. *Wetland Degradation and Loss in a Rapidly Urbanizing Area of Portland Oregon.* Wetlands 15:336-345.

[26] Bedford, B. L. 1996. *The need to define hydrologic equivalence at the landscape scale for freshwater wetland mitigation.* Ecological Applications 6:57-68.

[27] Gwin, S. E., M. E. Kentula and P. W. Shaffer, 1999. *Evaluating the effects of wetland regulation through hydrogeomorphic classification and landscape profiles.* Wetlands 19:477-489.

[28] Shaffer, P. W and T. L Ernst. 1999. *Distribution of soil organic matter in freshwater emergent/open water wetlands in the Portland, Oregon Metropolitan Area.* Wetlands 19:505-516.

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impacts to regional and local recharge, hydrologic and habitat functions of remaining wetlands and uplands, degradation due to planned and unplanned disturbances resulting from construction and airport operations, and whether the regional scope of alterations occurring to wetland resources affects the future sustainability of the fisheries resources of Walker, Miller and Des Moines Creeks. To date there has been no cumulative impact assessment completed by the Port. Significantly, correspondence from both the U. S. Army Corps of Engineers and EPA have pointed out the need for such an analysis.

31. Evaluation of the cumulative loss of wetlands is also important because the Port relies on what it claims are high levels of dissolved organic carbon (DOC) found in both Des Moines and Miller Creeks as limiting the biological availability of zinc and copper found in the Port's storm water runoff, effectively reducing the toxicity of Port stormwater to fish.[30] DOC derives from the breakdown of detrital material by bacteria and fungi. The comparatively high levels of DOC found in Des Moines Creek and particularly the levels found in Miller Creek are a result, in significant part, of the contribution of organic material from existing wetlands. It is noteworthy that, although Ecology's 401 acceptance of the Port's conclusion of no adverse effects to fish and other aquatic organisms from discharges of zinc and copper relies on the presence of high concentrations of dissolved carbon, there is no discussion of the *source* of that carbon or the fate of that source after the Port's project

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[29] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 11 Responses 34-38.

[30] *Pacific Coast Salmon Essential Fish Habitat Assessment, P.4-8.*

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is built. In fact, the DOC concentrations on which the Port depends to reduce partially the toxicity of zinc and copper in its stormwater discharges originate in the wetland systems they propose to degrade and eliminate.

32. The 401 also appears to rely on the Port's claim that replanting Vacca Farm, identified as a former wetland, will increase the potential for carbon export (DOC) functions from the area, providing mitigation for the loss of the role existing wetlands play. [31, 32] However, this overlooks that the Port's proposal is to excavate and regrade the soils at Vacca Farm. Although subsequent planting of trees and shrubs might eventually improve organic carbon export, nutrient cycling and sediment trapping at Vacca Farm, it is unlikely to occur any time in the near future as the most productive soils will be excavated and graded. As a result, the production of organic carbon will likely be significantly diminished for many years.[33]

33. The issue of organic carbon is also important in evaluating the functional role Miller and Walker Creek wetlands play in providing food web support to the creeks.[34] Part 230.31(a) and (b) of the federal Section 404(b)(1) Guidelines are instructive here. They

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[31] Response to Corps Request for Information – Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02. Table 30, p. 70.

[32] *Response to 2000 Public Notice Comments [Draft] Azous Environmental Sciences, March 19, 2001.* Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 11 Items 34-38.

[33] Day, F. P. Jr. and J. P. Meginigal 1993. *The relationship between variable hydroperiod, production allocation, and belowgroundorganic turnover in forested wetlands.* Wetlands 13:115-121.

[34] This issue was previously discussed in February 16, 2001 comments by Azous Environmental Sciences to USACE and DOE.

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refer to potential impacts that alter or eliminate populations in lower trophic levels, such as detrital (accumulated organic debris) feeders, and thereby impair the energy flow of primary consumers (such as herbivores) to higher trophic levels (such as predatory salmon). The guidelines go on to point out that the reduction and possible elimination of food chain organism populations can decrease the overall productivity and nutrient export capability of an aquatic system. What this means is that, in addition to the threat of lead and zinc directly affecting stream chemistry, the metals that are expected to bind to organic carbon (DOC) instead of fish gills are still likely to end up in the food chain when filter and detrital feeders consume the organic carbon, resulting in significant adverse consequences to the entire aquatic community.[35] Understanding that organic carbon is both the basis of the food web in Miller and Des Moines Creeks *and* the Port's argument for justifying its project's increasing of zinc and copper loadings in the creeks, it is reasonable assurance to require a more rigorous analysis of the Port's claim that water quality standards will be met and the food web will not be affected. What has been offered to date by the Port and in the 401 decision offers no basis for concluding that water quality standards will be met.

34. The Port's proposal and Ecology's 401 Certification depart from best available scientific knowledge of how to evaluate and effectively mitigate for wetland functional losses inherent in the Port's proposal. Ecology's 401 decision permits a project that ignores

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[35] See discussion on Aquatic Invertebrate Response to Zinc Exposure in Fundamentals of Urban Runoff Management. Horner, R. R., J. J. Skupien, E. H. Livingston and H. E. Shaver. Terrence Institute and USEPA. August 1994. Pp. 51-52. Study indicated intermittent episodes of low loadings (0 to 30 μg/L) of zinc resulted in significant reductions in live Amphipods.

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basic science-based principles of wetland protection and wetland loss mitigation. If that decision is implemented before the Board can review its merits, irreparable harm to the watersheds will occur.

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 11 day of September, 2001, at Seattle, Washington.

Amanda Azous

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EXHIBIT A

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AMANDA L. AZOUS

Amanda L. Azous is an environmental scientist, consultant and sole proprietor of AZOUS ENVIRONMENTAL SCIENCES, a private consulting firm, established in Seattle, Washington 1990 and located on Orcas Island, Washington since 1993. She is co-editor and primary author of the book Wetlands and Urbanization, published in 2000 by CRC/Lewis Press. Ms. Azous has a Bachelor of Landscape Architecture and a M.S. in Environmental Engineering and Science, both from the University of Washington, Seattle. She is also a registered professional wetland scientist (PWS Certification No. 001067).

Amanda Azous has worked on a broad range of projects including development of environmental policy, writing environmental protection regulations and developing performance standards for wetland restoration and mitigation projects. Her recent experience includes wetland design, enhancement and restoration, watershed analysis, environmental impact assessment, water quality studies, GIS analysis of landscapes, land use surveys and environmental impact evaluations. Her firm specializes in land management plans for forestry, conservation and stewardship as well as evaluations of environmental factors as a basis for community planning.

Ms. Azous is a recognized authority on wetlands and management of ecosystem processes. She is an author and co-author of journal articles and numerous technical reports addressing community planning, urban stormwater impacts and management of plant and amphibian communities in urbanizing watersheds.

Ms. Azous is a member of the Society of Wetland Scientists, Washington Native Plant Society, Society of Ecological Restoration, the San Juan County Land Bank Commission, San Juan County Noxious Weed Board and a member of the Advisory Council to the San Juan Nature Institute.

AZOUS
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RECENT PUBLICATIONS

Azous, A. L. and R. R. Horner (co-editors). 2000. *Wetlands and Urbanization: Implications for the Future.* CRC/Lewis Press.

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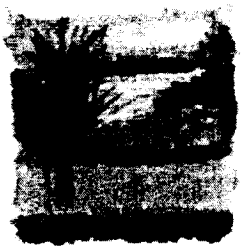
Azous, A. L. and K. O. Richter. 1995. *Amphibian and Plant Community Responses to Changing Hydrology in Urban Wetlands.* Puget Sound Research '95. Puget Sound Water Quality Authority, Seattle, WA.

Cooke, S. S. and A. Azous. 1995. *Vegetation Species Responses to Changing Hydrology in Urban Wetlands* in Proceedings Third Puget Sound Research Meeting, Puget Sound Water Quality Authority, Olympia, WA.

EXHIBIT B



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RE: Review of Wetlands Mitigation Plan for Construction of SeaTac Third Runway

Dear Mr. Luster, Mr. Stockdale, Ms. Terzi, Mr. Freedman, Ms. Breenan-Dubbs, Ms. Kirkpatrick, Mr. Landino and Ms. Daneker,

At the request of the Airport Communities Coalition (ACC) I have reviewed the wetland mitigation plan proposed by the Port of Seattle to compensate for impacts to wetlands resulting from the construction of the third runway at Seattle Tacoma International Airport. As you may know, I am an environmental scientist and a professional wetland scientist (SWS certification number 001067). A package describing my background and experience is attached to this report. This letter presents my comments and in particular explains my

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conclusion that the proposed mitigation is wholly inadequate to compensate for the expected losses in wetland functions stemming from the construction of the third SeaTac runway.

The following conclusions are detailed in this report:

- The mitigation proposed is not sufficient to reduce the total adverse impacts of the project to an acceptable level within the Walker Creek, Des Moines Creek and Miller Creek watersheds.
- The functions provided by the proposed out of basin mitigation are not comparable to the losses that are expected to occur and do not compensate for the appropriate losses in wetland functions occurring within the Water Resource Inventory Area (WRIA).
- The proposed mitigation at the Auburn site is subject to multiple risks and is unlikely to be sustainable.

The following documents were reviewed in preparation for this report:

- Assessment of Spawning and Habitat in three Puget Sound Streams, Washington (BioAnalysts, Inc., April 1999);
- Wetland Functional Assessment and Impact Analysis Draft, Parametrix, Inc., July 1999;
- Wetland Functional Assessment and Impact Analysis, Revised Draft, Parametrix, Inc., August 1999;
- Wetland Delineation Report, Revised Draft, Parametrix, Inc., August 1999;
- Wetlands Re-Evaluation Document, Draft, Port of Seattle, August 1999;
- Natural Resources Mitigation Plan, Draft, Parametrix, Inc., July 1999;
- Natural Resources Mitigation Plan, Revised Draft, Parametrix, Inc., August 1999;
- Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date.
- Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000.
- Supplemental Airport Site Wetland and Stream Analysis Parametrix, Inc., November 1999.
- Addendum to the Final Supplemental Environmental Impact Statement, Auburn Wetland Mitigation Project, Port of Seattle, May 5, 2000
- Biological Assessment, Revised Draft, Parametrix, November 1999;
- Biological Assessment, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000.
- SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000.

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Mitigation Strategy: Dead is Dead

Overall, the mitigation strategy mirrors a controversial environmental philosophy proffered by Dr. Brian Marr from the University of Washington Department of Environmental Engineering and Science, called "Dead is Dead"[1]. This philosophy states that since certain natural resources have been degraded by human activities over time (in this case by urbanization and the construction of the existing airport), it makes sense to sacrifice those degraded systems to create other sites that are (theoretically) better protected. This philosophy seems to underlie comments made to me by different Department of Ecology staff, who have on separate occasions, stated that the wetlands and creek stretches that will be filled and impacted within the Miller and Des Moines Creek watersheds are highly degraded, and therefore do not constitute a significant loss. This argument can be persuasive, however it is in conflict with the reviewing agencies duty under the law. For example, Ecology's regulatory responsibility under Chapter 173-201A-070 WAC, requires that "existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." Permitting further degradation in one watershed in exchange for mitigation in another watershed cannot be scientifically supported as protecting beneficial uses within the watershed nor within the WRIA.

This antidegradation policy is what underlies the basis of Ecology's process for wetland mitigation sequencing and for assessing the adequacy of a compensatory wetland mitigation location and design. (This policy has equally stringent parallels in the other federal agencies involved here.) Ecology may not permit any alteration of a wetland that impairs the functions of the wetland as they relate to any of the defined beneficial uses unless functionally equivalent mitigation is provided. Ecology is allowed to permit filling and alterations of wetlands and riparian areas, only if the net result of the action does not result in long-term harm to the environment.

Discussion of Planning Area Issues: Relationship of WRIA to Watershed Functions

Best professional wetland science stipulates that wetland mitigation occur within the affected drainage basin to adequately compensate for losses. This core mitigation principal is reflected in Ecology's Publication 97-112 (Revised April 1998) *How Ecology Regulates Wetlands*, which says that "it is difficult to replace hydrologic and fish habitat functions in a different drainage basin and *impossible* to replace them in a different watershed" (italics added).

The proposed areas for wetland impacts and the proposed mitigation site for wetland losses are located in the same water resource inventory area (WRIA). WRIA9 covers the entire Green and Duwamish River Basin and also includes eight coastal watersheds that are tributary to Puget Sound. The Green and Duwamish River Basin is a large inland river system, characterized by open landscapes, with large floodplains, forested and scrub-shrub wetlands and a wide historically meandering channel. Although in the same WRIA, the coastal watersheds are a significant contrast to the Green Duwamish River system, having

[1] Mar, B. W., Dead is Dead, Urban Ecology Vol. 5, pp, 103-112, 1980/1981.

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very different hydrogeologic structures, habitat and food and nutrient webs. These watersheds are characterized by complexes of headwater wetlands and hillslope seeps which form tributaries to larger streams that ultimately discharge to Puget Sound, providing sources of nutrients and freshwater to coastal estuarine habitats. Upland wetlands are important sources of nutrients and hydrology to lower stream reaches. Wetlands in these coastal watersheds tend to be forested or scrub-shrub hillslope wetlands and depressional flow-through wetlands in flatter areas and are typically associated with springs, creeks or streams.

The proposed wetland creation mitigation site within WRIA9 is located adjacent to the Green River. The ecosystem function of this proposed wetland creation is entirely different from the coastal wetland and riparian systems that are being impacted. The proposed mitigation is to create black cottonwood and willow, Oregon ash and Western red cedar plant associations typical of a floodplain wetland.[2] This is incorrectly equated with providing mitigation for habitat losses that are of an entirely different vegetative and hydrologic character. Even if the Auburn mitigation project were to be sustainable (an outcome that is not at all certain), it will not replace the hydrologic functions being eliminated within WRIA9. Neither will it function on behalf of the community of species that are being permanently impacted in WRIA9, wetland and riparian coastal communities. It cannot be emphasized enough that wetland losses will occur in three coastal freshwater salmonid supporting streams, a public resource that is becoming increasingly rare both within and outside of WRIA9.

Ecosystem processes operate over ranges of spatial and temporal scales. Although society may define the boundaries of management jurisdictions without reference to such processes, the scientific importance of context in determining the behavior of ecosystems at a particular location is, nevertheless, well documented.[3,4,5] Impact assessment and mitigation evaluation *must* consider context to be scientifically relevant.

As an example, San Juan County, which is comprised of several islands, is all in WRIA2. Using this project as a precedent, mitigation would be allowed on Orcas Island for wetland filling that was permitted on San Juan Island simply because they are both located in WRIA2. It is not possible to justify such a policy if protecting against degradation of public beneficial uses is the goal. Whether DOE relies on state statute for a narrower view, the reviewing federal agencies are clearly obligated to do more, and must have a clear and scientifically defensible position on this matter.

If a decision is made to allow mitigation to occur outside the watershed, there must be a clear link between the value, type and extent of wetland functions being eliminated and the beneficial uses obtained from the mitigation. This link is not adequately discussed and demonstrated in the available documentation. This constitutes a serious deficiency and relegates evaluation of the mitigation to an accounting of acreage without regard to ecosystem functions. The lack of identification and discussion of the cumulative functional

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[2] Addendum to the Final Supplemental Environmental Impact Statement, Auburn Wetland Mitigation Project, Port of Seattle, May 5, 2000, p. 12.

[3] Noss, R.F. 1991. Sustainability and wilderness. Conservation Biology 5:120-122.

[4] Noss, R.F. and L.D. Harris 1986. Nodes, networks, and MUMs: preserving diversity at all scales. Environmental Management 10:299-309.

[5] Sherman, K., L.M. Alexander, and B.D. Gold (eds.). 1990. Large marine ecosystems: patterns, processes, and yields. AAAS Symposium Series.

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losses related to the entire third runway project trivializes the role of state and federal agencies, which is to prevent degradation of wetland functions as well as acreage.

An evaluation of whether the mitigation adequately offsets the impacts cannot be completed without an analysis of the cumulative losses of wetland functions within the watersheds. These cumulative losses include impacts to regional and local recharge, hydrologic and habitat functions of remaining wetlands and uplands, degradation due to planned and unplanned disturbances resulting from construction and airport operations, and whether the regional scope of alterations occurring to wetland resources affecting the future sustainability of the fisheries resources of Walker, Miller and Des Moines Creeks.

The unique watersheds that are within WRIA9 are distinct and can be characterized. Beneficial uses within these watersheds can be clearly articulated. Therefore, protecting the public interest demands that the functions lost in the Miller Creek and Des Moines Creek watersheds be viewed in context of their ecosystem function within WRIA9. Protection of beneficial uses from further degradation would require in-kind compensation in context of the spatial loss. This would require that mitigation replace similar functions in the same or a similar watershed that is characterized by a coastal freshwater creek system capable of supporting salmonids.

Inadequate Link Between the Impacts to Wetland Functions and the Functions Gained From the Proposed Mitigation

The proposed mitigation plan involves both in-watershed and out of watershed activities involving wetland enhancement, restoration and creation. However, the proposal fails to provide adequate mitigation for wetland functions that will be lost or seriously impaired within WRIA9. There are also deficiencies in the analysis of wetland acreage that will be permanently impacted by the third runway construction

The problem stems from the limited scope of the wetlands assessment methodology. Although the third runway will affect numerous wetlands and several creek systems, wetland impacts were evaluated discretely and not as a system. Wetland functional assessment models are typically used with individual wetlands and are often not adequate for assessing the landscape role of a system of wetlands within a watershed. This case is a particularly good example of how beneficial uses can be lost when wetland functions are evaluated individually instead of cumulatively on a landscape scale. Regardless of the argument that many of the wetlands proposed for filling are degraded systems and, in isolation, have low value, viewed together, in context of the watershed and as a system, the affected wetlands clearly provide functions that are greater than the sum of their individual roles.

The goals of the proposed mitigation projects, detailed in Table 4.1-2 of the Natural Resource Mitigation Plan, are dominated by activities that replace losses in riparian habitat, enhance riparian buffers and replace flood storage.[6] This is a very narrow scope of functions to be mitigated and does not provide equal value for the significant losses to the watershed ecosystem that will occur as a result of the third runway construction. Significant wetland losses will affect riparian ecosystem functioning in the Miller, Walker and Des Moines Creek watersheds and include:

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[6] Summarized from Table 4.1-2 in the Natural Resources Mitigation Plan, Parametrix, Inc., Revised Draft, August 1999.

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- Permanently altered hydrology through losses of wetlands associated with Miller, Walker and Des Moines creeks that currently provide baseflow support to three creek systems. These creek systems are documented to support both native and hatchery salmonid species including Coho and cutthroat trout.[7,8,9,10]
- Loss of wetland and riparian ecosystems which currently provide resistance to and resilience from disturbances particularly hydrologic changes resulting from weather, climate change or future water resource allocations.
- Loss of wetland and riparian habitat complexity and species diversity, which also imparts resistance to disturbance, by providing source populations to recolonize disturbed areas and a genetic pool necessary to adapt to long term change.

These losses will permanently affect the occurrence, functioning and quality of freshwater coastal stream resources within WRIA9. Moreover these losses will seriously impact the sustainability of biological diversity including wetland and salmonid resources in the Miller Creek and Des Moines Creek watersheds.

Unaccounted for Wetland Functional Losses in Miller Creek and Des Moines Creek Watersheds

Hydrologic Functions: The wetland delineation report prepared by Parametrix accurately describes much of the hydrology of the wetlands located in the Miller creek watershed. Specific mention is made of hillside seeps as the source of water for wetlands 18, 19, 20 and 37.[11] The report acknowledges that wetlands 18 and 37 are hydrologically connected and contiguous although they received separate number designations. For reasons that are not explained, the areas are evaluated and tallied as separate wetland systems. Wetland 18/37 is an associated wetland to Miller Creek that captures water from hillslope seeps originating in the Vashon Recessional Outwash (Qvr) aquifer.[12] This wetland system provides an important function in the watershed by buffering Miller creek from hydrologic and temperature extremes through groundwater baseflow support.

Walker Creek basin is included in the watershed of Miller Creek. Walker Creek discharges to the main stem of Miller creek within approximately one mile of the outlet to Puget Sound. Each of the project documents I reviewed did not accurately describe or illustrate that the headwater of Walker Creek is located east of Wetland 44b on the east side of 12th Avenue S.[13] Walker Creek emerges from a hillslope seep that flows west to Wetland 44, crosses SR509 through a culvert and continues west through Wetland 43.

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[7] SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000, p. 3-4.

[8] Hillman, T.W., Stevenson, J.R., and D. J. Snyder. 1999. Assessment of Spawning and Habitat in Three Puget Sound Streams, Washington. Prepared for the Airport Communities Coalition, Des Moines, Washington by Bioanalysts, Inc., Redmond, Washington.

[9] Natural Resources Mitigation Plan, Parametrix, Inc., Revised Draft, August 1999.

[10] Note that all naturally spawned populations of Coho salmon and cutthroat trout are considered members of the Puget Sound Strait of Georgia Evolutionary Significant Unit and are candidate species under the Endangered Species Act.

[11] Wetland Delineation Report, Revised Draft, Parametrix, Inc., August 1999.

[12] SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000.

[13] Please review list provided on Page 2 of this report.

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Both the headwater seep that begins Walker Creek and portions of associated Wetland 44 will be filled and impacted by construction activities. Clearly, filling the headwaters of Walker Creek, will change its hydrology in the upland reaches of the basin. Once again, although the subject is discussed in the SeaTac Runway Fill Hydrologic Studies Report and in the Geotechnical Engineering Report found in Appendix B of the Wetland Functional Assessment and Impact Analysis, neither document provides a comprehensive documented analysis of the hydrologic impacts of filling the headwaters of Walker Creek on the creek's seasonal hydrology, even though the creek is documented to support salmonid production and fish inhabit Wetland 43.[14] Ignoring impacts to the upland tributary is again consistent with the "Dead is Dead" philosophy but inconsistent with the obligation of the reviewing agencies.

The plans to enhance the buffer along Miller Creek may benefit already disturbed portions of the creek buffer, but do not adequately mitigate for the loss of important hydrologic functions provided by the seeps and wetlands that currently buffer Miller Creek and Walker Creeks. The Vaca Farm floodplain and wetland restoration provide stormwater storage but, again, do not provide a functional equivalent to the losses that effect the resiliency of the creek system. Relying on the Vaca Farm restoration and buffer enhancements to Miller Creek for mitigation will result in further degradation of the Miller and Walker Creek systems.

In the Des Moines Creek watershed the hydrologic issues related to wetlands and riparian areas are different from those in Miller Creek. The impact of the borrow sites on the hydrology of remaining wetlands and Des Moines Creek is not adequately addressed. The SeaTac Runway Fill Hydrologic Studies Report states that the borrow areas will not affect the shallow aquifer, said to feed nearby wetlands. This conclusion is not supported by an independent analysis by Pacific Groundwater Group but is assumed by them from discussions in the original Geotechnical Engineering Report located in Appendix B of the Wetland Functional Assessment and Impact Analysis.

The proximity of Borrow Site 4 to Wetland 28 in the Des Moines Creek Watershed is cause for concern as is the proximity of some of the other wetlands to borrow sites, such as wetlands B15 and 48. Wetland 28 is the headwaters of the western tributary to Walker Creek. Appendix C Borrow Areas 1, 3 and 4 of the Wetland Functional Assessment and Impact Analysis does not identify Wetland 28 as being adjacent to Borrow Area 4 and does not discuss how the wetland may be impacted by excavation activities.[15]

Enough information to assess the impacts of the borrow sites is simply not provided. Appendix C provides conceptual excavation plans that show excavation contours. The maps show excavations occurring immediately adjacent to and within wetlands, yet only the area of wetland located within the borrow area is included in the impact assessment tabulation. No details are supplied within the supporting documents that can account for concluding there would be no direct impacts to adjacent wetlands.

The reduction of summer baseflows predicted for Des Moines Creek and the plan to augment summer flows as needed raises another significant issue related to hydrologic

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[14] June 27, 2000. Memo from John A. Strand, Ph.D to Peter Eglick. Columbia Biological Assessments, 1314 Cedar Avenue, Richland, WA 99352, See Attachment A to the report.

[15] Appendix C Borrow Areas 1, 3 and 4, Wetland Functional Assessment and Impact Analysis, Revised Draft, Parametrix, Inc., August 1999.

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functions. Suggested sources for this augmentation have included a well with a contested water right or a municipal water supply involving chlorine and other chemical treatment. Municipal water sources are not necessarily viable, permanent water sources for the creek as future growth occurs and water resources become more scarce and costly. Des Moines creek is known to be inhabited by wild and fishery stock Coho salmon and cutthroat trout. Therefore a clear understanding of how the hydrology of Des Moines Creek will be protected is vital. That clarity cannot be gained from the current documentation for the project.

