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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.

- 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.