Habitat Functions: The existing system of hillslope seeps and wetlands feeding Walker and Miller Creeks has a dendritic habitat structure. The original complexity has been degraded by past property development practices but what remains is a system of wetland habitats that are hydrologically connected to each other and to the hillslope to the east.

The best illustration of the existing habitat complexity existing along Miller Creek can be found on Project Plan C-2 of Appendices A-E Design Drawings Natural Resource Mitigation Plan.[16] The plan shows at least four drainages that originate on the hillslope east of 12th Avenue S, that feed associated wetlands and Miller Creek. Although some wetlands are fragmented (isolated) in the landscape, most are connected hydrologically or through adjacent uplands.

The proposed mitigation states it will improve habitat functions in exchange for filling the upland wetlands and seeps that produce the existing topographic and habitat complexity. On the surface, the proposed stream enhancements appear to be improvements, however, long-term sustainability of an ecosystem must be viewed within its landscape context.[17] At project completion the habitat remaining in the Miller Creek watershed will be a far more contained system, in large part channeled by a uniform wall, producing a simpler, more limited habitat system, lacking in complexity and therefore less resilient to losses in biodiversity due to disturbance events such as drought, toxic spills or sustained heavy rainfall. This view is confirmed by the independent review by Pacific Groundwater Group, which states that "To prevent a significant decline in local [species] populations, mitigation would be required to provide alternative habitat on-site."[18]

Maintaining biological diversity is central to the productivity and sustainability of wetland ecosystems. Specific examples of the critical role of biodiversity in ecosystem functioning include providing for:

- essential processes such as nutrient and water cycling,
- ecosystem resistance to and recovery from disturbances, and
- adaptability to long-term changes in environmental conditions[19].

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[16] Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date.

[17] Note: Landscape is used to mean the ecosystem character and functions of the land in a particular watershed or region.

[18] SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000, p. 8.

[19] The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management, US Forest Service, U.S.D.A., May 1996.

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The importance of ecosystem complexity and the vast array of interconnections that underlie ecosystem function is one of the most important lessons of ten decades of ecological research and natural resource management experience.[20] Complexity and diversity also impart resistance to and resilience from disturbance, and provide the genetic resources necessary to adapt to long-term change. Protecting wetland beneficial uses also includes protecting the complexity of species interactions that underlie ecosystem functioning and the role that diversity plays in maintaining processes across complex environmental gradients through space and time.

Biological diversity provides for both stability (resistance) to and recovery (resilience) from disturbances that disrupt important ecosystem processes. Resistance in wetlands results in large part from complex linkages among organisms, such as riparian areas that provide alternate pathways for flows of energy and nutrients. The presence of numerous organisms with similar capabilities in a complex habitat structure produces redundancy that is beneficial for ecosystem stability. On a watershed scale species populations are less variable because of the connections among habitats and the ability of species to migrate and reestablish after disturbances occur in a main stem or associated tributary.

Just as the presence of numerous hillside seeps and hillslope wetlands buffers against the loss of hydrologic function in Miller and Walker Creeks, these same seeps, wetlands and adjacent upland habitats buffer against isolation and extirpations of small mammals and amphibians. These are system level wetland function that makes it more likely that important processes (such as baseflow support to the creeks and nutrient uptake by the plant communities) will be optimized in the face of seasonal variations and periodic disturbances

Long-term adaptations of wetlands to changes in climate and other environmental variables are strongly dependent upon available biological diversity. The reservoir of genetic diversity within individual species and populations is central to their ability to adapt to environmental change.[21] Greater numbers of species and greater genetic variability within species provides for a larger number of biological building blocks for ecosystem response and species evolution. Maintaining habitat complexity provides the capacity to adapt and that is central to the long-term sustainability of beneficial uses.

Unaccounted for Wetland Acres Lost in Miller Creek Watersheds

The tabulation of wetland acres impacted by the third runway project, listed in Table 3.1-1 of the Natural Resource Mitigation Plan, is based on the assumption that if you fill only part of a wetland, the remaining portion of wetland retains its original functions and values, just located in a smaller area. For example, the table shows that 4.08 acres of the 5.74 acres comprising Wetland 37 will be filled and 2.6 acres of 3.56 acres belonging to Wetland 18 will be filled. Less than 29% of each wetland remains yet the wetland loss is accounted for as though the beneficial uses provided by the original wetlands were equal to what remains with only the spatial area having changed.

This mitigation strategy assumption that the remaining wetland area will function as it did previous to the fill, is unlikely to be true due to altered hydrology, reduced resource of

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[20] Peterson, C.H., 1993. Improvement of environmental impact analysis by application of principles derived from manipulative ecology: lessons from coastal marine case histories. Australian Journal of Ecology 18:2152.
[21] Antonovics, J., 1968. Evolution in closely adjacent plant populations. Heredity 23:219-238.

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wetland habitat and because local species and populations will change depending on what remains. The functional value of the remaining wetland would likely decrease resulting in a greater cumulative loss of wetlands than what is represented in the accounting of acreage alone.

In actuality, at least 35% of the wetlands will be removed from the area adjacent to the middle stem of Miller Creek. This is a significant permanent loss to the watersheds. The lack of discussion identifying the landscape (system level) role of these wetlands exemplifies how viewing natural systems as discrete elements unconnected to their landscape context can lead to significant losses of beneficial uses in our remaining wetland landscapes.

The mitigation impact analysis is also flawed because, for reasons that are not very well explained, wetlands along the western shore of Miller Creek are not identified. All of the wetlands associated with the affected reaches of Miller Creek are hydrologically connected and should be analyzed from a systems perspective as part of the wetland functional assessment. The assumption that impacts will stop 50 feet from the base of the retaining wall or fill base is not believable given the scale of wetland filling and the hydrologic connectivity of the wetlands and creek systems being altered. The omission of the western wetlands associated with Miller Creek is, unfortunately, also misleading as the mitigation plan (Figure 5.2-1) shows buffer enhancement area all along the western shore of Miller Creek when some of that area is also wetland. It appears that existing wetlands are being counted as buffer enhancement area.

The Natural Resource Mitigation Plan suggests that only 2.17 acres of wetlands will be temporarily disturbed due to construction activities.[22] However that number is probably much higher because the level of function in remaining wetlands cannot be maintained at the existing condition. Long-term secondary effects to remaining wetlands will include compaction of soils, reduced adjacent habitat, disturbance to remaining habitat and losses of localized species affecting both biological and genetic diversity. All of these impacts should have been acknowledged and addressed. These omissions indicate that the mitigation ratio claimed by the mitigation proposal is inaccurate and inadequate to offset losses in beneficial uses.

Additional Hydrologic Concerns

The Sea-Tac Runway Fill Hydrologic Studies Report summarizes investigations conducted to assess the hydrologic effects of constructing a fill embankment for the proposed third runway. The report states that it did not consider all Master Plan Improvements proposed by the Port of Seattle, did not address all hydrologic issues required for permitting nor did it consider all the possible effects related to the embankment and borrow areas.[23] Although the report claims that there will be no significant impacts to remaining wetlands and the Walker and Miller Creek systems, it also concedes that "a confident assessment of basin-wide recharge and baseflow impacts is currently lacking".[24] This is a critical point. To date there has been no other reported evaluation of basin-wide recharge and baseflow impacts. The importance of understanding and mitigating the full

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[22] Natural Resources Mitigation Plan, Revised Draft, Parametrix, Inc., August 1999, p. 3-3.
[23] SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000, p. 1.
[24] Ibid, p. 6

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extent of impacts to recharge in Miller, Walker and Des Moines Creek basins cannot be emphasized enough. As discussed previously, these are increasingly rare functional coastal creek systems that support cutthroat trout and other salmonid species.

The review report predicts an uncontrolled release of stormwater at some time during construction. Although the authors declined to predict the size and quantify the effects on fish, they noted that uncontrolled releases of turbid water would likely result in a decline of cutthroat and Coho salmon. The report goes on to conclude that the proposed mitigation for fisheries effects is limited in that "it will only effect localized Miller Creek habitat and resident cutthroat trout. Indirect construction and post-construction effects such as alterations to baseflow, peak flow, and sediment input could affect the entire stream systems, not just the airport project area."[25] This statement identifies and confirms the lack of attention to watershed ecosystem level impacts and identifies the inherent failure of the mitigation strategy to prevent degradation of beneficial uses.

Wetlands, Airports and the Siting of Incompatible Uses

The off-site habitat mitigation located in Auburn is designed to provide in-kind replacement of avian habitat and other wildlife habitat off site so as to comply with FAA Advisory Circular 150/5200-33.[26] This circular contains guidelines that suggest limiting the development of avian habitat within 10,000 feet of existing facilities to minimize the hazard of potential air strike by birds. RCW 36.70A.510 requires that jurisdictions discourage the siting of incompatible land uses near airport zones. These guidelines are referred to repeatedly in the reporting as a basis for reducing habitat values in the Miller Creek watershed as if these values did not already exist and would be new. The guidelines are said to require a mitigation strategy (out of kind and out of watershed) that is less than effective for protection of beneficial uses. It is important to note that both the FAA guidelines and the RCW address *existing* conditions. Neither is intended to apply to new airport facilities that will eliminate existing wetlands and beneficial uses. They are intended to discourage unsafe developments adjacent to existing airports. It is misleading to use the guidelines or the RCW as a basis for allowing out-of-watershed mitigation in lieu of preventing further degradation of the existing Miller and Des Moines Creek watershed resources.

Moreover, if the Port's interpretation of the regulations were correct, then the Port's own proposal for an expanded third lagoon system will have waterfowl-attractant issues, as will the proposed expansion to the Miller Creek Regional Detention Facility. The proposed third lagoon expansion will be used to store (and possibly pre-treat) liquid industrial wastes and would therefore fall under the FAA definition of a wastewater treatment facility. Section 2 of the FAA Advisory Circular, "Land Uses that are Incompatible with Safe Airport Operations" recommends that any new wastewater treatment facilities or associated settling ponds be sited no closer than 10,000 feet from turbine aircraft movement areas. The existing third lagoon is located within 2,000 feet of the runway, and the proposed expansion area is within 3,000 feet of the runway, therefore the proposed lagoon expansion would not comply with the FAA recommendations on hazardous wildlife attractants.

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[25] Ibid, p. 6-7

[26] Natural Resources Mitigation Plan, Revised Draft, Parametrix, Inc., August 1999, p. 7-1.

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Finally, Section 2-4(2)(b)(2) of AC 150/5200-33 of the FAA circular specifically states that exceptions to locating mitigation activities outside the separation criteria may be considered if the affected wetlands provide unique ecological functions, such as critical habitat for a threatened or endangered species or ground water recharge. With the recent listings of salmon, there may be additional requirements for mitigating degradation of salmonid habitat.

Auburn Mitigation Proposal

The wetland mitigation site in Auburn is located adjacent to an older channel of the Green River that has become a wetland over time as the river has altered its channel. Because the river has historically altered its channel in the mitigation area there is significant likelihood that it will do so again. The site is subject to tremendous river forces and located in an area that could be retaken by the Green River. Creating additional wetland areas may compromise the stability of the old channel. The Addendum to the Final Supplemental Environmental Impact Statement for the Auburn site briefly describes the hydrologic regimes that are proposed and a plan to use adjustable weirs to control water levels for optimum plant establishment.[27] The lack of detailed plans for implementing hydrology is a serious deficiency, particularly when adequate hydrology is one of the wetland functions that is least often successfully mitigated.[28] In light of these conditions, the absence of detailed information in the documentation provided to the agencies describing exactly the functioning of hydrology in the Auburn wetland is a significant void and leaves little basis on which to evaluate the mitigation plan's success. In addition the wetland design suggests the possibility that fish strandings could occur.

The proposed mitigation site along the Green River is also subject to impacts from activities in numerous up-river watersheds that pose risks of increased flooding, water quality degradation to downstream stretches, and catastrophic events such as toxic spills and impacts from continued urbanization. Numerous stretches of the Green River and its tributaries are on DOE's 303d list of impaired water bodies, including a listing for temperature exceedences in the area of the oxbow bends just northwest of the mitigation site. Temperature issues are a significant concern as highly valued Chinook spawning areas are located in the vicinity. Yet, the wetland design may well produce elevated water temperatures, especially until the forest canopy matures, that are not beneficial to Chinook who may use the area.

Finally, the presence of reed canary grass on the mitigation site is a significant management concern. The proposed strategy is to remove a foot of soil from the site and replace it with organic material mixed into the subsoil. This is unlikely to remove reed canary grass from the site. In addition, there are numerous avenues (water, wind, equipment, and boots) for new colonizations to occur as reed canary grass is well established along the Green River. This plant species is known for its invasive character and has

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[27] Addendum to the Final Supplemental Environmental Impact Statement, Auburn Wetland Mitigation Project, Port of Seattle, May 5, 2000, p. 4.

[28] Wetland Mitigation Evaluation Study Phase 1, Department of Ecology Publication No. 00-06-016, June 2000, p. 16.

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seriously affected the successful establishment of some of the targeted plant habitats in another nearby large wetland constructed as mitigation for a sports facility.[29,30]

In summary, the Auburn mitigation cannot provide a reasonable assurance that the project will supply adequate mitigation for lost beneficial uses, not only because it fails to provide the functional equivalent for what is being replaced, but also because it is at high risk for disturbances (which the Port of Seattle will have no control over) that will likely degrade the habitat values of the mitigation. This will result in an overall loss of beneficial uses from the third runway project.

Consistency Between Wetland Mitigation and Delineation Plans and Construction Drawings

It has been reported to me that Wetland 28 is shown as paved over on the construction drawings for the SASA area.[31] I have not had the opportunity to review the construction drawings to date so cannot verify whether this report is true. However, based on my recent experience reviewing the Port of Seattle's plans for the temporary SR509 interchange, it is very important that the reviewing agencies carefully crosscheck all construction drawings for consistency with the wetlands delineations and mitigation plan. In the case of the temporary interchange, a review of the Port's construction plans showed that a planned stormwater facility was located in an existing wetland and also revealed that the location of the temporary interchange was incorrectly shown on the topography, and had been shifted 40 feet or more, so it appeared further from existing wetlands than it actually was.

Summary

Although the June 2000 Implementation Addendum to the Natural Resource Mitigation Plan states that "the Port's mitigation plan will result in increased functional performance of the wetlands and creeks in the mitigation site relative to degraded wetlands" it offers no clear presentation of why that would be true and the available data suggests otherwise.[32] In reality, there is a functional and spatial reduction of wetlands that supply nutrients, baseflow, food web support and habitat to the stream systems with no mitigation for those direct functions. In reality, Walker, Des Moines and Miller Creeks are going to endure repeated disturbances from truck and fill operations, construction impacts, stormwater discharges, settling dust and unforeseen events that will continue to reduce the resiliency of the remaining wetlands and streams.

Uncertainties regarding the distribution and functional importance of many species and ecosystem elements, as well as our limited understanding of the complex relationships of organisms to wetland structure and functions, argue for a highly conservative approach to protecting the functions of wetlands. This is particularly important given the lack of success of related to wetland mitigation. DOE's own study of wetland mitigations found that only

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[29] Wetland Mitigation Evaluation Study Phase 1, Department of Ecology Publication No. 00-06-016, June 2000, p. 47.
[30] Pers. Comment, Erik Stockdale.
[31] E-mail, Kimberly Lockhard, Airport Communities Coalition, August 11, 2000.
[32] Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000.

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35% of wetland mitigation sites were meeting all performance standards. [33] It is also revealing that when individual functions were assessed in the DOE study, water regime was among the least often obtained successfully in mitigation.[34] The third runway project will degrade without effective mitigation two watersheds with salmonid streams known to be inhabited by species that are candidate for listing and where no degradation of hydrologic functioning can be acceptable.

Thank-you for your time spent in reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Attachment A: June 27, 2000. Memo from John A. Strand, PhD to Peter Eglick. Columbia Biological Assessments, 1314 Cedar Avenue, Richland, WA 99352.

Attachment B: Vita for Amanda Azous

Cc:
Airport Communities Coalition (ACC)
Dr. John Strand, Columbia Biological Assessments
Mr. Bill Rozeboom, Northwest Hydraulic Consultants
Mr. Tom Sibley, NMFS
Ms. Joan Cabreza, EPA

[33] Wetland Mitigation Evaluation Study Phase 1, Department of Ecology Publication No. 00-06-016, June 2000, p. v.
[34] Ibid, p. 16.

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EXHIBIT C

AZOUS
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September 1, 2000

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RE: Analysis of Proposed Mitigation Ratios for Impacts Resulting from the Construction of SeaTac Third Runway

Dear Mr. Luster, Mr. Stockdale, Ms. Terzi, Mr. Freedman, Ms. Breenan-Dubbs, Ms. Childers, Mr. Landino and Mr. Daneker,

At the request of the Airport Communities Coalition (ACC) I have reviewed the wetland mitigation plan and resulting ratios proposed by the Port of Seattle to compensate for impacts to wetlands resulting from the construction of the third runway at Seattle Tacoma International Airport. As you probably already know, I am an environmental scientist and a professional wetland scientist (SWS certification number 001067). A package describing my background and experience is attached to this report. This report analyses the proposed mitigation in detail and compares the proposal to the acreages and functions that will be lost.

The following conclusions are detailed in this report:

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- There are numerous errors in the accounting of wetland acreage that will be lost due to fill activities. These errors include mathematical errors in tabulating impacted wetland acres and inconsistencies identifying affected wetlands between documents prepared by Parametrix for the Port of Seattle. The result is an incorrect accounting of the full extent of wetland losses.
- No methods were provided for how permanent impacts were differentiated from temporary impacts to wetlands. Therefore temporary impacts remain unsubstantiated, often defy common sense, and significantly underestimate the degradation of beneficial uses that will occur in the Miller, Walker and Des Moines Creek watersheds.
- The use of buffer enhancement as mitigation for losses of associated wetlands to Miller Creek and Walker creeks does not provide measurable benefit from current conditions to offset losses of hydrologically connected wetlands and will result in further degradation to watershed resources. The regulatory standard requires one-for-one functional replacement for impacted uses. Enhancing a stream buffer in exchange for eliminating associated wetlands is not an acceptable trade.
- There is no clear link identified in the mitigation plan reports between the functions to be provided by the proposed out-of-basin wetland mitigation at Auburn, and those functions that will be eliminated in Miller, Walker and Des Moines Creek watersheds for the third runway. Without this link to ecological context, the mitigation provided is out-of-basin and out-of-kind, which will result in a result net loss of wetland functions within the watersheds and Water Resource Inventory Area 9 (WRIA9).[1]
- Finally, the Port's proposal is inadequate to meet recommended mitigation ratios developed by the Department of Ecology (DOE) in order to meet the regulatory goal of no net loss of wetland functions.

The mitigation documents provided by the Port are repetitive, inconsistent, and lack data to support a mitigation strategy that is counter to existing DOE policies. Critically, the organization and presentation of the natural resource mitigation plan in combination with having multiple drafts to review renders it difficult to tabulate filled wetlands and analyze their functions for consistency with the policy of no net loss of wetland functions. The following report attempts to do this. First, mitigation ratios are analyzed with respect to impacts identified by the Port in context of DOE policy and best professional wetland science. Secondly, impacts are re-evaluated, using corrected data, to predict a more realistic outcome to the mitigation strategy. The purpose was to evaluate the adequacy of the numbers of acres of mitigation proposed for within and outside the affected watersheds.

The following documents were reviewed in preparation for this report:

- Wetland Functional Assessment and Impact Analysis Draft, Parametrix, Inc., July 1999,

[1] *How Ecology Regulates Wetlands*, Washington State Department of Ecology, Publication 97-112 (Revised April 1998). See discussion on Compensatory mitigation regarding adequacy of mitigation methods.

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- Wetland Functional Assessment and Impact Analysis, Revised Draft, Parametrix, Inc., August 1999,
- Wetland Delineation Report, Revised Draft, Parametrix, Inc., August 1999,
- Wetlands Re-Evaluation Document, Draft, Port of Seattle, August 1999,
- Natural Resources Mitigation Plan, Draft, Parametrix, Inc., July 1999,
- Natural Resources Mitigation Plan, Revised Draft, Parametrix, Inc., August 1999,
- Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date,
- Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000,
- Supplemental Airport Site Wetland and Stream Analysis Parametrix, Inc., November 1999,
- Addendum to the Final Supplemental Environmental Impact Statement, Auburn Wetland Mitigation Project, Port of Seattle, May 5, 2000,
- Biological Assessment, Revised Draft, Parametrix, November 1999,
- Biological Assessment, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000,
- SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000.

Mitigation Ratios: Purpose and Context

It is worth reviewing Department of Ecology (DOE) policy in light of the requirements for mitigation documented in the memorandum of agreement concerning mitigation under The Clean Water Act Section 404(b)(1) Guidelines.[2] The objective of mitigation for unavoidable impacts is to offset environmental losses. The agreement states that for wetlands, such mitigation will provide, at a minimum, one for one functional replacement with an adequate margin of safety to reflect the expected degree of success associated with the mitigation plan.

DOE, after extensive research into wetland mitigation, has developed guidelines defining the margin of safety needed to mitigate wetland losses to achieve no net loss. The guidelines are based on habitat category and are shown in Table 1. Recommended mitigation ratios are 3:1 for Class 2 or 3 forested wetlands (49% of the wetlands being filled are forested or have a forested component), 2:1 for Class 2 or 3 scrub-shrub and emergent wetlands (34% of wetlands to be filled) and 1.25:1 for the lowest value, Class 4 wetlands (17% of filled wetlands).[3,4]

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[2] Memorandum Of Agreement Between The Environmental Protection Agency And The Department Of The Army Concerning The Determination Of Mitigation Under The Clean Water Act Section 404(B)(1) Guidelines, February 6, 1990.

[3] Wetland Mitigation Ratios: Defining Equivalency, Shorelands and Coastal Zone Management Program, Washington State Department of Ecology Publication Number 92-8, February 1992.

[4] Wetland Mitigation Replacement Ratios: An Annotated Bibliography, Publication #92-09, February 1992.

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DOE's recent Phase 1 report evaluating wetland mitigation in Washington found that only 29% of sites were in full compliance with permit requirements and only 35% were meeting assessed standards. The mitigation ratios recommended by DOE are derived from experience that the ecological experiment of wetland mitigation has been largely unsuccessful in achieving no net loss. Few systems other than Class 4 wetlands are successfully replicated; therefore greater areas of mitigation are required to offset functional losses.[5, 6] In fact the executive summary of DOE publication *Wetland Mitigation Replacement Ratios: Defining Equivalency* states that investigators who authored the report found that "forested systems were not replicated at all. The creation of a wetland that was functionally equivalent to its counterpart has never been documented".

The memorandum of agreement for implementing Section 404 guidelines states that in the absence of more definitive information on the functions and values of specific wetland sites, a minimum of 1 to 1 acreage replacement may be used as a reasonable surrogate for no net loss of functions and values.[7] However, this ratio is expected to be greater where the functional values of the area being impacted are demonstrably higher than the replacement wetlands and when the likelihood of successful mitigation is low. Both conditions apply in this situation, where out-of-kind and out-of watershed mitigation is proposed for the majority of wetland impacts, and where the bulk of wetland mitigation is to be located in a high-risk location (on the Green River north of Auburn) subject to the disturbance activities of numerous watersheds.[8]

Given realistic concerns about the success of wetland mitigation documented by DOE, it is critical that proposed mitigation be commensurate with the functions lost and of sufficient acreage to insure no losses of beneficial uses occur.[9] DOE's guidelines for mitigation ratio requirements are based on best available wetland science and are designed to protect wetlands as public resources. Here they are being ignored without justification.

What Constitutes Equivalent Mitigation and Why

The Implementation Addendum to the Natural Resource Mitigation Plan uses mitigation ratios designed for use in wetland mitigation banks, which are lower than DOE's guidelines for individual projects.[10] Mitigation ratios in banks are expected to be lower because it is understood that a bank will be well sited, with adequate hydrology and an overseeing staff to insure project success. The mitigation proposed for construction of the third runway is not part of a bank, does not carry the same reduction in risk as a bank, and therefore should not be evaluated using mitigation bank ratios.

The objective of mitigation for unavoidable impacts is to offset environmental losses. The memorandum of agreement for implementing Section 404 states that for wetlands, such

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[5] Wetland Mitigation Evaluation Study Phase 1, Department of Ecology Publication No. 00-06-016, June 2000.
[6] Wetland Mitigation Replacement Ratios: An Annotated Bibliography, Publication #92-09, February 1992.
[7] Memorandum Of Agreement Between The Environmental Protection Agency And The Department Of The Army Concerning The Determination Of Mitigation Under The Clean Water Act Section 404(B)(1) Guidelines, February 6, 1990. Section 3.b.
[8] See discussions in previous memo to Mr. Tom Luster, DOE et al. addressing both these conditions including risk factors related to the Auburn site. August 16, 2000, Review of Wetlands Mitigation Plan for Construction of SeaTac Third Runway, Azous Environmental Sciences.
[9] Wetland Mitigation Evaluation Study Phase 1, Department of Ecology Publication No. 00-06-016, June 2000.
[10] Tables 3-1 and 3-2, Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000, p. 9.

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mitigation will provide, at a minimum, one for one *functional* replacement (emphasis added).[11] That means that all identifiable wetland functions such as groundwater exchange, nutrient sediment trapping, wildlife habitat and flood storage, must be mitigated, not just some of the functions. The use of the term functional replacement specifically requires that all functions of the filled wetland be replaced. This emphasis is intended to prevent large-scale alterations of complex wetland systems to simplified forms providing only one or two of the original functions.

Table 3-3 of the Wetland Functional Assessment and Impact Analysis ranks the wetlands to be filled according to their value for nine identifiable wetland functions.[12] Five relate to the wetlands habitat value for fish, passerine birds, waterfowl, amphibians and small mammals. The remaining functions include exporting of organic carbon, groundwater exchange, flood storage and nutrient, sediment trapping. When the individual wetlands in Table 3-3 are tabulated with respect to their value, it turns out that they have the highest rankings for exporting organic carbon (81% ranked moderate to high), groundwater exchange (54%) and nutrient sediment trapping (54%), followed by small mammals and passerine bird habitat (42% each). Rankings for flood storage are among the lowest (only 15% of wetlands ranked moderate to high). These rankings provide evidence of what specific wetland functions are being eliminated and dictate the determination of what mitigation can be considered a functional replacement. They should be the criteria for determining no net loss.

Based on the Port's analysis of wetland functions, it is unacceptable for the Port's wetlands mitigation strategy to focus on providing low-ranking flood storage within the basin at the expense of the other high-ranking wetland system functions. Flood storage cannot be construed as providing functional replacement for wetland functions documented in the Parametrix functional assessment study, particularly as flood storage was among the lowest ranking attributes of the wetlands. Allowing in-basin wetland mitigation that mitigates for only one low-ranking function of the wetlands it is replacing will result in a loss of beneficial uses within WRIA9.

Accounting of Mitigation Ratio

Table 2, in this report, shows a summary of the permanent wetland impacts by wetland category that is taken from Table 3.1-1 of the Natural Resource Mitigation Plan.[13] The table shows the total acres of wetlands by class (DOE system), DOE's recommended mitigation ratio for that class, and the number of wetland acres required to meet DOE's guidelines. Tables 2 and 3 shows the Port's proposal for mitigation (in and out of basin) using the mitigation guidelines developed by DOE. The tables show that there is a less than 0.62:1 mitigation ratio within the basin and only a 0.69:1 ratio for the off-site mitigation including all claimed restoration and enhancement activities. The tables do not include the errors and omissions that have been found in the Port's documentation, do not include temporary impacts to wetlands and rely on the summary tables documented in the Parametrix reports for accuracy.[14] The tables also include credit for buffer enhancement for which there are no guidelines provided.

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[11] Memorandum Of Agreement Between The Environmental Protection Agency And The Department Of The Army Concerning The Determination Of Mitigation Under The Clean Water Act Section 404(B)(1) Guidelines, February 6, 1990. Section 3.B.

[12] Wetland Functional Assessment and Impact Analysis, Revised Draft, Parametrix, Inc., August 1999, p.3-5.

[13] Natural Resources Mitigation Plan, Parametrix, Inc., Revised Draft, August 1999, p.3-2 to 3-3.

[14] Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport, Parametrix Inc., June 2000, p. 9.

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Even ignoring these factors, the resulting mitigation proposed by the Port, including within and outside of the basin, amounts to only 23.93 credited acres, which is merely a 1.3:1 ratio. Mitigation ratios this low do not meet accepted standards, will result in degradation to beneficial uses within the Miller and Des Moines Creek watersheds and will produce a net loss of wetland functions within the WRIA.

Table 1. DOE Recommended Mitigation Ratios. [15]

	DOE Class and Habitat			
DOE Class and Habitat	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Class 4 all
DOE Recommended Mitigation Ratio	3:1	2:1	2:1	1.25:1
DOE Recommended Enhancement Ratio[16]	6:1	4:1	4:1	2.5:1

Table 2. Summary of Wetland Acre Impacts Claimed by Port and Required Mitigation Using DOE Guidelines.

	DOE Class and Habitat				
	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Class 4 all	Total Acres
Total Acres of Wetlands Eliminated	7.57	3.07	5.63	2.01	18.28
DOE Guideline for Wetland Creation/Restoration (Acres)	22.71	6.14	11.26	2.51	42.62
DOE Guideline for Wetland Enhancement (Acres)	45.42	12.28	22.52	5.03	60.90

Table 3. Summary of Port's Proposed In-Basin Mitigation and Mitigation Ratio.

	DOE Class and Habitat (Acres)					
Mitigation Activity	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Upland Buffer	Credited Acres	Cumulative Mitigation Ratio
Wetland Restoration		6.13			3.15	0.17:1
Wetland Enhancement		13.54			3.4	0.35:1
Buffer Enhancement				28.39	4.73	0.62:1[17]
Total					11.28	

[15] Wetland Mitigation Ratios: Defining Equivalency, Shorelands and Coastal Zone Management Program, Washington State Department of Ecology Publication Number 92-8, February 1992.

[16] Wetland Mitigation Ratios: Defining Equivalency, Shorelands and Coastal Zone Management Program, Washington State Department of Ecology Publication Number 92-8, February 1992.

[17] There are no recommendations given for the contribution of buffer enhancement and it is permitted on a case-by-case basis. A ratio of 6:1 is assumed for this discussion.

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Table 4. Summary of Proposed Out-of-Basin Mitigation and Mitigation Ratio.

	DOE Class and Habitat (Acres)					
Mitigation Activity	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Upland Buffer	Credited Acres	Cumulative Mitigation Ratio
Wetland Restoration	25.96	3.40	5.20		8.65	.47:1
Wetland Enhancement		6.00			1.5	0.56:1
Buffer Enhancement				15	2.5	0.69:1[18]
Total					12.65	

Corrections to Wetland Impacts Evaluation and Revised Mitigation Ratios

Wetland Impact Accounting Practices

There are numerous inconsistencies in the wetland acreage tables provided in the Parametrix reports that misconstrue the full extent of permanent impacts. One example is that portions of wetlands remaining after fill activities are considered fully functional. Although the Natural Resource Management Plan states "Where fill impacts to wetlands result in small fragments of remaining wetlands, the remaining area has been considered permanently impacted, and is tabulated in Table 3.1-1", that is not the case. There are numerous contradictions when the total wetland acres for individual wetlands shown in Table 1-1 of the Wetland Functional Assessment and Impact Analysis report is compared with the fill impact acres for each wetland presented in Table 3.1-1.[19, 20]

For example, Wetland 37a-f is identified as being 5.74 acres in size and having 4.08 acres filled, leaving 1.7 acres. Although 71% of the wetland is permanently filled, the remnant 29% is not included as an impacted wetland, although it certainly would have reduced ecosystem functioning from its original extent. Wetland 8 is described as 3.56 acres, of which 2.6 will be filled, leaving 27% of the original wetland (0.96 acres). Specific functional losses to these wetlands would include reduced habitat diversity and reduced species richness. The fill activities will permanently alter hydrology in the remaining wetland remnants, which would affect export of organic carbon and baseflow support functions. Other examples are wetlands 53, 11 and R1 with 0.05, 0.16 and 0.04 acres remaining respectively. Although very small and not likely to remain functional, these remnant wetlands are not included as permanently impacted wetland.

Another example is the siting of temporary ponds in the remnants of wetlands 18 and 37 as well as a portion of Wetland 44a. These wetland acres are counted as remaining functional wetlands, yet they are to be used as detention ponds for runway construction activities.[21] These

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[18] There are no recommendations given for the contribution of buffer enhancement and it is permitted on a case-by-case basis. A ratio of 6:1 is assumed for this discussion

[19] Natural Resources Mitigation Plan, Revised Draft, Parametrix, Inc., August 1999.

[20] Wetland Functional Assessment and Impact Analysis Draft, Parametrix, Inc., July 1999.

[21] Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date. p. STIA-XXXX-C4 and C-6.

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wetland areas are then also recorded as wetland restoration and included in the buffer enhancement calculation.[22]

Within the Des Moines Creek watershed wetland impacts are also underestimated. It is stated but not substantiated that a 50 foot buffer is sufficient to protect the hydrology of wetlands near the borrow site areas because those wetlands are fed by a shallow aquifer. Since there exists no actual hydrologic modeling of aquifer recharge for this basin, it is unreasonable to accept this assumption at face value.[23] Wetlands likely to experience permanent alterations to their hydrology as a result of runway construction activities include B4, B5, B6, B7, B9a&b, B10, B12, B15a&b, 29, 30, 48. In addition the full extent of wetlands B15 and 48 are not included in the tabulation of wetland area shown in the tables, so that the impact to these wetlands appears smaller than will actually occur because of their proximity to Borrow Site 1. It is estimated that these wetlands likely add around 5 acres to the tally of wetland impacts.

Finally, no methods were provided for how permanent impacts were differentiated from temporary impacts to wetlands, other than the unsubstantiated assertion that a fifty-foot buffer would protect remaining wetland areas. This defies common sense in addition to being contrary to best available wetland science on adequate buffers. DOE's own guidance says "buffer widths effective in preventing significant water quality impacts to wetlands are generally 100 feet or greater.[24] Temporary impacts remain unaccounted for and, again, the estimates provided by the Port significantly understate the degradation of beneficial uses that will occur in the Miller, Walker and Des Moines Creek watersheds.

Mitigation Credit Accounting

The site plan for the Vaca Farm wetland restoration, shown on sheet STIA-9805-C2 of the Appendices A-E Design Drawings Natural Resource Mitigation Plan, shows the area to be designed for water storage and lacking in structural features that would provide habitat, food chain support, baseflow augmentation or effective nutrient sediment trapping.[25] Such features would include sinuous wetland edges, meandering channels, an emergent understory in the planting plan, and retaining and avoiding disturbance to existing hydric soils. Labeling Vaca Farm a wetland restoration is unacceptable, as it is an alteration performed solely for stormwater management purposes without regard to other beneficial uses of wetlands. Indeed, it is the third runway project that is driving upwards the need for stormwater storage in the basin. Vaca Farm should be appropriately identified as a detention facility, and the wetlands eliminated should be correctly added to the list of permanently impacted wetlands. These include wetlands A1, A2, A3, A4, FW1, 2, 3, 5, 6, 8, 9,10 and 11, and total approximately 1.3 acres.

Buffer Enhancement Credit

Available documentation provided by the Port provides no basis for the Port's claim it will enhance 24 acres of Miller Creek upland buffer. There are numerous wetlands within the claimed buffer area that are already protected. Wetlands R1-10, A10, A11, 18, and 37c are all located in the buffer enhancement area and total approximately 5.7 acres (after filling). In addition wetlands, previously unidentified are shown within the buffer in Appendices A-E

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[22] Ibid, STIA-XXXX-L1.

[23] SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000, p. 1.

[24] *How Ecology Regulates Wetlands*, Washington State Department of Ecology Publication 97-112 (Revised April 1998). Section: The Case for Buffers.

[25] Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date.

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Design Drawings Natural Resource Mitigation Plan.[26] These include R17, R9a, R14a&b, R15, R12b, and A16. No acres are given for these wetlands. Although, it is not possible to determine the exact area of buffer enhancement to deduct from the claim of 24 acres, an estimate of approximately 5 acres can be made. It is not acceptable to include existing wetlands in a buffer enhancement calculation, as they are not intended to be altered. Under the circumstance the Port can only be credited with about 13 acres of upland buffer restoration to Miller Creek.

In addition, stormwater management facilities are sited within the Miller Creek buffer areas and in some cases are sited within wetlands. Stormwater facilities are not an appropriate use for a buffer as buffers are intended to provide terrestrial habitat for amphibians and small mammals that use wetlands and streams in these coastal watersheds. Stormwater management goals typically conflict with wetland functions and especially those of wildlife support. Detention facilities near wetlands frequently attract wildlife, due to the presence of water and warmer water temperatures, and ultimately can cause distress to wildlife due to unexpectedly large water level fluctuations, sedimentary deposits and maintenance activities.[27] All of the detention ponds shown in Appendices A-E show detention facilities located at least partially in the buffer. These facilities should be sited away from Miller Creek and associated wetlands. At minimum the areas should be removed from the calculation of enhanced buffer.[28]

Based on this discussion, the summary of wetland impacts was corrected, and is shown in Table 5, followed by the actual mitigation ratios presented in Table 6. Wetland impacts within the watershed are likely to exceed 24 acres when remnant wetlands, unaccounted for wetlands and wetlands permanently affected by hydrologic changes are included. The actual mitigation ratio that results is 0.17:1. Out-of-watershed mitigation remains 0.69:1 and when both in-basin and out-of basin mitigation is calculated cumulatively it just under 1:1. That is lower than the lowest mitigation requirement for low value Class 4 wetlands (less than 1.25:1). This is an unacceptable trade for the losses that will be sustained.

Table 5. Summary of Wetland Impacts and DOE Recommended Mitigation Ratios.

	DOE Class and Habitat				
	Class 2 Forested	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Total Acres
Acres	10.92	4.45	5.63	3.06	24.06
Required Acres of Wetland Creation	32.76	8.90	11.26	3.83	56.75
Required Acres of Wetland Enhancement	65.52	17.80	22.52	7.65	80.81

[26] Appendices A-E Design Drawings Natural Resource Mitigation Plan, Seattle-Tacoma International Airport, Parametrix, Inc. No Date. Landscape Plans L-1 through L-5.

[27] Dr. Klaus Richter. King County Natural Resources Division. Personal Communication. Subject of numerous discussions between 1998 and 2000.

[28] Estimated to be less than 0.5 acres.

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Table 6. Summary of Corrected In-Basin Mitigation Ratio.

	DOE Class and Habitat					
Mitigation Activity	Class 2 Forested	Class 2 or 3 Scrub-shrub	Class 2 or 3 Emergent or Open water	Upland Buffer	Credited Acres	Cumulative Mitigation Ratio
Wetland Restoration		0.00			0.00	0:1
Wetland Enhancement		13.54			3.4	0.19:1
Buffer Enhancement				13.00	2.16	0.3:1[29]
Total					5.56	

Summary

The wetland mitigation documentation provided by the Port focuses on an accounting strategy with little regard for replacing equivalent functions. If wetland regulation has become a numbers game then it is important, at minimum, to get the numbers right. The Port has not done so. This report has focused on correcting the numbers of acres claimed by the Port for wetland impacts and for wetland and buffer restoration. Evidence was also presented that shows providing only flood storage as mitigation does not meet the criteria for replacing the wetland functions slated to be eliminated from WRIA9 as a result of this proposal. Clearly, not only numbers of wetland acres are at stake, but also protection of beneficial uses, which demand that the importance of replacing wetland functions, in addition to acres, not be diminished.

Thank you for your time spent in reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Attachment A: Vita for Amanda Azous

Cc:
Mr. Tom Sibley, NMFS
Ms. Joan Cabreza, EPA
Kimberley Lockard, Airport Communities Coalition (ACC)
Dr. John Strand, Columbia Biological Assessments
Mr. Bill Rozeboom, Northwest Hydraulic Consultants
Mr. Peter Willing, Water Resources Consulting, Inc.

[29] There are no recommendations given for the contribution of buffer enhancement but it is permitted on a case-by-case basis.

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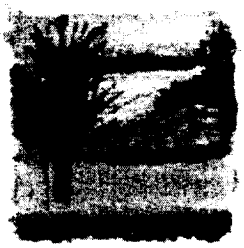
EXHIBIT D

February 16, 2001



Mr. Jonathan Freedman, Project Manager
U.S. Army Corps of Engineers (USACE)
Regulatory Branch
Post Office Box 3755
Seattle, Washington 98124-2255

Ms. Ann Kenny, Environmental Specialist
Washington State Department of Ecology
Shorelands and Environmental Assistance Program
3190 - 160th Avenue Southeast
Bellevue, Washington 98008-5452

Reference: Seattle, Port of, 1996-4-02325 Comments on impacts to wetlands, streams and fisheries resources resulting from proposed 3rd runway and related development actions at Seattle-Tacoma International Airport.

Dear Mr. Freedman and Ms. Kenny,

Azous Environmental Sciences (AES) has been retained on behalf of the Airport Communities Coalition to review the impact of the Port of Seattle's proposed development at SeaTac airport on wetlands, streams and fisheries resources. Comments were submitted on the 1999 Wetlands Delineation and Wetland Functional Assessment documents as well as the June 2000 Natural Resources Mitigation Plan and related documents in letters dated August 16th and September 1st of 2000 to the Department of Ecology and the U.S. Army Corps of Engineers. The purpose of this letter is to provide comments and analyses of the December 2000 updates of these documents. A complete list of materials examined in preparing this critique is provided below.

List of Documents Reviewed:

- *Natural Resource Mitigation Plan (NRMP)*; Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc.
- *Natural Resource Mitigation Plan (NRMP) Appendices A-E Design Drawings* dated December 2000, Parametrix, Inc.
- *Natural Resource Mitigation Plan (NRMP) Revised Implementation Addendum* dated August 2000 Parametrix, Inc., Number 556-2912-001 (03).
- *Wetland Functional Assessment and Impact Analysis; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.
- *Wetland Delineation Report; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.

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- *Pacific Coast Salmon Essential Fish Habitat Assessment; Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000. Number 556-2912-001 (01) (48).
- *Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., June 2000.
- *Supplement to Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000.
- *Seattle Tacoma International Airport (SEA) Wildlife Hazard Management Plan*, developed by Seattle-Tacoma International Airport in cooperation with US Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services, August 2000.
- *Comprehensive Stormwater Management Plan, Master Plan Update Improvements*; Technical Appendices J, Q and R, by Parametrix, Inc., December 2000.
- *Feasibility of Stormwater Infiltration, Third Runway Project Sea-Tac International Airport, Sea-Tac, Washington*, prepared for Port of Seattle by HartCrouser, December 6, 2000. J-4978-06

I am an environmental scientist, founder of Azous Environmental Sciences and a professional wetland scientist (SWS 001067). I am co-editor and co-author of *Wetlands and Urbanization* (CRC/Lewis Press 2000), a professional reference book on how best to protect and manage wetlands in an urbanizing environment. I hold a Masters degree in environmental engineering and science and a Bachelor of Arts in landscape architecture, both from the University of Washington. I have worked as a scientific analyst for over 20 years and have specialized in natural resource science since 1991. A package describing my background and experience is attached to this report.

Activities that degrade or destroy special aquatic sites, such as filling wetlands, are among the most severe environmental impacts the Clean Water Act and Section 404 Guidelines are intended to prevent.[1] The stated principle guiding decision-making for Section 404 permits is that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources. Under the Act, dredged or fill material may not be discharged into the aquatic ecosystem unless it can be demonstrated that the discharge will not have an unacceptable adverse impact, either individually or in combination with known and/or probable impacts of other activities affecting the ecosystem. Accurate determination of the adversity of an impact and identification of commensurate acceptable mitigation to offset adverse impacts depends on careful analysis of the following factors:

- The physical area of the wetland loss.
- The functions provided by the wetland loss.
- The cumulative effect of all identified losses including area and functions.

Without this information, it is simply not possible to determine the effectiveness of mitigation. Without this information, the acceptability of adverse impacts cannot be decided. Although these requirements were clearly pointed out in comments made in my September 1, 2000 letter, essential data and analysis remain missing:

- The keystone of the mitigation proposal, the analysis of wetland functions being eliminated, is still unaccountably absent, and the wetland assessment is unsupported as a result. This omission has apparently led the Port to propose a mitigation package that offers to replace the wrong functions.

[1] Section 404 (b)(1) Part 230.1(d) Purpose and policy.

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- Calculations of the extent of permanent and temporary wetland area losses remain unscientific and are contrary to common sense.
- Astoundingly, there continues to be no analysis of cumulative effects. Simply listing other projects and identifying project level adverse impacts does not constitute an analysis of the cumulative effects of all the projects.

These serious voids leave USACE and the Department of Ecology with insufficient information to make a reasonable judgment as to whether the proposed discharge will comply with the intent and purpose of the Clean Water Act. To illustrate better what is missing from the NRMP, the Biological Assessment, and the Wetland Functional Assessment documentation, I have prepared a series of analyses that address these voids using the data provided by the Port's documents. The following new analysis of data will illustrate why the agencies must find either that there is insufficient information to have reasonable assurance of no significant adverse impacts, or that there is inadequate mitigation to offset the significant adverse impacts of this project.

Wetland Functional Assessment of Losses in the Miller Creek and Des Moines Creek Watersheds

Although the December 2000 NRMP appears at first to have increased proposed mitigation of losses from constructing the Third Runway over previous plans, the appearance is false because the mitigation actually proposed remains largely unrelated to the environmental functions that will be eliminated by loss of watershed systems. To illustrate the kinds of information missing from the assessment of functions performed by Parametrix for the Port of Seattle, I assembled data provided in Table 1-2 of the December 2000 Wetland Functional Assessment, and Tables 3-1 and 3-3 of the December 2000 NRMP into a spreadsheet and produced Figures 1, 2 and 3 showing the wetland functions affected by the project.

Table 3-3 gives one of five rankings (low, low-to-moderate, moderate, moderate-to-high, or high) to each function of the wetlands to be eliminated. All rankings of low, low-to-moderate, and moderate were placed in one category ("Low-Moderate"), and all rankings of moderate-to-high and high were placed in a second category ("Moderate-High"). Figure 1 is a bar chart illustrating the functional rankings of the acres of wetlands to be eliminated from both Miller and Des Moines Creek watersheds, using the two categories.

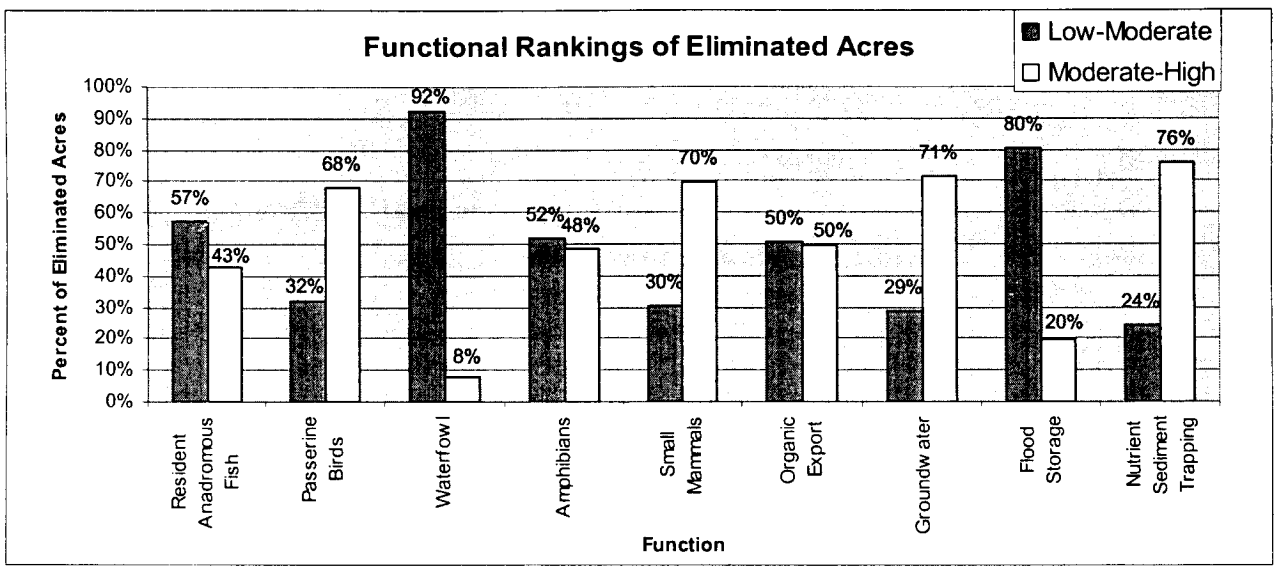

Figure 1. Functional rankings assigned to wetlands being eliminated for the Third Runway Project.

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Figure 1 shows that the highest-ranking functions being eliminated from the watershed in the greatest proportion are habitat for passerine birds (68%), small mammals (70%), groundwater discharge/recharge (71%), and nutrient sediment trapping (76%). Forty-three percent of the wetland acres being eliminated are ranked moderate-to-high for anadromous fish habitat, forty-eight percent are ranked moderate-to-high for providing amphibian habitat, and fifty percent are highly valued for export of organic material.

Significantly, *92 percent* of the eliminated wetlands are low-to-moderate for waterfowl habitat, and 80 percent are low-to-moderate for flood storage. These are proportionally the *lowest*-ranking functions among all the wetlands being eliminated, yet waterfowl habitat and flood storage are the primary functions targeted for replacement in the NRMP.[2] The grossly misplaced emphasis makes no environmental sense at all and serves to create the impression of mitigation where no effective mitigation in fact exists. The mitigation proposal appears to be tailored to the needs of the project rather than the requirements of the Clean Water Act.

Figure 2 shows the ratings of wetlands in the Miller and Des Moines Creek watersheds, using Department of Ecology's (DOE) Wetland Rating System. Starting at the left of each chart in Figure 2, the first bar shows the proportion of wetlands being eliminated for each of the three pertinent DOE ratings. The second bar shows the percent of wetland acres in the Port's entire project area that have that rating and are being eliminated. For example, the Miller Creek Basin chart in Figure 2 shows that 58 percent of the wetlands eliminated by the Third Runway in the Miller Creek watershed are rated Class II. It also shows that 45 percent of all the Class II wetlands identified within the Miller Creek Basin project area will be eliminated.[3]

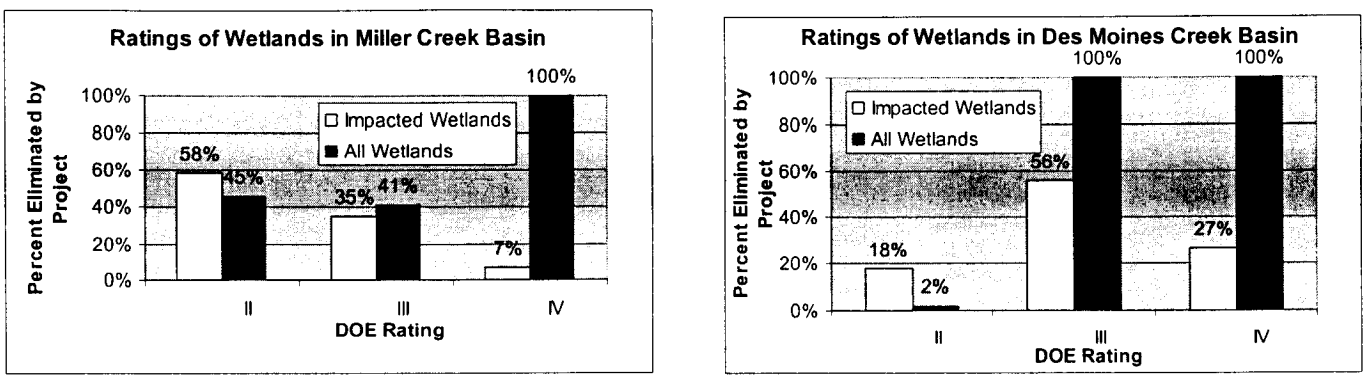

Figure 2. Department of Ecology (DOE) ratings for wetland acres eliminated.[4]

The bar charts in Figure 2 illustrate that the majority of wetland acres being eliminated for the Third Runway project in the Miller Creek watershed are more highly rated Class II wetlands, rather than lower quality Class III and IV wetlands. This evidence directly contradicts the repeated statements

[2] NRMP Table 1.3-1 and pages 1-1 and 1-2.

[3] Ideally the second bar would show the percent of wetlands being eliminated *in the watershed* by DOE rating but that data was not available.

[4] NRMP Table 2-1.1 is source of data for charts.

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made in the NRMP and Wetland Functional Assessment that the wetlands to be eliminated are degraded to the extent that they provide few valuable functions.[5]

Another important measure of wetland function is proportion of habitat types, such as emergent, scrub-shrub, or forested wetlands. Figure 3, below, identifies the types of habitat that will be eliminated in the Miller Creek and Des Moines watersheds. The charts show that the majority of wetland acres to be eliminated in Miller Creek are forested wetlands, followed by emergent habitats. Shrub wetlands constitute the smallest component of habitat types being eliminated.

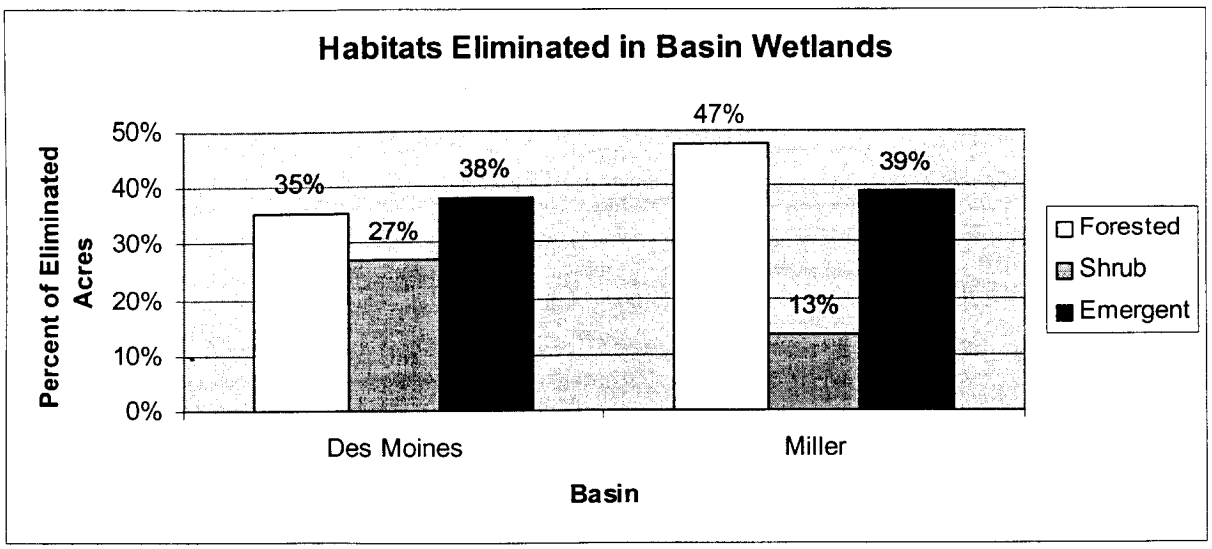

Figure 3. Proportion of wetland habitats eliminated.

Based on the results revealed in Figures 1, 2 and 3, commensurate mitigation for these lost functions would require replacement of habitat for passerine birds, small mammals, and amphibians. It would require assurances that the sediment and nutrient trapping functions be compensated for, as well as groundwater exchange functions. To comply with Section 404 Guidelines, a plan would have to ensure that sources of organic export within the affected watersheds be maintained and that there be no net loss of fisheries habitat (resident or otherwise), particularly in light of recent and proposed Environmental Species Act (ESA) listings. An acceptable plan would include creation of wetlands rated Class II or greater and would provide habitat dominated by forested and emergent wetland systems.

In contrast, the in-basin mitigation being offered within Miller Creek watershed ignores these key requirements. Instead, the Port proposes to replace the existing wetland functions, identified clearly in the data gathered by its own consultants, with a questionable restoration of a scrub-shrub wetland, the least common habitat type found in the watershed. Further, the restoration is designed to replace "lost" flood plain, which is not identified anywhere in the wetland functional assessment as a significant function provided by the impacted wetlands.

[5] NRMP Section 2 and Wetland Functional Assessment Section 4.

Determining the Extent of Permanent and Temporary Wetland Losses

I pointed out the Port's unrealistic approach to determining what constitutes permanent versus temporary wetland impacts in my August 16th and September 1st comment letters. The December 2000 Wetland Functional Assessment may reflect an attempt to clarify permanent impacts from temporary impacts, but is still founded on unsupportable optimism regarding how much wetland can be eliminated from a system and still leave a wetland viable. The assumptions regarding what constitutes a temporary versus permanent impact remain ill-defined. Moreover, the Port significantly underestimates the extent of indirect impacts.

How Much Wetland Area Can Be Eliminated From a Wetland and Still Leave it Viable?

The NRMP makes the argument that the acres of wetland lost is commensurate with the proportion of functions provided by that acreage.[6] In other words, according to the Port's reasoning, if half a wetland is eliminated, the remaining half will necessarily provide half the previous functions. Within some ranges of values, there may be a one-for-one relationship between function and size of a wetland. Nevertheless, there is ample evidence that as wetland size diminishes the value of the wetland decreases in greater proportion because the remaining functions are qualitatively less significant.

Interestingly, this increased degradation ratio phenomenon is demonstrated in the data gathered by Parametrix for the wetland functional assessment. When one compares the average size of wetland within the DOE Rating Classes (see Table 1), it is apparent that smaller wetlands were less highly rated than the larger wetlands. By reducing the size of a wetland, one removes significant value in greater proportion than the percentage of lost area, to the extent that the wetland is rated lower when assessed at the reduced size. Moreover, the Port's argument is based on the erroneous assumption that wetlands have uniform conditions, whereas they often have a high degree of internal diversity. Large area reductions can eliminate entire populations of small mammal or amphibian species using the wetland by reducing or eliminating key features of their required habitat such as needed emergent areas or a forested buffer.

Table 1. Existing conditions: DOE Rating and average wetland size.

	DOE Rating		
	II	III	IV
Smallest Wetland in Category (acres)	0.57	0.01	0.02
Largest Wetland in Category (acres)	35.45	4.63	0.87
Average Sized Wetland in Category (acres)	**6.60**	**0.47**	**0.20**

Table 2, below, shows the total wetland acres and total acres impacted for each of the wetlands identified by the NRMP. Most of the wetlands are 100% impacted and are properly accounted for in terms of permanent impacts. A few have between zero and 13 percent of their areas permanently impacted, an effect whose significance may not be readily predictable. However, wetlands 18, 37, A12, and R1 all have *more than 70 percent* of their areas permanently impacted.

It is highly improbable that wetlands 18, 37, A12, and R1 could retain their DOE ratings or value if the physical basis of their functions were reduced over more than 70 percent of their area. Such a high

[6] NRMP Section 3.

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degree of loss is likely to eliminate whole habitats within these wetlands, affecting their suitability for wildlife, nutrient sediment trapping, and organic export functions.

Table 2. Total wetland acres and total acres impacted for each of the wetlands identified by the NRMP.[7]

Wetland ID	Total Wetland Acres	Wetland Acres Impacted	Percent of Wetland Eliminated	Revised Acres for Permanently Impacted Wetlands
5	4.63	0.14	3%	0.14
9	2.83	0.03	1%	0.03
11	0.5	0.5	100%	0.5
12	0.21	0.21	100%	0.21
13	0.05	0.05	100%	0.05
14	0.19	0.19	100%	0.19
15	0.28	0.28	100%	0.28
16	0.05	0.05	100%	0.05
17	0.02	0.02	100%	0.02
18	**3.56**	**2.84**	**80%**	**3.56**
19	0.56	0.56	100%	0.56
20	0.57	0.57	100%	0.57
21	0.22	0.22	100%	0.22
22	0.06	0.06	100%	0.06
23	0.77	0.77	100%	0.77
24	0.14	0.14	100%	0.14
25	0.06	0.06	100%	0.06
26	0.02	0.02	100%	0.02
28	35.45	0.07	0.2%	0.07
35	0.67	0.67	100%	0.67
37	**5.73**	**4.11**	**72%**	**5.73**
40	0.03	0.03	100%	0.03
41	0.44	0.44	100%	0.44
44	3.08	0.26	8%	0.26
52	4.7	0.54	11%	0.54
53	0.6	0.6	100%	0.6
A1	4.66	0.59	13%	0.59
A12	**0.11**	**0.08**	**73%**	**0.11**
A5	0.03	0.03	100%	0.03
A6	0.16	0.16	100%	0.16
A7	0.3	0.3	100%	0.3
A8	0.38	0.38	100%	0.38
B11	0.18	0.18	100%	0.18
B12	0.78	0.07	9%	0.78
B14	0.78	0.78	100%	0.78
E2	0.04	0.04	100%	0.04
E3	0.06	0.06	100%	0.06
FW5	0.08	0.08	100%	0.08
FW6	0.07	0.07	100%	0.07
G2	0.02	0.02	100%	0.02
G3	0.06	0.06	100%	0.06
G4	0.04	0.04	100%	0.04
G5	0.87	0.87	100%	0.87
G7	0.5	0.5	100%	0.5
R1	**0.17**	**0.13**	**76%**	**0.17**
W1	0.1	0.1	100%	0.1
W2	0.24	0.24	100%	0.24
TOTAL	**75.05**	**18.25**	**24%**	**21.33**

[7] Data taken from NRMP Table 2.1-1 and Table 3.1-1. Bold values exceed 70% loss of original acres.

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Furthermore, the NRMP does not even attempt to account for the temporary impacts to these wetlands in addition to the permanent ones. The Wetland Functional Assessment lists each of these wetlands as sustaining temporary impacts as well as permanent ones.[8] Wetlands 18 and 37 are subjected to 0.93 acres of temporary impacts, including a temporary storm water pond located in Wetland 37. Temporary disturbance from construction activities are virtually inevitable in Wetlands R1 and A12, but the amount of area is not specified. The plain result is that of the 2.35 acres remaining between wetlands 18 and 37 after permanent impacts, 0.95 acres will be "temporarily" impacted by construction activities and the construction of a storm water management pond, leaving 1.4 acres of what was originally a 9.3-acre wetland complex. Arguing that the same functions present in a 9.3-acre wetland will proportionately scale down on a one to one ratio within a grossly reduced 1.4-acre wetland defies logic, ignores well-known objective features of wetlands, and significantly undermines the scientific credibility of the Port's analysis.

Classifying the construction zone around the embankment and wall and the construction of temporary storm water ponds within wetlands as only "temporary" impacts is misleading. While the Port has not revealed its timeline for use of these "temporary" ponds, it is probably at least several years judging from their function in the construction scheme. Furthermore, excavation and compaction activities that occur in constructing the temporary ponds will detrimentally affect soil characteristics and microorganisms that are fundamental to establishing wetland plants and a healthy and diverse wetland ecology. The life cycles of amphibians, mammals, and insects that historically used the wetland system will be disrupted, with the likely consequence of eliminating entire populations. The extensive delay encompassing initial impact, use during construction, and final restoration effectively eliminates habitat use of the area for a decade or more. Such cumulative disruptions to the system will likely be significant enough that new recruitment of species cannot occur. Impacts of this significance effect wetland ecosystem processes for decades.

It is my professional opinion that wetlands with greater than 70 percent of their area eliminated and subject to significant "temporary" construction related impacts are altered in ways that will affect their functionality for time scales on the order of 50 years. These wetlands should therefore be considered permanently impacted. If such wetland remnants are included in the calculations of permanent wetland impacts, it brings the total permanently impacted wetland acres from 18.25 (18.33 minus the 0.12 acres for off-site mitigation also included in Table 3-1.1 of the NRMP) to 21.33 acres, a significant and unmitigated increase.

Cumulative Effects Analysis

Part 230.11 (g) of the Section 404 Guidelines for implementing the Clean Water Act requires that cumulative effects attributable to the discharge of dredged or fill material in waters of the United States be predicted to the extent reasonable and practical. Cumulative impacts are the changes in an aquatic ecosystem attributable to the collective effect of a number of individual discharges of fill material. Although, on its own, the impact of a particular discharge may constitute a minor change, the cumulative effect of numerous such piecemeal changes can result in major impairment of water resources and interfere with the productivity and water quality of existing aquatic ecosystems. Thus, by definition, analysis of cumulative effects must consider impacts to wetlands on a larger scale than that of individual projects.

A list of impacts confined to individual activities, even if comprehensive, is not a substitute for analysis of their cumulative effects. Instead, cumulative impacts must be measured in an appropriate

[8] Wetland Functional Assessment, December 2000, Table 4-5, p. 4-13.

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manner, depending on the resource management issues of concern. Typically, a planning area such as a watershed would be selected. A proper analysis identifies measurements of function, such as acres of wetlands, acres of uplands, and acres of contiguous habitat, for the pre-project and post-project conditions. Only such broad-scale metrics can give the required comprehensive picture of the outcome, a task for which descriptive lists necessarily fall short. These are generally recognized standard analytical methods for evaluating cumulative impacts.

For example, under existing conditions in Miller Creek basin, there remain approximately 300 acres of habitat (uplands and wetlands, not including lakes) in parcels either large enough by themselves, or sufficiently contiguous with Miller creek or other habitat areas, to provide measurable habitat functions. These lands constitute approximately six percent of the eight-square mile watershed.[9, 10] The Third Runway Project will *eliminate approximately 75 acres* of the existing wetland and upland habitat and proposes to replace it with 36.85 acres of upland habitat restored from land that is currently used as residential housing. The loss in uplands and wetlands resulting from the Third Runway Project will reduce the remaining functioning habitat area by approximately 13% and reduce the percentage of habitat within the entire basin to *five percent.*

An evaluation of the proportion of only wetlands eliminated within the watersheds (not including uplands) would be extremely important information in assessing adverse impacts particularly the loss of wetlands associated with or hydrologically connected to the creek systems. However, the Port has not provided the data required for such an evaluation, and I was unable to adequately estimate wetlands remaining in the basin from aerial photographs alone. Until these data can be presented and evaluated, it is impossible to assess fully the impact of wetland losses on primary productivity and its consequent effect on in-stream and downstream fisheries resources, including the estuarine habitat located at the outlet of Miller Creek that is frequented by Chinook salmon.

Similar metrics were prepared for the SeaTac International Airport (STIA) project area in order to assess localized impacts. The STIA project area located within the Miller and Walker Creek watersheds encompasses the central third of sub-basins appertaining to Miller Creek, and also includes the headwater and upper 25 percent of sub-basins belonging to Walker Creek. Within the area encompassed by these sub-basins, existing functioning habitat areas constitute about 242 acres in approximately 1650 acres of the Miller Creek drainage basin located within the STIA boundary.[11] Functioning habitat represents about 15 percent of the STIA project area under existing conditions. When completed, the area of functioning upland habitat in the STIA project area (assuming the enhancement activities are successful) will be limited to 10 percent. A five percent decrease in functioning habitat is a significant reduction, but in this instance is particularly egregious, as it is *fully a third* of the already reduced habitat that remains.

Table 2-1 of the Wetland Functional Assessment provides the number of acres of wetlands found within the SITA project area for the Miller and Des Moines Creek watersheds. Combining these data with data from Table 3.1-1 of the NRMP reveals that that 23 percent of the wetland acres found in the project area within the Miller Creek watershed and seven percent of those within Des Moines Creek watershed will be eliminated.

This analysis of cumulative affects is limited to the raw data provided in the mitigation plan documents and what I was able to estimate from aerial photos, but serves to illustrate the kind of metrics that are needed in order to fully evaluate the significant adverse impacts that are cumulative.

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[9] NRMP 2000 p. 2-7, Section 2.2.1.1

[10] These estimates of habitat area were calculated using 1997 aerial photographs of the watershed.

[11] See Figure 1 of the Supplement to the Biological Assessment etc. December 2000.

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Without such metrics, it is likely that the adversity of the impacts on the resource will be underestimated leaving no reasonable assurance of protecting public resources.

Even with limited data, this analysis reveals a net loss of habitat within the Miller Creek watershed. The Port's addition of upland buffer to the mitigation plan is not sufficient to offset the acres of habitat lost from development activities. The loss of wetlands in addition to the loss of uplands will permanently and significantly degrade a watershed that has limited remaining habitat areas. The enhancement proposals may be well meaning and might help improve some habitat remnants, but will not offset significantly the substantial area loss, particularly of wetlands. Permitting the proposal as it now stands would allow the "dead is dead" philosophy referred to in my August 16th comment letter to prevail.[12] This philosophy states that since certain natural resources have been degraded by human activities over time (in this case by urbanization and the construction of the existing airport), it makes sense to sacrifice those degraded systems to create other sites that are (theoretically) better protected. However, this philosophy is not consistent with the state of the existing habitat and wetlands at the STIA site or with the requirements of the Clean Water Act. The area in question is not dead: it is home to three creeks and attendant wetland systems which have, despite pressure from STIA, managed to maintain their viability and water quality sufficient to support resident and migrating salmon species. USACE and DOE are required to protect them under the Clean Water Act.

Are There Opportunities for In-Basin Mitigation?

It is fair to ask whether there are reasonable alternatives that would allow in-basin mitigation to prevent further degradation of the Miller Creek watershed. Port consultants have repeatedly argued that the threat of bird strikes renders in-basin mitigation unacceptable. However, a close reading of the Position Paper regarding Off-Airport Mitigation of Wetland Habitat Function and the analysis of mitigation site alternatives provided by Table 7.2-2 in the December 2000 NRMP, reveals significant confusion between bird species that pose a threat to aircraft and the species of birds that would actively use wetlands associated with Miller and Walker Creeks.

Avian species that threaten aircraft are primarily Canada geese and other waterfowl that use open landscapes adjacent to open water.[13] Managing the threat is largely a matter of removing their preferred habitat from the safety area. Wetlands can be constructed that discourage use by problematic species, as exemplified by the restoration goals of Vacca Farm. Forested and emergent habitat under a relatively closed canopy provide numerous critical wetland functions, including habitat for birds of species that do not cause safety concerns. In general, the bird strike hazards produced by locating created wetlands in sites 8 and 12 would not be significant if the wetlands were designed to avoid open landscapes with open water. It is unreasonable to eliminate in-basin wetland mitigation for bird-strike reasons, because there is sufficient knowledge of bird species requirements to manage the threat by appropriate wetland design. In addition, the elevation of the runway in relation to the mitigation sites would effectively eliminate as hazards many species that might use the wetlands but typically do not fly as high as the runway would be in relation to the wetlands.

Potential mitigation Sites 8 and 12, listed in Table 7.2-2 and shown on the map in Figure 7.2-3, of the NRMP comprise a total of 39 acres in the Miller Creek watershed. These sites are in-basin and adjacent to Miller creek. The table states that Site 8 is within the runway footprint, but the map in Figure 7.2-3 shows Site 8 to be located outside the runway footprint.

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[12] *Dead is Dead. -An Alternative Strategy for Urban Water Management*, Brian W. Mar, Urban Ecology, 5 (1980/1981), pp 103-112.
[13] *Wildlife Hazard Management Plan*, Section 3.4, Vegetation Management.

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In Table 7.2-2, the Port contends that both sites 8 and 12 are surrounded by roads on two sides and are therefore not suitable for a mitigation site. That assertion must be examined in context. In effect, the Port argues that it is more suitable to create "compensatory" wetlands completely outside the watershed with no hope of countering local environmental degradation than to create in-basin wetlands that may be more isolated, but provide locally key functions that prevent degradation within the watershed. This issue is particularly critical because at stake in the permitting process are many wetlands associated with salmon-bearing streams and located in watersheds where few wetlands remain.

Furthermore, the map in Figure 7.2-3 shows there are additional opportunities to provide upland habitat to buffer wetlands created within sites 8 and 12, using undeveloped land with greater than five percent slope, forested and unforested. By using sites 8 and 12 for creation of new wetlands, and adding upland buffers commensurate with the area of undeveloped upland being eliminated by the Third Runway Project, there is a far greater chance the project could be constructed without the significant adverse effects within the Miller Creek watershed that are inevitable under the current proposal. In addition, the project would help prevent the destruction of remnant natural sites within an area already significantly affected by development.[14]

Other Significant Concerns

1. Failure to Take Well-Established Wetlands Functions into Account

One particularly disconcerting void in the Port's evaluation of potentially significant alterations is the lack of discussion on the contribution of wetlands in the Miller and Des Moines creek watershed to primary productivity in the creek systems. Although approximately half of the wetland acres to be eliminated are ranked moderate-to-high for the function of organic export (see Figure 1), there is no discussion of the effect of that loss on the food webs of Miller and Des Moines creeks.

It is now universally accepted that wetlands are among the most productive ecosystems on the planet. The boundary zones (ecotones) between land and inland wetlands and streams are the principal routes for the transport of organic matter and nutrients within a watershed.[15] A *Carex* sedge meadow typically will produce three or more times the organic carbon than is produced by a woodland shrub land complex (1000 g C/m^3 versus 270).[16] The condition of plants growing in water or saturated soil provides a steady supply of water and nutrients that have the potential to support high productivity. The typically anoxic soil makes a suitable environment for nitrogen-fixing bacteria associated with the plant roots. As a result of these processes, wetland communities have a profound influence on the nutrient supply to natural waters.

The wetlands within the Miller and Des Moines Creek watersheds are extremely important because of their value for production of organic carbon and for their role in moderating nitrogen export. Reducing remaining wetlands within this watershed will alter the interception of nitrogen and increase the supply of nitrogen to the estuary at the mouth of the creeks. Since nitrogen is a limiting nutrient for phytoplankton production in coastal waters, the reduction of wetlands within the watershed could result in increased eutrophication in the shoreline environment. The reduction of wetland plants in the watershed would also reduce the volume of organic particulate matter that results from the death and partial decomposition of wetland plants. The extent of this effect will determine the degree to which the food web would shift from detritus consuming filter feeders to phytoplankton production.

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[14] 404 guidance Part 230.75.

[15] Hillbricht-Ilkowska, Phosphorus and Nitrogen Retention in Ecotones of Lowland Temperate Lakes and Rivers, HYDROBIOLOGIA, 1993, Vol. 251, No. 1-3.

[16] Barnes and Mann, Fundamentals of Aquatic Ecosystems. Tables 4.1 and 11.1.

This shift could have enormous consequences for both resident fisheries as well as for species that use the lower reaches but are not resident, such as Chinook. This is because detrital food sources are essential to the development of invertebrate communities on which salmonid fish species feed. Reductions in the productive capacity of the riparian wetland systems are certain to affect fish production. [17]

Evaluation of loss of wetlands is also important because the Port claims the high levels of dissolved organic carbon (DOC) found in both Des Moines and Miller creeks will limit the biological availability of zinc and copper found in their storm water runoff, effectively reducing the toxicity of their stormwater to salmon.[18] DOC derives from the breakdown of detrital material by bacteria and fungi. The comparatively high levels of DOC found in Des Moines Creek and particularly the levels found in Miller Creek are very likely high because of the contribution of organic material from existing wetlands. It is noteworthy that although the Port's conclusion of no adverse effects to fish and other aquatic organisms from discharges of zinc and copper relies on the presence of high concentrations of dissolved carbon, there is no discussion about what constitutes the source of that carbon and how it will be maintained after the project is built. This is a truly a fundamental and revealing oversight because the DOC concentrations on which the Port depends to reduce the toxicity of zinc and copper in their stormwater discharges originates in the wetland systems they propose to degrade and eliminate.

The loss of wetlands will negatively affect fisheries resources. The loss of DOC in the system will affect the food web and will likely increase the bioavailability of toxic metals, especially in the Miller Creek system. Both of these alterations could have serious adverse impacts to resident and migratory Coho salmon and could affect the essential fish habitats for ESA listed Chinook salmon populations located at the mouths of Des Moines and Miller Creeks.

2. Ignoring Hydrologic Effects of Clearing

Borrow Sites 1, 3 and 4, located in the Des Moines Creek Basin at the south end of the STIA, are currently mostly undeveloped and covered by upland coniferous forest and wetland second-growth deciduous forest. These lands contribute to the headwater area of Des Moines Creek and constitute much of the forestland remaining in the basin. The proposed clearing and excavation of the borrow areas will significantly alter land cover, affecting infiltration, eliminating evapotranspiration and generally reducing the contribution of precipitation to groundwater. This will have a long-term effect of reducing seepage flows and diminishing base flows in Des Moines Creek. In addition the lining of the IWS system, although beneficial for preventing pollutant releases to groundwater, is likely to alter low flow conditions significantly in Des Moines Creek.[19]

Several wetlands are situated down gradient from Borrow Site 1, including 48, 32, B15, B12, and B4. The December 2000 NRMP Table 5.3-6 of performance standards for these wetlands states that water will be redirected to the wetlands in order to keep soils saturated to the surface from December to March or April in normal rainfall years. On what basis was this performance standard developed? Has the Port measured the existing hydroperiods of these wetlands? Is the performance standard proposing to match the existing conditions or is it intended to create new and improved hydroperiod conditions? No information is provided to answer these fundamental questions, and no detail is provided on the engineering methods to be used to extend and prolong the hydroperiod of wetlands that are currently fed by shallow groundwater.

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[17] *Dissolved Organic Material and Trophic Dynamics, R. S. Wotton, BioScience, Vol. 38, No. 3.*

[18] *Pacific Coast Salmon Essential Fish Habitat Assessment, P.4-8.*

[19] See Item 10 for additional information in comments made by Northwest Hydraulic Consultants dated February 15th, 2001.

Moreover, even if water flow can be maintained to meet the performance standard, the standard is unlikely to have sufficient duration to preserve wetland functions. Uplands commonly retain saturated soils until March or April. Such a short water season is little guarantee that wetland functions will be preserved.

A similar situation is present near Borrow Site 3. The highest elevations of the site will be cleared and excavated leaving a 50-foot buffer around wetlands B10, 29, B9, 30, B7, B6, and B5. The performance standard requires that soils be saturated in Wetland 30 until May and that there be standing water in Wetland 30 from December until April. That is too narrow a window for successful amphibian breeding in many years, especially if temperatures are cooler than normal. Water must be provided until the middle of June to insure habitat is available for the entire breeding season.

The effective season for supporting aquatic dependant species requires water to be present through the second week in June. Without a more wetland-friendly performance standard, the activities within the Borrow Sites will adversely alter existing wetland functions, in addition to reducing base flows in Des Moines Creek.

3. Effects of Non-permitted Degradation

Impacts to wetlands have *already* occurred, in particular hydrologic and habitat isolation, in advance of the permit. In October 2000, I examined September 2000 aerial photographs of the Third Runway Project area to determine the extent of pre-permit construction activities. Several wetlands were at least partially surrounded by fill and construction activities. The resolution of the aerial photography was insufficient in many instances to determine whether a 50-foot buffer was left intact, but it was clear that several wetlands were completely or very nearly isolated by clearing and fill deposits.

These activities affected wetlands 12, 13 and 14, and R1, R2, and R4, which are associated wetlands to Miller Creek. Also affected by fill activities were wetlands 23, G3, 52, and 53. In addition, grading and fill activities were apparent within as little as 50 feet of the eastern lobes of wetlands W1, W2, 18, and 19.

Although in these instances a buffer of sorts exists, what remains does not constitute protection to a wetland when adjacent fill and clearing effectively isolate the wetland biologically and in all likelihood hydrologically. Moreover, it is likely that fill activities have continued since September, when the aerial photos were taken, resulting in further damage and isolation to the project area wetlands. These activities have reduced and continue to reduce the value of the wetlands, possibly eliminating normal functioning within these wetlands for decades. They appear to be activities that would require a permitting process, with prior review of the adverse environmental effects.

Even more flagrant is that forested habitats are being permanently removed that may affect listed endangered species prior to the completion of the ESA consultation for the project. At the very least, the Port's activities should be stopped before they do additional damage to Miller Creek's few remaining wetlands. Further, evaluation of the proposal should begin with the proposition that as a first step current damage from circumventing the permitting process must be reversed before approvals under the Clean Water Act are decided. Otherwise the baseline, which underlies the Port's application, will have been rendered false at the outset.

4. Contradictory Treatment of Seepage Flow Issues

In previous communications with Mr. Erik Stockdale, Wetland Specialist for the Department of Ecology, I discussed the issue of how seepage flows will continue to hydrate the wetlands located at the base of the MSE wall and embankment and expressed concerns regarding how the system will actually work. I pointed out several discrepancies between illustrations in the Appendices to the August 2000

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NRMP and the grading and drainage plans shown in the Stormwater Management Plan (SMP). He indicated that the inconsistencies would be discussed with Port consultants, and my understanding was that these inconsistencies would be remedied in the final documents.

Unfortunately, how seepage flows are to be captured and returned to the wetlands remains vague and inconsistent even in the December 2000 documents. *This is a significant issue.* The hydroperiod of a wetland affects its functions because it controls the input and output of nutrients and their availability for habitat.[20] Maintaining seepage flow hydrology to the wetlands located at the base of the wall and embankment is essential to their continued viability and highly challenging to engineer. If the Port cannot demonstrate how seepage flows can be successfully maintained, then the mitigation requirements must be substantially higher than proposed.

The Port had failed to provide sufficient information to ascertain what is being proposed, let alone whether the proposed discharge will comply with Section 404 guidelines. As an example, it is unclear how wetland hydrology will be maintained to Wetland 39 because Pond D is located such that it would intercept ground and surface water flows to Wetland 37. It is also unclear why a ditch will be located adjacent to the embankment wall within Wetland 37. As currently shown, it appears the ditch will capture seepage flows and carry them *away* from Wetland 37, rather than allow seepage flows to infiltrate to Wetland 37. This impression is not clarified in the NRMP or SMP discussions, which offer insufficient information to assess the outcome in conjunction with inconsistent information provided between the NRMP and the SMP. Additional detailed examples of similar inconsistencies are provided in comments submitted to you by Dyanne Sheldon.[21]

5. *Effect of MSE wall on microclimate variables in Miller Creek and adjacent remaining wetlands.*

There is no discussion in the documentation provided about the impact the MSE wall itself will have on remaining wetlands and Miller Creek. Due to the unprecedented size and mass, the wall could significantly alter temperatures in the remaining wetlands by producing an increase in shade effects during the morning, effectively shortening the growing day for many species. In contrast, late afternoon temperatures may rise significantly during sunny periods, should the wall capture heat and radiate it to adjacent aquatic habitats. This could result in significant alterations to the phenological development of plants, amphibians and insects using Miller Creek and associated wetlands. The cooler temperatures created by the wall from shading effects are likely to shift the emerging and breeding season later by a few weeks, which could put water dependent species that use the seasonal wetland habitats at greater risk. Higher summer temperatures could increase water temperatures in Miller Creek and adversely affect fish habitat and food web resources.

Review Comments Made in Previous Letters that Remain Unresolved

I commented on previous versions of the Port's documents on August 16th and September 1st of 2000. The majority of concerns expressed in those comment letters remain unresolved. The comment letters are important to understanding the background and context for this report and are included as attachments. The following are summaries of continuing issues:

1. The mitigation ratios for in-basin mitigation are exceedingly low, unrelated to the predicted losses, and are not even close to meeting Washington State Department of Ecology Guidelines. The mitigation package as proposed will inevitably produce a net loss of wetland functions within the Miller Creek watershed.

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[20] Wetland Ecosystems Studies From a Hydrologic Perspective, James W. La Baugh, Water Resources Bulletin, American Water Resources Association, Vol. 34, No. 6 1986.

[21] Dyanne Sheldon February 16th comments on Port of Seattle Reference No. 1996-4-02325.

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2. Use of a water resource inventory area (WRIA) as a pretext for allowing out-of-basin mitigation is scientifically indefensible from a resource management standpoint and inconsistent with the Clean Water Act and Section 404 guidelines. Further, the mitigation package proposed by the Port is not consistent with the intent and requirements of RCW 90.74.005 to 94.74.020, which specifies that mitigation outside the impacted area be completed in advance of impact and intends that it be timed, designed and located in a manner to provide equal or better biological functions and values when compared to traditional on-site, in-kind mitigation.[22]

3. The Port proposes to create open stormwater ponds that will likely attract undesired wildlife even while the Port refuses to create in-basin mitigation wetlands. In addition, the proposed remedial action of installing netting over the ponds creates a hazard to all wildlife. Stormwater ponds also tend to operate as ecological sinks, attracting animals, and depending on their management in relationship to water depths and temperature, are often death traps. There is no indication that these inconsistencies have been adequately addressed.

4. The wetland restoration planned for Vacca Farm continues to have significant problems, including the lack of habitat values, questionable removal of peat soils, and lack of adequate hydrology to maintain the system as a wetland. The excavation of the existing peat will provide little additional storage while removing highly valued wetland soils capable of storing water and releasing it at the end of the rainy season, one of the primary functions of a wetland. The peat soils provide important hydrologic support during the late spring and early summer for a period of several weeks.

Vacca Farm is designed such that the majority of the wetland will receive water only during extreme storm events such as a 100-year flood, effectively reducing the wetland's value for biological support. The wetland plan shows the wetland will be graded so that any water is quickly discharged via an approximately 200 foot wide shallow swale to Miller Creek. Therefore, although hummocks have been added to the December 2000 NRMP to provide more topographic relief in response to comments previously made, in the absence of adequate hydrology, such habitat measures are largely ineffective. The "restored" wetland will not convey water sufficient to maintain wetland functions. Moreover the redesigned Miller Creek Channel is unlikely to convey water from the Vacca Farm storage facility because the Port's plans reflect that the creek channel will be hydrologically disconnected from the peat soils by a geotextile liner, needed to hold the water in place.[23] This condition is described in additional detail in comments on the project made by Dyanne Sheldon.[24]

5. Secondary effects on the wetlands that are anticipated as a result of the construction include altered hydroperiods, altered substrate conditions due to construction activities, and possible water quality issues that may have significant adverse effects on life stages of aquatic life forms.

6. The plan provides no pre-project monitoring of wetland hydrology to provide data for measuring post project success. There are therefore no baseline data to compare against when determining whether hydrologic impacts to wetlands have occurred. Without these data, there is no basis for enforcing further mitigation or adapting management because there is no clear target defined for the post-construction condition. The Port has had years to collect the data. Their absence precludes approval of the application at this time.

7. The headwater of Walker Creek continues to be incorrectly and inconsistently reported. Map 14 and Image #14 of the December 2000 Wetland Delineation Report show correctly that there are three tributaries to the start of Walker Creek within Wetland 44. These constitute the headwater of Walker

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[22] Revised Code of Washington, RCW 90.74.005 to 90.74.020 is located in Title 90 Water Rights-Environment.

[23] NRMP Appendices A-E, Sheet STLA-9805-C5.

[24] Dyanne Sheldon, February 16th comments on Seattle, Port of, 1996-4-02325

Creek, which begins east of SR509 in Wetland 44. The tributaries are seasonal seeps in the upslope areas, one of which is located east of 12th Avenue South. From there, Walker Creek travels west through a culvert crossing under SR509 to Wetland 43.

Although the correct information is available in the wetland delineation report, maps of the area in the NRMP shows the headwater of Walker Creek as the outlet of Wetland 43, and the text contained in Section 4.3.2.11 of the Wetland Functional Assessment and Impact Analysis (December 2000) repeats this misrepresentation. The report incorrectly states, "There are no perennial 'headwater seeps' that provide significant base flow to Walker Creek in the area where the embankment fill impacts Wetland 44." In fact, both Map 14 and Image #14 clearly show three tributaries to Walker Creek. Two of them become one perennial stream within the location of the embankment fill. Figure 5a shows the delineated boundary of Wetland 44 presented in Map 14 of the NRMP. Next to it, Figure 5b shows a map of the runway embankment footprint, as shown in Figure 3.1-1 of the NRMP, overlaid on Figure 5a. It shows that the southern-most tributaries are scheduled to be under the embankment fill.

In a previous version of the NRMP (August 1999), Map 10 of the Wetlands Atlas shows Walker Creek originating from the culvert under SR509 and flowing west and northwest until it disappears in under the wetland vegetation (provided in Figure 6a). Curiously, this creek channel, which actually exists, is not shown in the December 2000 Wetland Delineation Report map of Wetland 43 (provided in Figure 6b). This conceals the facts that the embankment construction will fill a portion of the headwaters of Walker Creek and that significant disturbance will occur within the remainder of the headwater wetland from construction activities. This serious harm to the headwater of Des Moines Creek hidden in contradictory reports subverts the permit review process.

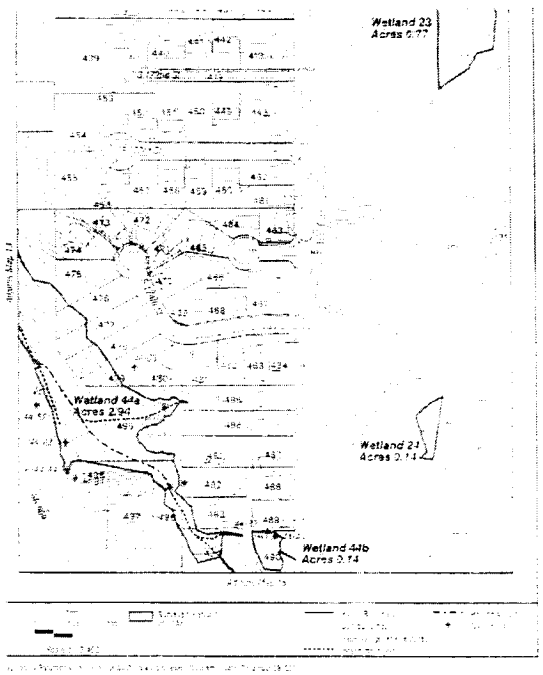

Figure 5a. Wetland 44 boundaries.

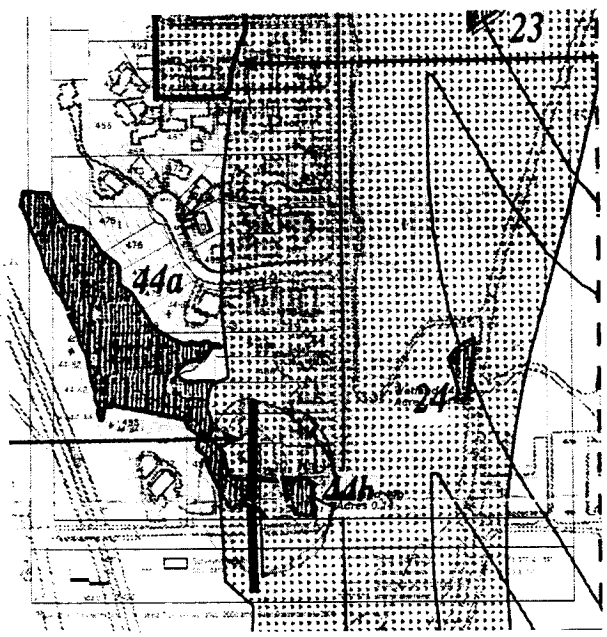

Figure 5b. Embankment footprint in relation to Wetland 44 boundaries.

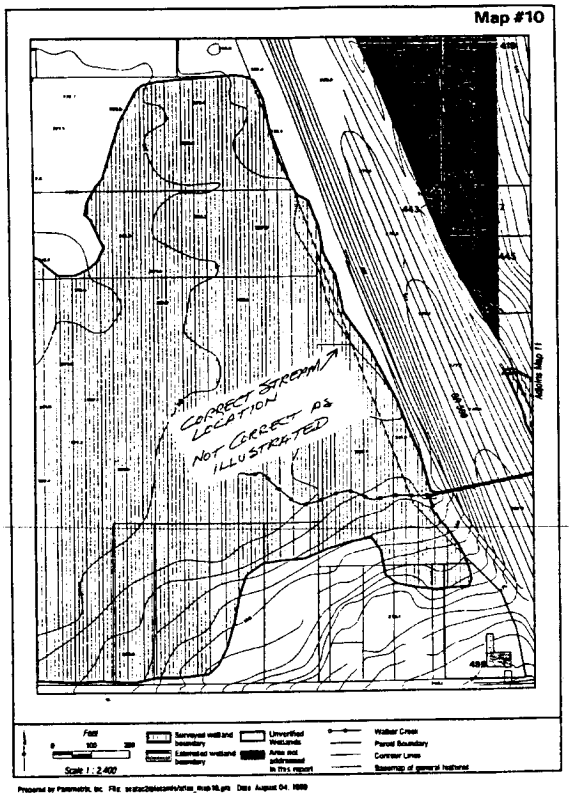

Figure 6a. Map 10 from August 1999 NRMP shows Walker creek channel.

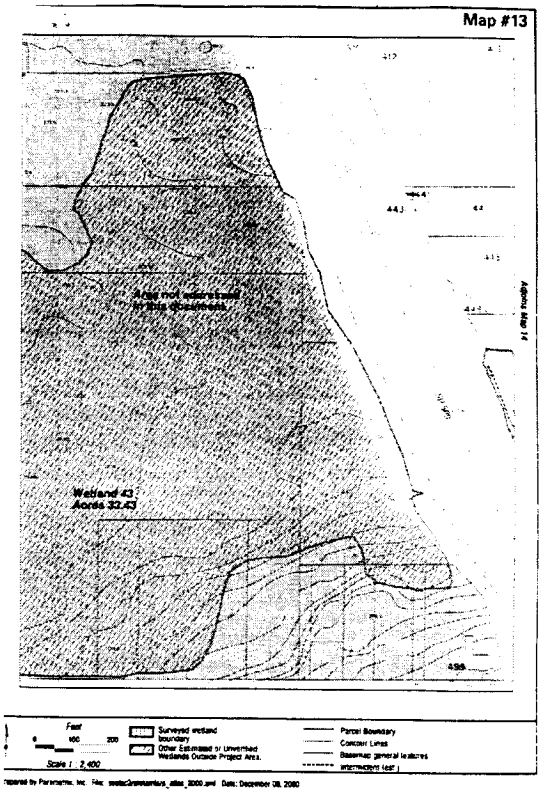

Figure 6b. Map 13 from December 2000 NRMP shows no creek channel.

The NRMP states that the stormwater system of SR509 is the headwater to Walker Creek because of its contribution to Walker Creek flows.[25] Although stormwater flows from SR509 may substantially increase Walker Creek, they cannot accurately be construed as the creek headwaters. The landscape position of Wetland 44 in relationship to 43, the presence of a clearly defined channel, and the perennial stream flows cited in the descriptions of Wetland 44 are clear evidence that Walker Creek's headwater is located in Wetland 44 and not in Wetland 43.

Tributary flow volume is an unusual definition of a headwater. Although there are different ways to define a headwater, the generally accepted definition is that a headwater is defined by the furthest upstream tributary (from the mouth) that has a perennial flow. Using this more appropriate definition, Wetland 44 and its tributaries comprise the Walker Creek's headwater. Headwater wetlands and tributary seeps have an important ecologic and hydrologic role in maintaining function in a creek system and are protected for that reason. Filling a headwater wetland will alter a stream's condition profoundly. The runway embankment fill will negatively affect the Walker Creek system by filling the upland seeps and portions of the wetland that comprise Walker Creek's true headwater.

Summary

The proposed fill activities in wetlands simply do not comply with Part 230 of the Section 404 Guidelines, nor do they preserve water quality in the Miller and Des Moines Creek systems. They are likely to result in significant degradation of the aquatic ecosystem under Part 230.10(b). The proposed

[25] Wetlands Functional Assessment, p. 4-64.

project does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem. Moreover, in several key areas, there is insufficient information to support the claim that the proposed discharges will comply with Section 404 approval requirements. These shortcomings include no analysis of cumulative effects, no clear proposal of how to maintain hydrology to remaining wetlands, and no analysis of the impact the loss of the critical remaining wetlands in the Miller and Des Moines Creek watersheds will have on water quality and fisheries resources. Finally, the proposal ignores practicable in-basin mitigation alternatives that would likely have much less adverse impact on the affected aquatic ecosystems.

Thank you for your time spent in reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Attachments:

Azous Environmental Sciences Comment Letters Dated:
A. August 16, 2000
B. September 1, 2000
C. Vita: Amanda Azous

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EXHIBIT E

July 6, 2001

Ms. Muffy Walker
US Army Corps of Engineers
Regulatory Section, Seattle District
PO Box 3755
Seattle, WA 98124-2255

Ms. Gail Terzi
US Army Corps of Engineers
Regulatory Section, Seattle District
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Ms. Ann Kenny
Senior Environmental Specialist
Shorelands and Environmental Assistance Program
3190 - 160th Avenue Southeast
Bellevue, Washington 98008-5452

RE: 1. Seattle, Port of, 1996-4-02325
2. Port of Seattle's Response to Previous Comment Letters on impacts to wetlands, streams and fisheries resources resulting from proposed 3rd runway and related development actions at Seattle-Tacoma International Airport.

Dear Ms. Walker, Ms. Terzi and Ms. Kenny,

The following comments address recent Port of Seattle's responses to continuing questions raised by Azous Environmental Sciences (AES), the Environmental Protection Agency (EPA) and the Corps of Engineers (Corps) regarding the potential impacts to wetlands and streams resulting from the proposed 3rd runway and related development actions at Seattle-Tacoma International Airport.[1]

Attachment A provides a list of documents reviewed previously, several of which are referred to in this report. The following documents were also reviewed and are addressed in this report:

- Response to 2000 Public Notice Comments [Draft]. March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport.
- Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02.
- Wetland Function Assessment and Impact Analysis. Seattle Tacoma International Airport Master Plan Update. December 2000April 2001. 556-2912-001.

[1] Response to 2000 Public Notice Comments [Draft]. March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport.

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- CENWS-OD-RG. Memorandum for the Record (MFR). Subject: Meeting with the Port. Enclosures 1 and 2 containing water level data and data sheets from the Wetland Functional Analysis. Parametrix, Inc.
- Memo from Sally Marquis, Manager Aquatic Resources Unit, United States Environmental Protection Agency Region 10, to Colonel Ralph Graves, District Engineer, Seattle District, Corps of Engineers, dated June 8, 2001 listing issues of concern related to 1996-4-02325.
- Memorandum for the Record (MFR). CENWS-OD-RG. April 24, 2001. Subject: Summary of telephone conversations with Elizabeth Leavitt and/or Jim Kelly regarding Corps review of the draft response to comments from Azous and Sheldon.

Based on these latest documents, recently made available to ACC, the proposed fill activities in wetlands still do not comply with Part 230 of the Section 404(b)(1) Guidelines. The Port's proposal neither preserves water quality nor prevents adverse impacts to aquatic resources in the Miller and Des Moines Creek systems. The proposed STIA Masterplan Update Improvements are likely to result in significant degradation of the aquatic ecosystem under Part 230.10(c)(3).

The proposed project does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem. In several key areas, the Port has supplied insufficient information to support the claim that the proposed discharges will comply with Section 404 approval requirements. The shortcomings of the Port's proposals continue to include inadequate compensation for the lost wetlands and aquatic resource functions and no analysis of cumulative effects including no evaluation of the impact of eliminating a significant proportion of the remaining wetland acres in the Miller Creek watershed.

The decision on what constitutes equivalent mitigation for impacts resulting from the construction of the Third Runway in this proceeding will set a far-reaching standard. Defining "one-for-one functional replacement" in permits requiring mitigation is fundamental to the Clean Water Act's protection for wetlands and necessary to achieving progress towards the state and national goal of no net loss.[2] Purported mitigation that depends on enhancement without regard to loss of critical wetland functions is fundamentally flawed and has demonstrably failed to stem the tide of wetland loss nationally or in Washington State.[3,4] To allow this will result in a significant diminution of the character, quality and functioning of remaining wetlands in the Miller and Des Moines Creek watersheds. Decisions made here will affect wetlands protection efforts throughout the region and will foretell the success of your agencies in achieving national and Washington State mandates well into the future.

The Net Loss Remains

The objective of mitigation for unavoidable impacts is to offset environmental losses. The Memorandum of Agreement Between the Environmental Protection Agency (EPA) and the US Army Corps of Engineers (Corps) prescribes that mitigation will provide, at a minimum, one for one

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[2] Memorandum Of Agreement Between The Environmental Protection Agency And The Department Of The Army Concerning The Determination Of Mitigation Under The Clean Water Act Section 404(B)(1) Guidelines, February 6, 1990. Section III.B.

[3] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy.

[4] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000.

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functional replacement, specifically mentioning that there be no net loss of values, and directs that the mitigation be planned with an adequate margin of safety to reflect the expected degree of success associated with the mitigation plan. After reviewing recent responses to questions and requests for information provided by the Port to the Corps, the essential question remains unanswered: How does the mitigation proposed by the Port for filling wetlands in the Miller and Walker Creek watersheds provide one for one replacement of functions being lost?

In answer to this question the Port, in its March 19, 2001 response to the Corps, refers the reviewer to Chapters 3, 4, 5 and 7 of the Natural Resources Mitigation Plan (NRMP) as well as tables 30-3 (which does not exist in the NRMP) and Tables 4.1-1 through 4.1-3.[5] These were reviewed previously and formed the basis of the February 16th comment letter by AES. Referring the reviewer back to documentation already identified as incomplete is not responsive to the questions posed. The Port has failed to resolve the following outstanding issues (among others), each of which is addressed below:

- Unaccounted For Loss Of Wetland Functions
- Reduced Organic Carbon Production From Loss of Wetlands
- Unaccounted for Loss of Wetland Landscape Functions
- Underestimated Permanent Impacts
- Unaccounted for Loss From Out of Watershed Exchange for Miller and Des Moines Creek Functions
- Functional Loss From Unaccounted for and Unmitigated Cumulative Effects
- Functional Loss From Underestimated Hydrologic Impacts

Unaccounted For Loss Of Wetland Functions

The Port's March 19th submission to the Corps acknowledges the request for an overall logical accounting of the wetland area and functions proposed for elimination in several responses including number 2, 6, 7, 9, and 28, which all refer the reader to Chapter 4 of the NRMP and Tables 4.1-1 through 4.1-3. However, the data presented in these tables simply do not provide a quantitative analysis of one-for-one functional exchanges. Tables 4.1-1 to 4.1-3 are nothing more than lists of proposed mitigation activities. The tables and accompanying discussion claim that individual listed activities will mitigate for other listed losses, but the Port does not demonstrate through quantitative analysis or scientific references that the activities proposed will, in fact, mitigate for the wetland functions eliminated.

As an example, tables 4.1-2 and 4.1-3 of the December 2000 NRMP state that in-basin mitigation will restore 6.6 acres of prior converted cropland to provide flood storage eliminated by constructing the runway embankment in the Miller Creek floodplain.[6] Yet, the wetlands data provided by the Port, when analyzed, show that only 20 percent of wetland acres eliminated were

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[5] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, Responses 2, 6, and 9.

[6] *Natural Resource Mitigation Plan (NRMP);* Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc. Pages 4-7 to 4-10.

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ranked moderate to high for flood storage functions.[7] Why is flood storage the primary goal of the major in-basin restoration activity when flood storage is not the predominant wetland function being eliminated? Flood storage serves the Port, but it does not serve the Clean Water Act requirement to mitigate one-for-one losses of aquatic system functions.

When acres of wetlands are evaluated with respect to the functions they provide within the watershed, the most important functions provided by the wetlands the Port proposes to fill are nutrient cycling, sediment trapping, groundwater exchange, habitat for small mammals, passerine birds and to a lesser extent amphibians. In addition, the Port identified 50 percent of the wetland acres as moderate to highly valued for organic export and 43 percent for their function in supporting resident anadromous fish. Yet, the scientific basis for and the area extent of mitigation activities planned to compensate for these critical wetland functions, identified within the Miller and Des Moines Creek watersheds by the Port in its Wetland Functional Assessment, are not disclosed in Tables 4.1-1, -2 or 4.1-3.

The Port's March 19th response to this significant flaw in its mitigation strategy (Response No. 7) demonstrates its confusion. Figure 1 in the AES comment letter of February 16, 2001 shows that the Port has ranked the majority of wetland acres it proposes to eliminate as having moderate to high nutrient sediment trapping and groundwater exchange functions and low to moderate flood storage functions. Instead of *demonstrating* that the most highly ranked functions provided by the wetlands proposed for elimination in the watershed will be mitigated, the Port focuses on AES's use of two summarized categories of the Port's five rankings for the wetlands, as if examining only two categories weakens the need to assess whether the proposed mitigation is quantitatively equivalent or better. In doing so the Port missed the point that it has not tied the acres of wetlands proposed for elimination to the functions they provide and matched it with a mitigation package that will meet the regulatory standard of functional replacement. AES used two categories for purposes of simplifying the analysis so the point would be more easily understood. The same analytical procedure could be performed by the Port, using all five rankings, to relate the mitigation proposal to the functions provided by the wetlands the Port proposes to eliminate and would result in analogous outcomes.

The Port offers Table 3-3 of the Wetland Functional Assessment and Impact Analysis, which provides rankings for eight wetland functions for the impacted wetlands, as the proof that it has used data to design mitigation offering equivalent functions.[8] But, Table 3-3 is simply a list ranking each impacted wetland for each function. It does not relate wetland area to eliminated functions and does not demonstrate any connection with the Port's mitigation proposal. Simply listing a series of rankings for each wetland does not relate the functions lost to the functions proposed for creation. In the AES February 16th comment letter it was demonstrated that, when measured in terms of the number of wetland acres providing the most highly valued functions, there was a significant disparity between the functions lost and gained.

Tables 24 through 28 in the May 11th Port response to the Corps also list impacts to the ecological functions of wetlands to be affected by the Port's proposal. These descriptions are informative but again neglect to quantify the relationship between function, area and mitigation

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[7] Figure 1. Functional rankings assigned to wetlands being eliminated for the Third Runway Project. Comments on impacts to wetlands, streams and fisheries resources resulting from proposed 3rd runway and related development actions at Seattle-Tacoma International Airport. Azous Environmental Sciences. February 16, 2001.

[8] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 2. Response 7.

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proposed.[9] Regardless of whether Ecology or the Corps exercises authority to limit the scope of options in a mitigation plan to areas on or near the project site or to habitat types that are the same as those proposed for elimination by the project, your agencies are tasked to approve plans that clearly provide equal or better biological functions and values within the watershed.[10, 11] Establishing equivalency can only be assured with an accounting of losses and gains, and to account for losses and gains the exchange must be quantified. When recent in-depth studies by Ecology and the federal government demonstrate that mitigation more often than not fails, it is essential under the Clean Water Act that the proposed wetland elimination be denied unless the Port can quantify functional losses and prove it can mitigate to *effectively* stem further degradation of Miller and Des Moines Creek aquatic habitats prior to wetland destruction.[12, 13]

Although the Port describes its mitigation proposal as mostly on-site and in kind, the proposal has no break down of in kind and out of kind mitigation provided to substantiate the claim.[14] A review of the mitigation activities listed in Table 4.1-3 of the NRMP shows that with the exception of the 6.6 acre Vacca Farm restoration, the remaining 60.4 acres of in-watershed mitigation is enhancement; 41.8 acres of enhanced buffer and 18.61 acres of enhanced wetland. The failure of enhancement activities to compensate for wetland loss is well documented in the scientific literature.[15, 16] Yet the Port is arguing that enhancement of an upland buffer and remaining wetlands is an equivalent functional exchange for eliminating 18.37 acres of existing wetlands. Here, the riparian wetlands targeted for elimination by the Port have far superior water quality and water storage functions in comparison to the upland buffer the Port intends to restore.[17, 18] Moreover enhancement of the Miller Creek riparian buffer and remaining wetlands could actually reduce those area's effectiveness for water quality and storage functions because of disturbance to the soil.[19] Such an exchange of functions is not based on sound science and does not meet the standard of in-kind.[20]

The National Academy of Sciences (NAS) has just issued a comprehensive study evaluating the efficacy of mitigation practices to restore and maintain no net loss under the Clean Water Act. The study concluded that the functions of a wetland proposed for fill need to be precisely characterized and quantified, as should the functions of the proposed compensatory mitigation.[21] The NAS study

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[9] *Response to Corps Request for Information– Section 404(b)(1).* May 11, 2001. STIA Masterplan Update Improvements. 50248448.02. Tables 24-28, pp. 53-62.

[10] RCW 90.74.020(2).

[11] Part 230.75 Section 404(b)(1) Subpart H.

[12] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000.

[13] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy. p.2.

[14] *Natural Resources Mitigation Plan* (NRMP), Parametrix, Inc., December 2000. Page 4-1

[15] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy.

[16] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000. DOE found only 14% of enhancement projects met performance standards for the mitigation.

[17] Dunne and Black 1970. *Partial area contributions to storm runoff production in permeable soils.* Water Resources Research 6:1296-1311.

[18] Dunne and Leopold 1978. Water in Environmental Planning. San Francisco, W. H. Freeman.

[19] Shaffer, P. W and T. L Ernst. 1999. Distribution of soil organic matter in freshwater emergent/open water wetlands in the Portland, Oregon Metropolitan Area. Wetlands 19:505-516.

[20] The need to quantify and explain the basis for one for one functional exchange was extensively discussed in comments dated August 16, 2000 and September 1, 2000 from Azous Environmental Sciences.

[21] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy., p 108.

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also concluded that mitigation is often focused on too few functions, often leaving out functions that are critical to the watershed, such as hydrologic connectivity and hydrogeomorphic characteristics. Since hydrology is the important determinant of wetland functions, best available wetland science requires that restoration and mitigation in Miller and Des Moines Creek watersheds result in mitigation that re-establish the natural wetland's hydrogeomorphology to improve the likelihood of actually mitigating the lost wetland functions.[22] Although the Port provides the hydrogeomorphic class of the wetlands proposed for fill, project documentation offers no evidence that this information was used to develop the mitigation strategy for replacing lost wetland functions.

The importance of quantifying functional exchanges cannot be emphasized enough because as permitted wetland alterations change the number, types and positions of wetlands on the landscape, maintaining the diversity of hydrologic regimes becomes more difficult and increasingly critical to preserving the diversity of functions provided by wetlands.[23, 24, 25, 26] To date the Port has failed to demonstrate that its plan can mitigate for the loss of slope and riverine wetland functions. As a consequence the agencies are left with a proposal for largely ineffectual enhancement activities.[27]

Reduced Organic Carbon Production from Loss of Wetlands

The Port argues in its March 19th response that there will be no loss of organic carbon export to the Miller Creek and Des Moines Creek systems because enhancement plantings in buffer areas and in Vacca Farm will offset the loss of wetlands that currently provide that function.[28] The Port promises, with no scientific substantiation, that enhancement of the buffer will offset the losses of productive wetlands. The Port's response to concerns about the cumulative harm to the structure and function of the aquatic food web, in particular through the loss of production of organic carbon, is to state that organic carbon production will be enhanced from the present condition. But, the Port provides no supporting evidence that this will be the case and the claim is contrary to scientific understanding concerning the role of uplands versus wetlands in organic carbon export.

The boundary zones (ecotones) between land and inland wetlands and streams are the principal routes for the transport of organic matter and nutrients within a watershed.[29] The condition of plants growing in water or saturated soil provides a steady supply of water and nutrients that have the potential to support high productivity, typically three or more times the organic carbon

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[22] Shaffer, P. W., M. E. Kentula and S. E. Gwin. *Characterization of Wetland Hydrology Using Hydrogeomorphic Classification.* Wetlands, Vol. 19, No. 3, Sept. 99, pp. 490-504.

[23] Kentula, M. E., R. E. Brooks, S. E. Gwinn, C. C. Holland, A. D. Sherman, and J. C. Sifneos. 1992. An approach to Decision Making in Wetland Creation and Restoration. Island Press, Washington DC, USA.

[24] Holland, C. C., J. E. Honea, S. E. Gwinn and M. E. Kentula. 1995. *Wetland Degradation and Loss in a Rapidly Urbanizing Area of Portland Oregon.* Wetlands 15:336-345.

[25] Bedford, B. L. 1996. *The need to define hydrologic equivalence at the landscape scale for freshwater wetland mitigation.* Ecological Applications 6:57-68.

[26] Gwin, S. E., M. E. Kentula and P. W. Shaffer, 1999. *Evaluating the effects of wetland regulation through hydrogeomorphic classification and landscape profiles..* Wetlands 19:477-489.

[27] Shaffer, P. W and T. L Ernst. 1999. *Distribution of soil organic matter in freshwater emergent/open water wetlands in the Portland, Oregon Metropolitan Area.* Wetlands 19:505-516.

[28] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 11 Responses 34-38.

[29] Hillbricht-Ilkowska, Phosphorus and Nitrogen Retention in Ecotones of Lowland Temperate Lakes and Rivers, HYDROBIOLOGIA, 1993, Vol. 251, No. 1-3.

produced by an upland woodland shrub complex.[30] The soil of a wetland is the locus of most of the physical, chemical and biological processes that give wetlands the ability to improve water quality. Sediment retention takes place at the soil surface. Soil permeability affects its ability to store and convey water. More than planting trees and shrubs is required to offset the functional losses caused by excavating and removing the wetland soils, especially as the planned enhancement activities likely will adversely disturb the remaining soils.

The Port has also stated that replanting Vacca Farm will increase the potential for carbon export functions from the area, providing mitigation for the role existing wetlands play.[31,32] The Port's proposal is to excavate and regrade the soils at Vacca Farm. Although planting trees and shrubs might otherwise eventually improve organic carbon export, nutrient cycling and sediment trapping at Vacca Farm, it is unlikely to occur any time in the near future as the most productive soils will be excavated and graded. As a result, the production of organic carbon will likely be significantly diminished for many years.[33]

The Port's May 11th response to the Corps also contradicts its claim that it is adequately protecting aquatic resources. On page 18 the Port argues that the very high concentrations of organic carbon (OC) currently found in Miller and Des Moines creeks will limit bioavailability of copper and zinc from the Port's stormwater discharges. The assessment that OC is sufficient to perform this role is based on 11 samples taken from different locations along Des Moines and Miller Creeks. Four of the eleven samples were taken January 14, 1999, five on April 13th, 2001 and two on April 14th, 2001. The Port's sampling regime provides no historical record because each sample location was sampled only once; it provides no seasonal record because all samples were taken in January or April in different locations; and it offers, at best, a very limited snapshot view of OC in Miller and Des Moines Creeks because too few samples were taken on each stream system in the same day.

Although some of the samples collected show high levels of OC, the Port offers no evaluation of or data on the source of organic carbon (OC), whether seasonal changes might affect OC availability, or a candid assessment of whether the Port's activities such as the proposed Vacca Farm excavation will diminish OC availability. This information is essential if the Port is citing the presence of ample OC to prevent water quality degradation from its contribution of zinc and copper. In addition, the Port has still not defined the role of Miller Creek's adjacent wetlands and hillslope seeps to the high organic carbon levels on which it relies to avoid impacts to aquatic species. Without a better analysis of the relationship of existing wetlands to the organic carbon levels found in Miller and Des Moines Creeks and without more scientific foundation to the Port's claim, there is no reasonable assurance that the remaining aquatic resources will be protected from further degradation.

The issue of organic carbon is also important in evaluating the functional role Miller and Walker creek wetlands play in providing food web support to the creeks.[34] Part 230.31(a) and (b) of the

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[30] Barnes and Mann, Fundamentals of Aquatic Ecosystems. Tables 4.1 and 11.1.

[31] Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02. Table 30, p. 70.

[32] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 11 Items 34-38.

[33] Day, F. P. Jr. and J. P. Meginigal 1993. *The relationship between variable hydroperiod, production allocation, and below ground organic turnover in forested wetlands.* Wetlands 13:115-121.

[34] This issue was previously discussed in February 16, 2001 comments by Azous Environmental Sciences to USACE and DOE.

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Section 404(b)(1) Guidelines refer to potential impacts that alter or eliminate populations in lower trophic levels, such as detrital feeders, and thereby impair the energy flow of primary consumers to higher trophic levels. The guidelines go on to point out that the reduction and possible elimination of food chain organism populations can decrease the overall productivity and nutrient export capability of an aquatic system. In addition to the threat of lead and zinc affecting stream chemistry, the metals that are expected to bind to organic carbon instead of fish gills are still likely to end up in the food chain when filter and detrital feeders consume the organic carbon, resulting in significant adverse consequences to the entire aquatic community.[35] Understanding that organic carbon is both the basis of the food web in Miller and Des Moines Creeks *and* the Port's argument for justifying increasing zinc and copper loadings in the creeks, it is prudent to demand a more rigorous analysis of the Port's claim that water quality standards will be met and the food web will not be affected.

Unaccounted for Loss of Wetland Landscape Functions

The filling of wetlands heavily influences the aquatic resources provided by urban watersheds. Fills redistribute and reform the wetland landscape usually adversely affecting watershed resources.[36, 37, 38] For example, permitted wetland activities in three Portland urban landscapes altered the wetland mosaic by decreasing the proportion of slope and riverine wetlands present and increasing the proportion of depressional wetlands.[39] This is a significant alteration of these watersheds because hydrologic conditions affect primary production and the allocation of fixed carbon in plants, which determines the pool of carbon that is available for soil production and to the food web of aquatic systems.[40, 41, 42] This scenario is very similar to Miller Creek, where slope and riverine wetlands are being eliminated from the watershed and replaced primarily by enhancement plantings and the restoration of a wetland designed primarily for periodic water storage. Again a predictable result of the landscape level alteration of wetland distribution in the Miller and Des Moines Creek watersheds is a decrease in the availability of carbon for soil production and food web support, a reduction in available aquatic habitat and an overall degradation of watershed resources from loss of wetland landscape functions. Simply stating, as the Port does, that adverse impacts won't occur in the watershed from its activities, does not provide reasonable assurance when studies of similar situations suggest otherwise.

Underestimated Permanent Impacts

The Port's May 11, 2001 Response to the Corps incorrectly states that lower quality category III and IV wetlands dominate the acres of impacted wetlands on the West Side. The Port's response

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[35] See discussion on Aquatic Invertebrate Response to Zinc Exposure in Fundamentals of Urban Runoff Management. Horner, R. R., J. J. Skupien, E. H. Livingston and H. E. Shaver. Terrence Institute and USEPA. August 1994. Pp. 51-52. Study indicated intermittent episodes of low loadings (0 to 30 µg/L) of zinc resulted in significant reductions in live Amphipods.

[36] Kentula, M. E., J. C. Sifneos, J. W. Good, M. Rylko and K. Kunz. 1992. *Trends and patterns in Section 404b permitting requiring compensatory mitigation in Oregon and Washington, USA.* Environmental Management 16:109-119.

[37] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000.

[38] *Wetland Mitigation Replacement Ratios: An Annotated Bibliography*, Publication #92-09, February 1992.

[39] Gwin, S. E., M. E. Kentula and P. W. Shaffer, 1999. *Evaluating the effects of wetland regulation through hydrogeomorphic classification and landscape profiles.* Wetlands 19:477-489.

[40] Kantrud H. A., J. B. Millar, and A. G. van der Valk. 1989, *Vegetation of wetlands in the Prairie Pothole Region.* P. 132-187. *In* A. G. van der Valk (ed.) Northern Prairie Wetlands. Iowa State University Press, Ames, IA USA.

[41] Day, F. P. Jr. and J. P. Meginigal 1993. *The relationship between variable hydroperiod, production allocation, and below ground organic turnover in forested wetlands.* Wetlands 13:115-121.

[42] Wetzel R. G. 1983. Limnology. Saunders College Publishing Company, Philadelphia, PA USA.

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refers the reader to a Table that is not identified but is likely meant to be Table 2, which follows the paragraph.[43] In actuality, the majority of wetlands impacted on the West Side are Category II (8.37 acres), which is 59 percent of the total 14.23 acres the Port has predicted will be impacted on the West Side.[44] The 5.86 acres or 41 percent (referred to by the Port as 70 percent of the wetlands) are mostly Category III wetlands comprising 4.89 acres and only 0.97 acres (7 percent) are Category IV wetlands. It is revealing that the Port continues to misstate the value of the wetland resource of Miller Creek to the extent that it both failed to crosscheck its conclusions with its previous documentation or properly analyze the data found in its own table. The result is a serious failure, intentional or not, to objectively evaluate the functions of Miller Creek wetlands.

As part of its refusal to provide an accurate evaluation for agency review, the Port continues to claim it is only impacting an already degraded wetland system without addressing the important, if not desperate role, the remaining wetlands play in maintaining existing aquatic uses. The Port attempts to deflect criticisms on this point by discussing differences between Ecology's wetland rating system and a wetland functional assessment system.[45] But this response does not address the key issue, which is that wetland functions are dependent upon wetland structure (which is the basis of Ecology's wetland rating system). Eliminating 56% of the Class II wetlands (which have more structural elements than Class III and IV wetlands) will reduce the structural diversity of the remaining system thereby reducing the level of wetland function disproportionate to the lost acreage. The Port pretends that this permanent loss will not occur and proposes no mitigation for it.

In its March 19th response to the Corps, the Port claims that "reductions in wetland size will result in little or no impact to wetland functions" and argues that small remnants, such as the 0.04 acres remaining of Wetland R1, the 0.03 acres remaining of Wetland A12, should not be included in tallies of permanent impacts. The Port argues that such wetlands will continue to provide one for one area replacement of all functions found in the original wetland, even though these wetland remnants are subjected to "temporary" construction impacts.[46] According to the Port, temporary impacts from the project include temporary access roads, temporary sediment and erosion control ponds, staging areas and stockpiling areas.[47] These are all activities that severely compact and disturb soil, interrupt drainage patterns and adversely impact habitat functions.

The successful restoring of wetland functions is highly dependant on the degree of disturbance to hydrology, organic soils and vegetation structure. The National Academy of Science (NAS) found that the time for reaching equivalency for soil, plant and animal components in wetland restoration projects ranged from more than three to 30 years for soils, 10 years or more for below ground biomass and more than five to 10 years for establishing a target species composition with the

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[43] Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02. Response 4, Section 2(b)(1) Description of Discharge Sites, West Side (Third Runway), p. 9.

[44] *Natural Resource Mitigation Plan (NRMP)*; Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc. Table 3-1, Pages 3-2 to 3-3.

[45] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 3 Items 10-11.

[46] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 5 Item 15.

[47] Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02, p. 63.

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higher time frames representing wetlands with greater damage.[48] The Port's analysis of what constitutes a "temporary" impact, described in its May 11th response to the Corps, is inconsistent with the NAS analysis. The Port proposes to re-establish pre-disturbance conditions by removing stockpiled fill material, aerating soils and planting with native forest and shrub vegetation--all of which are unlikely to result in a restoration of wetland functions to these highly impacted wetlands within a reasonable time frame. The wetlands utilized for temporary roads, erosion control, staging and stockpiling will be heavily damaged by these activities. According to the NAS study, these high disturbance activities will significantly reduce the predictability of the restoration effort and require many years to reach equivalency. Further, based on the Port's own estimate of construction time frames ranging from one to as long as five years, such as for Wetland 18, the Port's claim of temporary impacts absurd. The acknowledged permanent loss of most of Wetland 18 in addition to the long term consequences of "temporary" impacts to most of its remaining 0.72 acres effectively removes the majority of its wetland functions from the Miller Creek system for 15 or more years--hardly a temporary impact.

In summary, the Port uses the notion of "temporary" impacts to describe what, in the case of wetlands 18, 37, A12 and R1, will be activities which disturb wetland functions to the extent the remaining portions will require complete reconstruction. The NAS study calls into serious question how the extent of wetland alterations proposed by the Port could be classified as temporary given the timelines for reaching equivalency. Add to that the Port's optimistic but mistaken view that small remnants will provide one for one area replacement of all functions found in the original wetland, and the Port's argument that it has accurately tallied permanent adverse impacts from temporary ones loses significant credibility.

The Port also underestimates permanent functional losses in its May 11th response to the Corps when it claims that most riparian functions provided by Wetlands 18 and 37 will remain because fill in the wetlands will be limited to areas greater than 50 feet from Miller Creek.[49] The Port's assertion that the functions provided by riparian wetlands, including wetlands 18 and 37, are located only in the first 50 feet adjacent to the stream is not referenced and is not supported by science. The Port takes the position that the almost eight acres of wetlands lost between wetlands 18 and 37 provide little or no functional support to the less than one acre of undisturbed (according to the Port) wetland that will remain of each when the Port's project is constructed. A review of studies which measured upland buffer effectiveness according to environmental indicators, such as levels of benthic invertebrates and salmonid egg development in the receiving water, generally found that *at least 98 feet* was needed to effectively buffer a stream in order for it to maintain shade, retain a water temperature low enough for salmonid habitat and to maintain contributions of large woody debris.[50, 51] Those studies looked at upland buffers and did not even consider the added functions provided by riparian wetlands, such as those here, which provide associated habitat, water quality treatment and hydrologic support to a stream in addition to shade and temperature control.

The Port claims that it has accurately accounted for permanent wetland impacts relies heavily on the preservation of seepage flows from the embankment wall as a means of retaining functions in

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[48] Compensating for Wetland Losses Under the Clean Water Act. National Academy of Sciences Committee on Mitigating Wetland Losses. National Academy Press, Washington DC. 2001 Pre-Publication Copy. P. 36 Table 2.2.

[49] P 55 Biological Functions. Response to Corps Request for Information– Section 404(b)(1). May 11, 2001. STIA Masterplan Update Improvements. 50248448.02.

[50] *Wetland Mitigation Evaluation Study Phase 1*, Department of Ecology Publication No. 00-06-016, June 2000. p. 48.

[51] *How Ecology Regulates Wetlands*, Washington State Department of Ecology, Publication 97-112 (Revised April 1998). Section: The Case for Buffers..

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the remnant wetlands left after construction. But the ability to maintaining seepage flows from the embankment wall while maintaining the wall's structural stability has not yet been demonstrated as feasible.[52] The Port's non-responses to concerns expressed by AES regarding how stormwater management and erosion controls will operate effectively while maintaining seepage flows to wetlands is contained in the Port's March 19th letter to the Corps.[53] The Port essentially repeats information that has been provided in previous documents and refers the reader to the Wetland Functional Assessment and Impact Analysis report which, in combination with AES's reviews of the NRMP appendices and the Port's Stormwater Management Plan (SMP), generated the concerns over inconsistencies between the documents in the first place.

Finally, the Port acknowledges no permanent impact from the construction dewatering that will occur to depths of 20 feet and to lateral distances of ten's of feet in the construction area.[54] Although the Port describes this impact as "very limited", that conclusion cannot be supported when the remaining buffer between construction activities and Miller Creek is often only 50 feet and in some cases as narrow as 30 feet. The Port's dewatering activities will interrupt seepage flows to the remaining slope and riparian wetlands and potentially may affect hydrology in Miller Creek. Dewatering, even "temporarily", the wetlands the Port is relying on to provide critical OC support to Miller Creek and nutrient cycling functions will further reduce the Port's claimed provisions for protection of watershed aquatic resources.

Unaccounted for Loss From Out of Watershed Exchange for Miller and Des Moines Creek Wetland Functions

Off-site mitigation in the watershed is addressed by 33 CFR Part 320.4(q)(1). Off-site mitigation as long as it is within the same Water Resource Inventory Area (WRIA) is addressed by RCW 90.74.010 (1). RCW 90.74.010 (6) also specifies that a WRIA be defined as a watershed. But a WRIA is composed of many watersheds and natural resource scientists know that wetland functions are generally most valuable locally. The RCW addresses this concern in its definition of context for out of watershed mitigation, which requires a plan for managing wetland resources. The RCW stipulates the following information requirements for determining whether equal or better biological functions will result from a permit decision:[55]

> (a) The relative value of the mitigation for the target resources, in terms of the quality and quantity of biological functions and values provided;
>
> (b) The compatibility of the proposal with the intent of broader resource management and habitat management objectives and plans, such as existing resource management plans, watershed plans, critical areas ordinances, and shoreline master programs;
>
> (c) The ability of the mitigation to address scarce functions or values within a watershed;

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[52] June 25, 2001 memo from Northwest Hydraulic Consultants to US Army Corps of Engineers and Washington State Department of Ecology..

[53] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 13-15 Items 47 to 49.

[54] *Wetland Functional Assessment and Impact Analysis; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc., Appendix B, p.223-24.

[55] RCW 90.74.020 (3)

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(d) The benefits of the proposal to broader watershed landscape, including the benefits of connecting various habitat units or providing population-limiting habitats or functions for target species;

(e) The benefits of early implementation of habitat mitigation for projects that provide compensatory mitigation in advance of the project's planned impacts; and

(f) The significance of any negative impacts to nontarget species or resources.

These requirements mean that if off-site mitigation is proposed outside of the actual watershed in which impacts occur, it must at minimum, be done within a reasoned context. The selection of out of basin mitigation must have a scientific basis and be supportable in terms of long-term goals and planning strategies. The existence of a local, WRIA or state wetland plan is critical to show a framework for deciding when out of watershed mitigation is appropriate and when it will work to meet local, state or federal wetland goals. The flexibility intended by the legislation is allowed only within a sound scientific and planning context.

The small wetlands remaining in the Miller and Des Moines Creek watersheds are critical components to maintaining habitat and significantly influence the habitat suitability of the creek systems and remaining undeveloped watershed.[56, 57] The off-site mitigation plan proposed by the Port has not been tied to an identified need for wetland categories or functions at risk in the WRIA.[58] In the absence of such a proven context the Port offers a compromise of environmental protection standards in favor of flexibility spurred by its self-interest.

Functional Loss From Unaccounted for and Unmitigated Cumulative Effects

A cumulative impacts analysis is essential for compliance with the Clean Water Act regulations and to meet principles embedded in sound science. The requirement for a cumulative effects analysis is based on the recognition by state and federal agencies that project level impacts can accumulate and exceed thresholds that adversely affect a watershed beyond what would be predicted from individual reviews of proposed project components.[59, 60, 61] The Clean Water Act, State Environmental Policy Act, National Environmental Policy Act and local regulations all depend on a cumulative impacts analysis to identify any additional mitigation required to prevent degradation of watershed resources. The Port's list of projects that it identifies as a "cumulative impact assessment" is inadequate information for evaluating potential cumulative degradation to beneficial uses within the watershed.[62, 63] The need for a proper cumulative effects study was discussed in

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[56] Magee, T. K., T. L. Ernst. M. E. Kentula and K. A. Dwire. 1999. *Floristic comparison of freshwater wetlands in an urbanizing environment.* Wetlands 19:517-534.

[57] Naugle, D. E., R.R. Johnson, M. E. Estey, K. F. Higgins. 2000. *A landscape approach to conserving wetland bird habitat in the prairie pothole region of Eastern South Dakota.* Wetlands 20:599-604.

[58] LA Peyre, M. L., M. A. Reams and I. A. Medlessohn. 2001. *Linking actions to outcomes in wetland management: an overview of U.S. state wetland management.* Wetlands 21:66-74.

[59] Section 230.11(g) Section 404(b)(1) Subpart B.

[60] Memo from Sally Marquis, Manager Aquatic Resources Unit, United States Environmental Protection Agency Region 10, to Colonel Ralph Graves, District Engineer, Seattle District, Corps of Engineers, dated June 8, 2001 listing issues of concern related to 1996-4-02325.

[61] Memorandum for the Record (MFR). CENWS-OD-RG. April 24, 2001. Subject: Summary of telephone conversations with Elizabeth Leavitt and/or Jim Kelly regarding Corps review of the draft response to comments from Azous and Sheldon.

[62] Pieces of a State Wetlands Program. Recommendations of the Washington State Wetlands Integration Strategy Working Group (SWIS).

detail in my comment dated February 16, 2001 and some examples were provided to show the kinds of information that should be evaluated.

Since the February 16, 2001 comment letter I have had an opportunity to evaluate further the acres of wetlands in the Miller Creek watershed now, compared to if the proposal is permitted. There are currently approximately 37.42 acres of wetlands that are hydrologically connected to Miller Creek remaining in Miller Creek Watershed.[64] Of that set, 26.02 acres of wetlands are located in the upper Miller Creek watershed. Of those remaining hydrologically connected wetlands, 7.05 acres will be eliminated by the Port's proposal, which is 21 percent of the entire watershed and 27 percent of the upper watershed. Eliminating such a high percentage of remaining wetlands within an already degraded watershed will very likely exceed key thresholds for protecting water quality, aquatic ecosystem diversity, productivity and stability resulting in significant harm, among them reduced food web support, changes in water chemistry and alterations to invertebrate communities. Under these circumstances, the mitigation proposal offers little reasonable assurance that watershed resources will be protected. The Port's upbeat claims are conspicuously divorced from supporting data and do not provide a measurable basis for the Corps and Ecology to make a reasonable judgment of compliance.

Functional Losses From Underestimated Hydrologic Impacts

The first data offered by the Port showing pre-construction hydrologic conditions for wetlands in the construction zones is presented in Enclosure 2 of the June 25, 2001 MFR from Muffy Walker. The first monitoring date is April 15, 2000. The second is almost a year later, February 22, 2001 followed by March 29th and May 1st. This sparse database cannot be used to define pre-construction hydrology. Sampling must occur a minimum of nine times a year to establish a hydroperiod for the wetland.[65] Second, the early spring from February 1st to May 31st is the most critical period for determining wetland plant and animal communities and water depth should have been measured more frequently for that period during 2001, the only year for which such data is offered.[66] Third, sampling should not occur exclusively during a low rainfall year such as 2001 because the measured depths to saturation and to water will likely be lower than normal for the seasons measured and therefore not representative of normal conditions. Finally, the Port should not be given the benefit of the doubt for its construction activities over the last year. The pre-construction condition of wetlands has already been altered to the extent that irrigation and septic sources of groundwater flows have been eliminated, and clearing vegetation and stockpiling soils have altered the microclimate around numerous wetlands. The Port's delay in providing essential data while it altered the pre-construction landscape makes it impossible to rely on data gathered now as accurately representing pre-construction wetland conditions.

Interestingly, the Port discusses the hydrology of specific wetlands in its March 19th submission and says that performance standards for the Borrow Areas are based on observations that the

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[63] Bedford, B. L. 1999. *Cumulative Effects on Wetland Landscapes: links to wetland restoration in the United States and Southern Canada.* Wetlands 19(4):775-788.

[64] This number was derived from the Port's data identifying wetlands that are immediately adjacent or hydrologically connected to Miller Creek and from the wetland inventories provided by the Cities of Des Moines, Burien and Normandy Park. It does not include ponds or lakes.

[65] Azous and Horner. Wetlands and Urbanization: Implications for the Future. Lewis Publishers. Boca Raton, FL 2001, p. 308.

[66] Ibid., p. 312.

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wetlands lose wetland hydrology in early to mid spring.[67] The Port states that all of the wetlands near the Borrow Area lack saturated sols in the late spring and summer months. These statements imply that wetlands were observed more than once throughout some spring season. Since the Port's report was written prior to the 2001 spring monitoring of wetland water levels, the statements suggest there is other data available describing or measuring wetland hydrology. If so this data has not been published in documents reviewed to date with the exception of observed hydrologic indicators documented for one site visit. The Port should supply this data or limit its conclusions accordingly.

Summary

The Port's mitigation package is far removed from Ecology's longstanding guidelines for appropriate mitigation activities and ratios.[68, 69] The project, as proposed, is inconsistent with federal and state mandates. Encouraging flexibility in meeting no net loss is not license to abandon it. A review process open to alternative means of achieving mitigation must still require applicants to demonstrate how no net loss is being met.

The departures from best available scientific knowledge of how to effectively mitigate for wetland functional losses inherent in the Port's proposal significantly undercut the Port's claims of improving watershed resources through its proposed mitigation. These departures also leave the agencies in the uncomfortable position of being called to permit a project that ignores basic science-based principles of wetland protection. There is ample evidence from government-sponsored studies that the experiment of permitting mitigation and, in particular permitting "enhancement", in exchange for destruction of natural wetlands has failed. There should be no exceptions for the Port in applying wetland science or regulations. The decisions made here are not trivial and will set a standard for wetlands protection efforts well into the future.

The Port's responses to date are unresponsive and monotonous claims that the job is done and the Port has complied with the Clean Water Act. Notwithstanding Dorothy's experience in Oz, the Port's repeating of this claim does not make it so. There are profound negative implications for wetlands and aquatic resources from the Port's unwillingness or inability to fully comply with the Clean Water Act and the Port's attempt to apply an inferior and unscientific standard of mitigation. It is up to the agencies to resist the pressure to succumb to the Port's campaign of wearing repetition.

Thank-you for your time spent in reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Cc: Kimberley Lockard, Airport Communities Coalition (ACC)
Ms. Joan Cabreza, USEPA

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[67] *Response to 2000 Public Notice Comments [Draft]. Azous Environmental Sciences,* March 19, 2001. Master Plan Update Projects-Section 404/401 Permits. Seattle Tacoma International Airport, p. 12-13 Items 40-43.

[68] *How Ecology Regulates Wetlands,* Washington State Department of Ecology, Publication 97-112 (Revised April 1998). See discussion on Compensatory mitigation regarding adequacy of mitigation methods.

[69] *Wetland Mitigation Ratios: Defining Equivalency,* Shorelands and Coastal Zone Management Program, Washington State Department of Ecology Publication Number 92-8, February 1992.

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Attachment A: List of Documents Reviewed

- *Addendum to the Final Supplemental Environmental Impact Statement*, Auburn Wetland Mitigation Project, Port of Seattle, May 5, 2000.
- *Appendices A-E Design Drawings Natural Resource Mitigation Plan*, Seattle-Tacoma International Airport, Parametrix, Inc. No Date.
- *Assessment of Spawning and Habitat in three Puget Sound Streams*, Washington (BioAnalysts, Inc., April 1999).
- *Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., June 2000.
- *Biological Assessment*, Revised Draft, Parametrix, November 1999.
- *Comprehensive Stormwater Management Plan, Master Plan Update Improvements; Technical Appendices J, Q and R*, by Parametrix, Inc., December 2000.
- *Feasibility of Stormwater Infiltration, Third Runway Project Sea-Tac International Airport, Sea-Tac, Washington*, prepared for Port of Seattle by Hart Crouser, December 6, 2000. J-4978-06.
- *Implementation Addendum, Natural Resource Mitigation Plan, Master Plan Update Improvements*, Seattle-Tacoma International Airport, Parametrix Inc., June 2000.
- *Natural Resource Mitigation Plan (NRMP) Appendices A-E Design Drawings* dated December 2000, Parametrix, Inc.
- *Natural Resource Mitigation Plan (NRMP) Revised Implementation Addendum* dated August 2000 Parametrix, Inc., Number 556-2912-001 (03).
- *Natural Resource Mitigation Plan (NRMP)*; Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc.
- *Natural Resources Mitigation Plan*, Draft, Parametrix, Inc., July 1999.
- *Natural Resources Mitigation Plan*, Revised Draft, Parametrix, Inc., August 1999.
- *Pacific Coast Salmon Essential Fish Habitat Assessment; Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000. Number 556-2912-001 (01) (48).
- SeaTac Runway Fill Hydrologic Studies Report, Pacific Groundwater Group, June 19, 2000.
- *Seattle Tacoma International Airport (SEA) Wildlife Hazard Management Plan*, developed by Seattle-Tacoma International Airport in cooperation with US Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services, August 2000.
- *Supplement to Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000.
- *Supplemental Airport Site Wetland and Stream Analysis*, Parametrix, Inc., November 1999.
- *Supplemental Airport Site Wetland and Stream Analysis*, Parametrix, Inc., November 1999.
- *Wetland Delineation Report, Revised Draft*, Parametrix, Inc., August 1999.
- *Wetland Delineation Report; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.
- *Wetland Functional Assessment and Impact Analysis Draft*, Parametrix, Inc., July 1999.

- *Wetland Functional Assessment and Impact Analysis, Revised Draft*, Parametrix, Inc., August 1999.
- *Wetland Functional Assessment and Impact Analysis; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.
- *Wetlands Re-Evaluation Document*, Draft, Port of Seattle, August 1999.

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EXHIBIT F

AZOUS
ENVIRONMENTAL
SCIENCES

May 24, 2000

Ms. Gail Terzi and Mr. Jonathan Freedman
US Army Corps of Engineers
Regulatory Section, Seattle District
PO Box 3755
Seattle, WA 98124-2255

RE: Review of Wetlands Impacts Resulting from Construction of Temporary Interchange at SR509 and S. 176th Street.

Dear Ms. Terzi,

The Airport Communities Coalition (ACC) requested that I review the SR509 temporary interchange project associated with the construction of the third runway at Seattle Tacoma International Airport. The project is located in Burien, and construction will occur in areas to the east and west adjacent to SR509 and north of S. 176th street.

I am an environmental scientist and a professional wetland scientist (SWS certification number 001067). A package describing my background and experience is attached to this report. This letter presents my comments resulting from the review and specifically addresses the potential for impacts to Wetland 43 from the construction of the temporary interchange.

My conclusion, detailed in this report, is that construction of the temporary interchange will result in periodic discharges to Wetland 43 from of sediment-laden stormwater from both expected and unexpected stormwater events. The disturbance to the wetland resulting from these events will have significant environmental consequences to wetland water quality, aquatic habitat and may be sufficient to alter the vegetation community further affecting wetland functions.

I reviewed the project plans (signed February 24, 2000) and hydraulic report (April 12, 2000) prepared by HNTB Corporation, and the wetlands reports prepared by Parametrix, Inc. including the *Wetland Delineation Report*, *Wetland Functional Assessment and Impact Analysis*, *Wetlands Re-Evaluation Document* (all dated August 1999) and the more recent Memorandum, dated May 3, 2000, regarding *Analysis of indirect impacts to wetlands from the temporary SR-509 interchange- Seattle Tacoma Airport*. I also visited the site on May 21, 2000 and observed conditions along the west side of SR509.

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Correct Wetland Boundaries and Site Conditions Suggest Direct Discharges Will Occur

There are two issues of consequence that should be carefully evaluated. First, there are inconsistent presentations of the wetland boundaries presented in different reports, which affect the accuracy of calculations of the actual distance between the construction zone and Wetland 43. The August 1999 wetlands documents show Wetland 43 as not yet field verified and provide a generalized boundary. The February 2000 plans and April 2000 hydraulic report prepared by HNTB show what appears to be a wetland delineation map, however the wetland boundary differs from the May 5th Parametrix memo. The HNTB plans and hydraulic report locate the wetland boundary west of what looks like a stormwater treatment structure beginning south of the culvert that carries the headwaters of Walker Creek from Wetland 44 to Wetland 43. The May 5th Parametrix memo shows the wetland boundary to be about 50 feet closer, beginning at the base of the old maintenance road (approximately 12 feet wide) which lies at the bottom of the approximately 30 foot fill prism that is the roadbed for SR509.

Figure 1 shows the wetland boundary delineation (attached to the May 3rd Parametrix Memorandum) overlaid on the plan drawing TE-2 of temporary erosion and sediment controls. The figure shows that the stormwater facility is actually located in the wetland and the wetland boundary is located on the order of 50 feet closer to the construction zone than discussed in the reporting. Figure 1 also shows contours, which show that the wetland begins at the toe of the fill prism for SR509.

It is clear from the topography and the 1961 aerial photo provided in the May 5th Parametrix memo, that SR509 and the old access road were constructed through what was originally one wetland. The Parametrix report indicates that the stormwater facility shown on the plan drawings by HNTB as existing was constructed within the wetland. In addition, it is important to note that much of the wetland habitat located along the toe of the SR509 fill prism is open water, which is highly vulnerable to effects of sedimentary discharges and would also transport sediment to the Walker and Miller creek systems affecting downstream fish and wildlife resources.

Secondly, much of the construction site adjacent to Wetland 43 is located along a very steep slope, which ends near the wetland boundary. From the shoulder of SR509 moving west in the area shown on Figure 1, there is an approximately 30 foot elevation drop over about 60 feet of lateral distance to an old vegetation encrusted asphalt access road about 12 feet wide. From there the grade drops about 6 feet at 50 percent slope to the boundary of Wetland 43. Figure 2 shows a 1998 aerial photo of the area with the May 5th wetland boundary overlaying the aerial. The photo clearly shows the steep, mixed grass and shrub slope of the highway leading down to the linear feature of the old access road and the wetland boundary immediately adjacent. The dark line crossing SR509 between Wetland 43 and 44 shows the location of the culvert carrying the original drainage course that produced the wetland feature.

The proximity of the wetland to the construction zone in conjunction with the steep slope on which construction will occur means there will be direct impacts to Wetland 43 from sedimentary discharges due to rainfall events in conjunction with construction activities. Although temporary erosion control measures have been specified for the

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project, they will not prevent sedimentary discharges to Wetland 43 given the project site conditions.

In addition, it is not accepted professional practice to site stormwater facilities in a wetland due to the lack of adequate treatment that results under those conditions. The facility was improperly sited within the wetland. It is unclear from the reporting how the stormwater facility will be used in the future. The wetland should not be further altered for stormwater management purposes.

Sedimentary Discharges to Wetland 43 Will Occur

Sedimentary discharges occur primarily as a result of rainfall on unprotected soil and dusty surfaces. The movement of sediment across the landscape depends upon the landscape condition determined primarily by land cover and slope condition. In general the more vegetated the landscape the more sediment is slowed and captured before entering wetlands and streams and the flatter the landscape, the less likely sediment will travel significant distances. The poorest condition for preventing sedimentary discharges to wetlands is sparsely vegetated steep slopes, which are typical of the fill prism that is upland of Wetland 43.

Figure 3 shows results of a scientific review of several studies addressing what area is needed to protect different wetland functions. The first bar shows that discharge of sediment to a wetland requires a distance from the source of a minimum of 33 feet up to a maximum effective distance of 197 feet. Wetlands requiring only 33 feet between the sources of sediment for adequate protection are low quality wetlands with heavily vegetated buffers in flat or nearly flat terrain. Wetlands requiring a distance of 197 feet would be high quality wetlands in steep terrain with poorly vegetated land cover. Wetland 43 is a moderate to high quality wetland (Category 2) in steep terrain, at the base of a highway with a poorly vegetated upland (significant percentage of bare ground between plants). Based on the results of numerous scientific studies, sedimentary discharges to the wetland will occur, given the close proximity of the sediment source (as little as 40 feet in many areas) and the steepness of the upland construction zone.

Temporary erosion measures are planned and have been installed already on the site. Wattles have been placed parallel to the hillslope and a temporary silt fence has been installed at the base of the SR509 slope east of the old access road. These measures are severely inadequate to handle the volume of sediment that would be expected for the scale of this project. Moreover, the most significant discharges will occur from unexpected storm events. The general notes on the temporary erosion and sedimentation plan state that the requirements will be upgraded as needed for unexpected storm events, however this will not prevent direct impacts to Wetland 43 from unexpected storm events before upgrades to the system are made. That is the purpose for having an adequate buffer between a wetland and a construction project. The specified temporary erosion controls are not intended or designed to prevent sedimentary discharges, but to augment the protection afforded by an adequate buffer between the sediment source and wetland.

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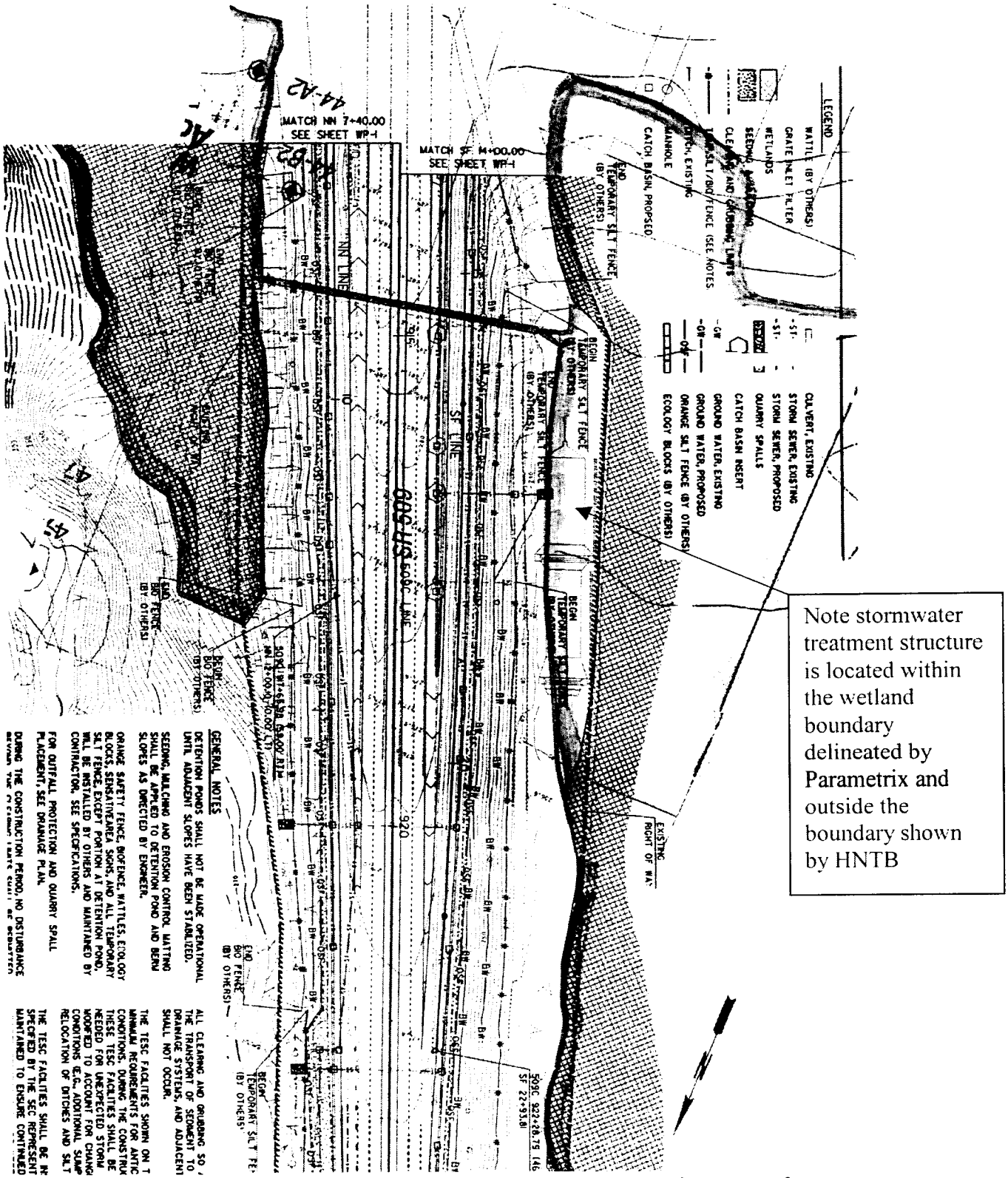

Note stormwater treatment structure is located within the wetland boundary delineated by Parametrix and outside the boundary shown by HNTB

Figure 1. The wetland boundary delineation overlaid on the plan drawing TE-2 of temporary erosion and sediment control plan.

AR 008376

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Figure 2. Aerial photo of construction site showing correct wetland boundary (green shading) in proximity to SR509. (Scale 1"=200 feet)

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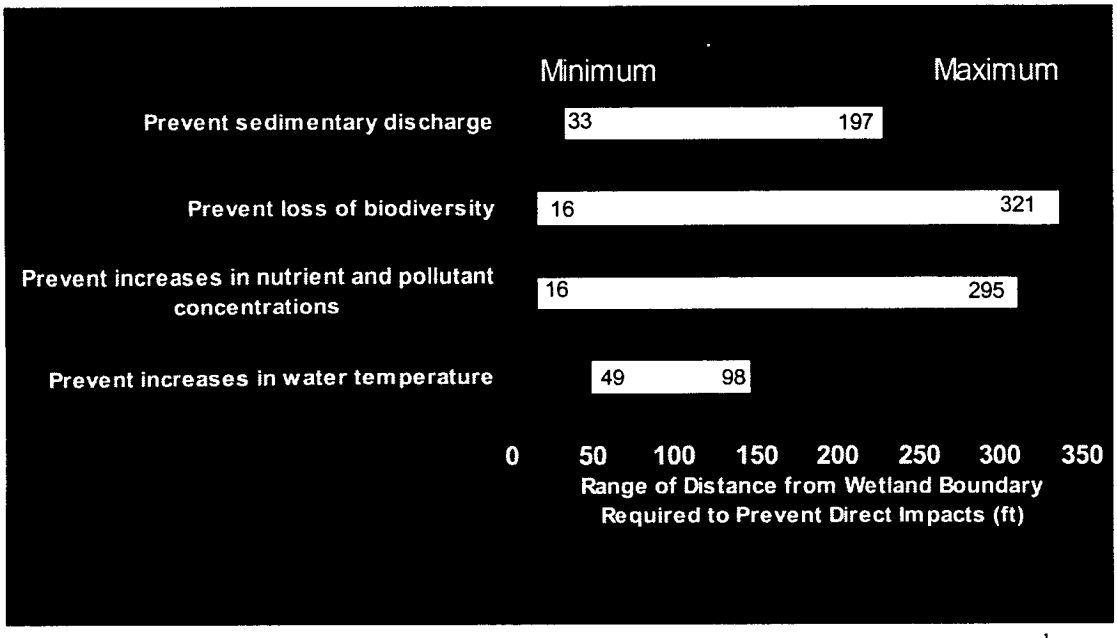

Figure 3. Range of distances required to prevent direct loss of wetland functions.[1]

The May 5th Parametrix report makes the argument that because the existing buffer is not functioning very highly no additional impacts will occur to Wetland 43 from the construction of the temporary interchange. This argument misconstrues the purpose of a buffer, which is to protect the associated sensitive area. In cases where buffers are considered inadequate, jurisdictions typically will require a larger distance between the activity and the wetland. It is not accepted practice to reduce the required buffer and ignore wetland protection functions when a buffer is determined to be poor quality habitat but to increase it so no wetland functions are lost.

Finally, I have reviewed the report by Cooke Scientific Services, Inc. regarding the project and concur with Dr. Cooke's concerns about the close proximity of Wetland 43, located to the east of SR509, and the interchange construction zones. These reductions in buffer area are verified in the Parametrix report. In summary, the project will directly impact Wetland 43 with periodic discharges of sediment-laden stormwater from both expected storms and from unexpected stormwater events. The disturbance resulting from these events to the wetland will have significant environmental consequences to wetland water quality, aquatic habitat and may be sufficient to alter the vegetation community further affecting wetland functions.

Thank-you for the opportunity to review this project and I appreciate your time spent reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Cc: Airport Communities Coalition (ACC)
Peter Eglick, Helsell Fetterman, LLP

[1] From Castelle, A. J. A. W. Johnson and C. Conolly, 1994, Wetland and Stream Buffer Size Requirements – A Review. Journal of Environmental Quality. Vol 23, No. 5, 878-882.

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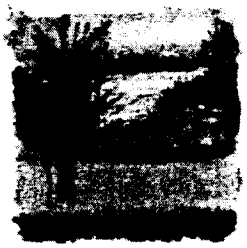
EXHIBIT G



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June 5, 2000

Ms. Gail Terzi and Mr. Jonathan Freedman
US Army Corps of Engineers
Regulatory Section, Seattle District
PO Box 3755
Seattle, WA 98124-2255

RE: Review of Wetland 44a in Relation to Proposed Temporary Interchange at SR509 and S. 176th Street.

Dear Ms. Terzi and Mr. Freedman,

The Airport Communities Coalition (ACC) requested that I review Wetland 44a and its relationship to the east side of the proposed SR509 temporary interchange located in the City of SeaTac. The purpose of my review was to evaluate whether wetland 44a (using the delineation provided in the Parametrix Memorandum, dated May 3, 2000, entitled *Analysis of indirect impacts to wetlands from the temporary SR-509 interchange- Seattle Tacoma Airport*) was correctly located on the project plans (signed February 24, 2000) and hydraulic report (April 12, 2000), both prepared by HNTB Corporation.

I visited the area on June 1, 2000 and, with the permission of adjacent property owners, walked west from S. 174th Street to Manhole AC-5 and the chain link fence located along the right of way of SR509 (shown on Map 1 of this report). Map 1 shows a sewer line, manhole locations and the chain link fence defining the right of way, in relation to SR509. The map was prepared for Southwest Suburban Sewer District in 1984. I located each of the manholes shown on Map 1 and noted their location in relation to the chain link fence shown to be on the right-of-way in Map 1 and Wetland 44a. I followed the fence south and noted the topography while reviewing the topographic map with the wetland boundaries provided in sheet GP-2 Grading Plan of the project plans prepared by HNTB along with the boundaries of the wetland provided by Parametrix in their May 3rd Memorandum.

It is very difficult to understand what existing conditions are with the materials provided by HNTB and Parametrix. The project plans prepared by HNTB do not show topography without a wetland overlay and the shading used to indicate the wetland areas makes it very difficult to read the topography. Similarly, the wetland delineation map provided by Parametrix has few topographic lines shown on it and they do not agree with the contours shown on HNTB's maps. Compounding the problem is that the wetlands map does not have the centerline of SR509 clearly marked making it difficult to align the maps properly.

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After visiting the site and reviewing the materials carefully, it is clear there is a significant discrepancy between what actual conditions are on the east side of SR509 and what is shown on sheet GP-2 Grading Plan in the project plans prepared by HNTB. Map 2 shows a portion of the GP-2 grading plan overlaid on Map 1, the sewer line plan. It is difficult to see the contours with the wetland shading superimposed but there is a depression located in the northern end of Wetland 44a. I shaded the bottom of the depression red to help you see it. During my field visit I stood on Manhole covers AC-5 and AC-5a (best seen on Map 1 on the left). From both manhole covers I saw the chain link fence located west along the right-of-way and, west of the fence, observed the depression shown in red on Map 2. From these observations, the depression appears to be located within the right-of-way, and not to the east of the right-of-way as is shown on the project plans and in the hydraulic report prepared by HNTB.

The depression I observed is clearly within the wetland and was located west of the chain link right-of-way fence. There were no other depressions in the area that could have been mistakenly identified. Based on the data available, it is reasonable to assume Wetland 44a may be 20 to 40 feet closer to SR509 then what is shown in the project plans. Under the circumstances it can be reasonably expected that significant impacts resulting from sedimentary discharges will occur to Wetland 44a as a result of the interchange construction.

Wetland 44a essentially begins at the base of the fill prism for SR509 and its boundary lies adjacent to the highway for much of its length. I noted two small creeks flowing from east to west (shown on Map 1). These creeks feed Walker Creek, which flows from south to north through Wetland 44a, then west under SR509 to Wetland 43 and ultimately Miller Creek. This creek system, connecting the wetlands and tributary to Miller Creek, is not detailed in any of the reporting on this project. This is a significant oversight because impacts, including sedimentary discharges, to Wetland 44a and its associated creeks will significantly affect wetlands 43, and 44a, Walker Creek as well as Miller Creek due to the hydraulic connection between these systems.

In summary, the location of Wetland 44a is not correctly shown on the topography on which the project plans for the temporary interchange is based. The error, depending on its explanation, could mean the wetland is located significantly closer to the construction zone than what is shown in the project's documentation. This condition could result in significant sedimentary discharges to Wetland 44a. I hope this information is helpful. Please call if you have any questions or would like to discuss these findings further.

Sincerely,

Amanda Azous

Cc: Airport Communities Coalition (ACC)
Peter Eglick, Helsell Fetterman, LLP

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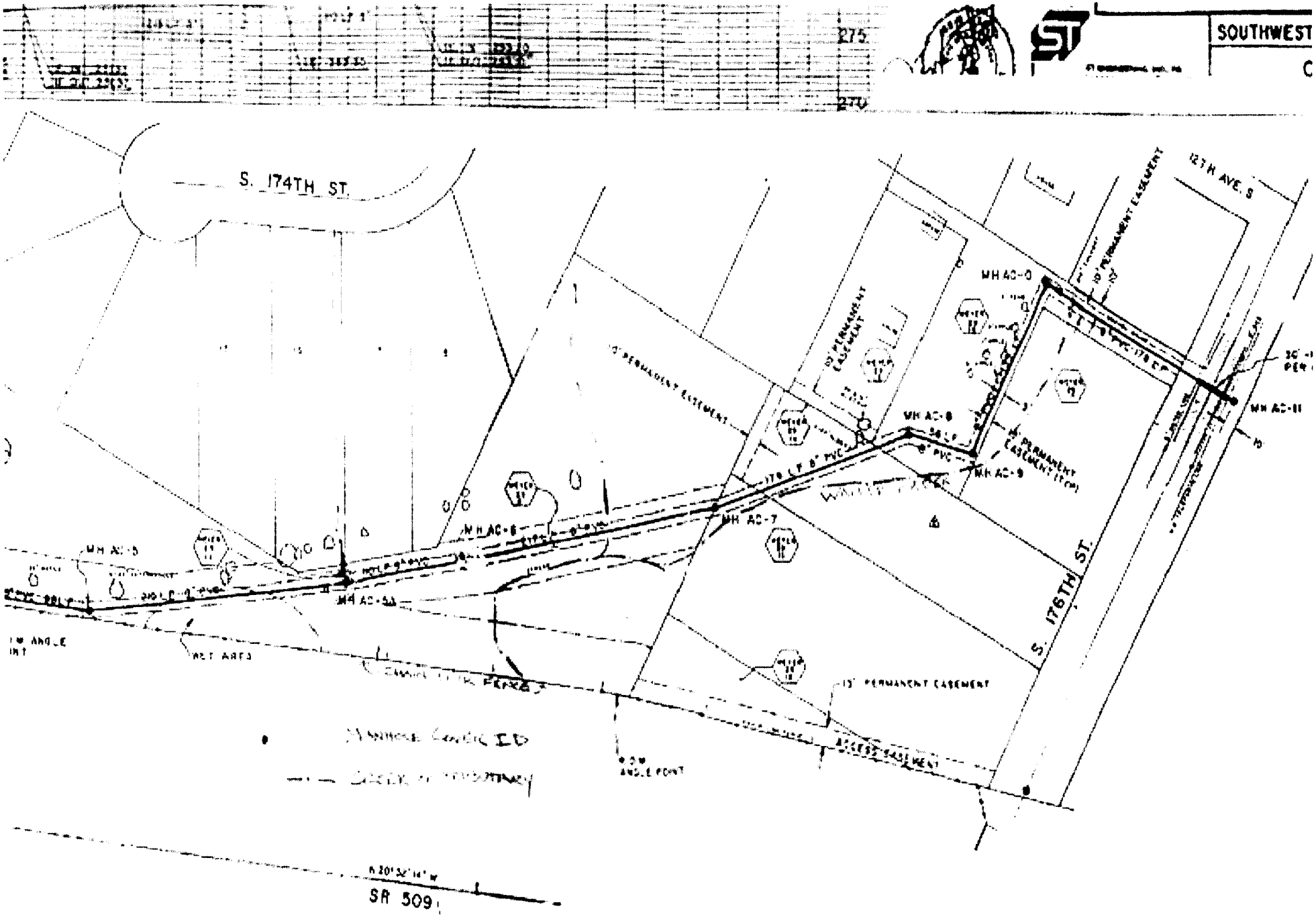

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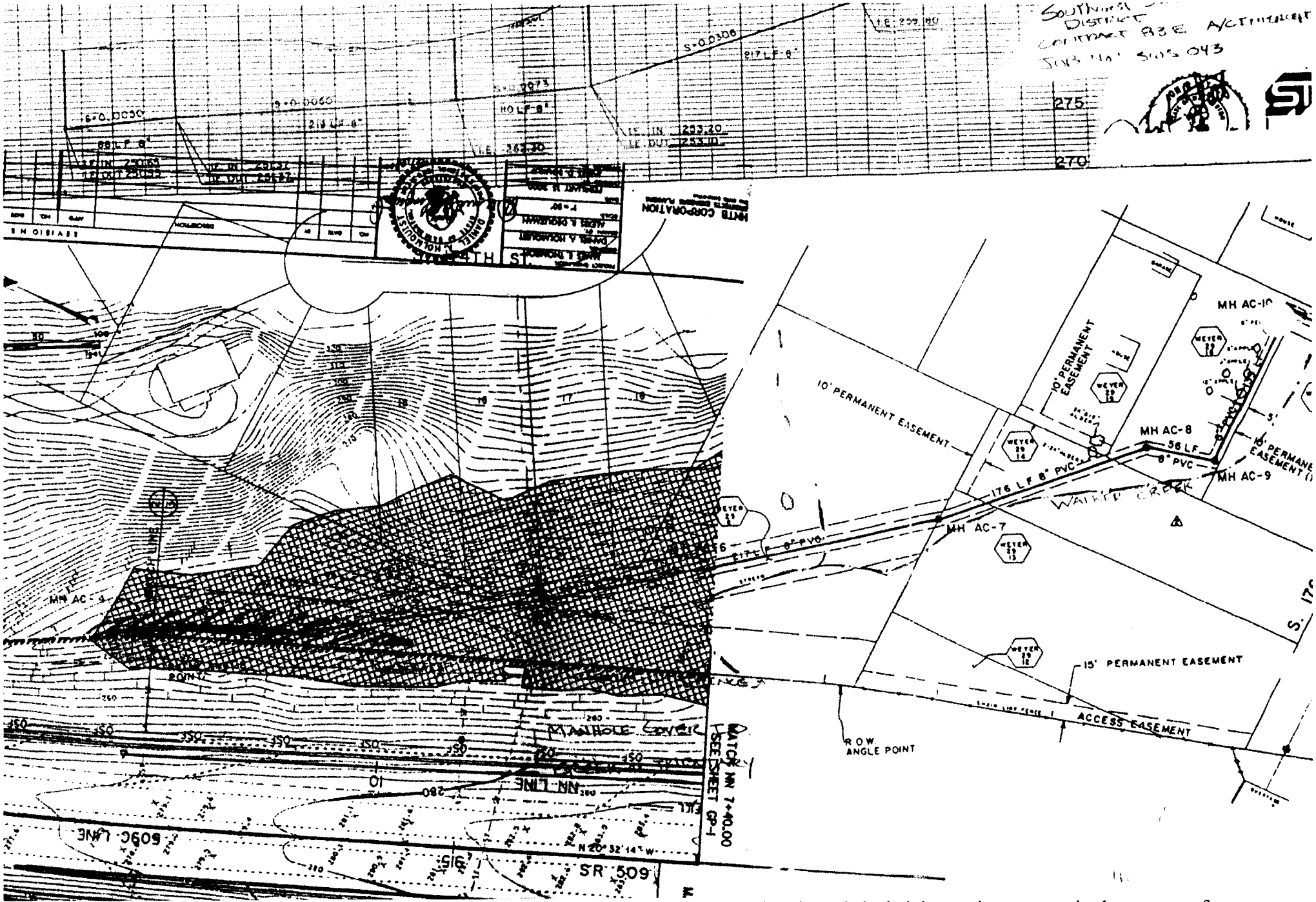
Map 1. Map of sewer line showing locations of manholes, right-of-way fence and SR509 centerline. (Scale 1"=100 feet).



Map 2. Partial overlay of wetland boundaries showing location of depression in red. Note that the red shaded depression on map is shown east of the right-of-way fence whereas it actually lies west of the right-of-way map. (Scale 1"=100 feet).

EXHIBIT H

May 14, 2001

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Ms. Muffy Walker
US Army Corps of Engineers
Regulatory Section, Seattle District
PO Box 3755
Seattle, WA 98124-2255

and

Ms. Gail Terzi
US Army Corps of Engineers
Regulatory Section, Seattle District
PO Box 3755
Seattle, WA 98124-2255

RE: Position of Wetland 44a in Relation to Proposed Temporary Interchange at SR509 and S. 176th Street.

Dear Ms. Walker and Ms. Terzi,

As you know, I am an independent wetland scientist engaged by the Airport Communities Coalition ("ACC) to review matters relating to the Port of Seattle's proposed Third Runway project, including the SR 509 Temporary Interchange. In the process of reviewing documents and on-going correspondence regarding the Temporary Interchange at SR509 and S. 176th Street, I have been monitoring changes in conditions to the extent possible from materials received through public disclosure requests. Several changes to the temporary interchange project have been made. There remains, however, a nagging and potentially serious problem regarding the actual and mapped position of SR509 in relation to Wetland 44a. In addition, there is continuing concern about how construction of the temporary interchange can occur without sedimentary discharges to wetlands, given the close proximity of wetlands 44 and 43 to the proposed ramps.

Attached to this letter is a report submitted on June 5, 2000 regarding the discrepancy between the topography shown on the engineering drawings for SR509 by HNTB and what actually exists on the east side of SR509. It is possible that the Corps has received an explanation for this discrepancy that I am not aware of. However, unless addressed, the consequences of the error could have a significant adverse effect on wetland 44a. The magnitude of this error, depending on its explanation, could mean Wetland 44a is located within or significantly closer to the construction zone than what is shown in the project's documentation. This condition could result in filling or unacceptable sedimentary discharges to Wetland 44a.

If you examine sheet D2 of the Drainage Plans for the Temporary Interchange you will notice a depression located at about 242 foot contour and situated east of SR509 within Wetland 44a. The depression is shown to be located outside the fence delineating the right of way belonging to SR509. However if you were to actually stand within that depression in its real location, you would be west of the fence marking the right of way. This means that some combination of the topography, the wetland boundary, the right of way or the location of SR509

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is incorrectly displayed. If the wetland is located correctly on the topography, the possibility exists that the wetland is actually significantly closer to the construction than shown in the permit request documents. This should be known in advance of the permit's approval as it could result in additional compromises to the buffer for Wetland 44a , the possibility of water quality violations due to sedimentary discharges or, worst case, actual filling of the wetland.

Similar to Wetland 43 west of SR509, Wetland 44a essentially begins at the base of the fill prism for SR509 and its boundary lies adjacent to the highway for much of its length. I noted in the June 5th 2000 report that two small seasonal creeks were observed flowing west to Walker Creek, which flows from south to north through Wetland 44a, then west under SR509 to Wetland 43.

My concern remains about how construction of the temporary interchange will occur without sedimentary discharges to the adjacent wetlands given the close proximity of the wetlands to the proposed ramps. I understand that measures have been promised to prevent sediment discharges during construction on the fill prism on both sides of SR509. But clearly, there is very little buffer for errors under these steep slope conditions. Further, the reality of what happens during construction activities is often different from the version presented in the planning stages, especially in situations such as here, where we know the wetland boundary lies as close as 12 feet of the wall line of the ramp located on the east side, and may be closer when the plans are corrected to represent actual field topography.

Finally, in the June 13th 2000 memorandum for the record from the Corps to the Port of Seattle, and the accompanying August 24, 2000 Corps letter to the Port, the Corps states that the Temporary Interchange project does not have a utility other than the construction of the Third Runway and therefore advises that the Port cannot proceed with the temporary interchange until a decision has been made on the entire Third Runway project. The possibility of a new plan to avoid direct impact to wetlands is mentioned, with the requirement for submission of such a revised plan by the Port to the Corps. I assume that these requirements are still in effect and that you will required corrected plans from the Port. As you are aware, Wetlands 44 and 43 are headwater areas to Walker and Des Moines Creek and will likely be adversely impacted should there be inadvertent filling and insufficiently managed sediment events.

Please review the adequacy of provisions to protect against sedimentary discharges to Wetlands 43 and 44a as well as verify the location of Wetland 44a and its position in relation to the topography on which the project plans for the temporary interchange are based. Clearly, the grossness of this error provides no reasonable assurance that the adjacent wetlands will be protected. Insufficient oversight of both these situations could result in significant adverse impacts to Wetlands 43 and 44a. I hope this information is helpful. Please call if you have any questions or would like to discuss these findings further.

Sincerely,

Amanda L. Azous

Attachments: June 5, 2000 Report, Azous Environmental Sciences

Cc: Kimberly Lockard, Airport Communities Coalition
Peter Eglick, Helsell Fetterman, LLP
Kevin Stock, Helsell Fetterman, LLP

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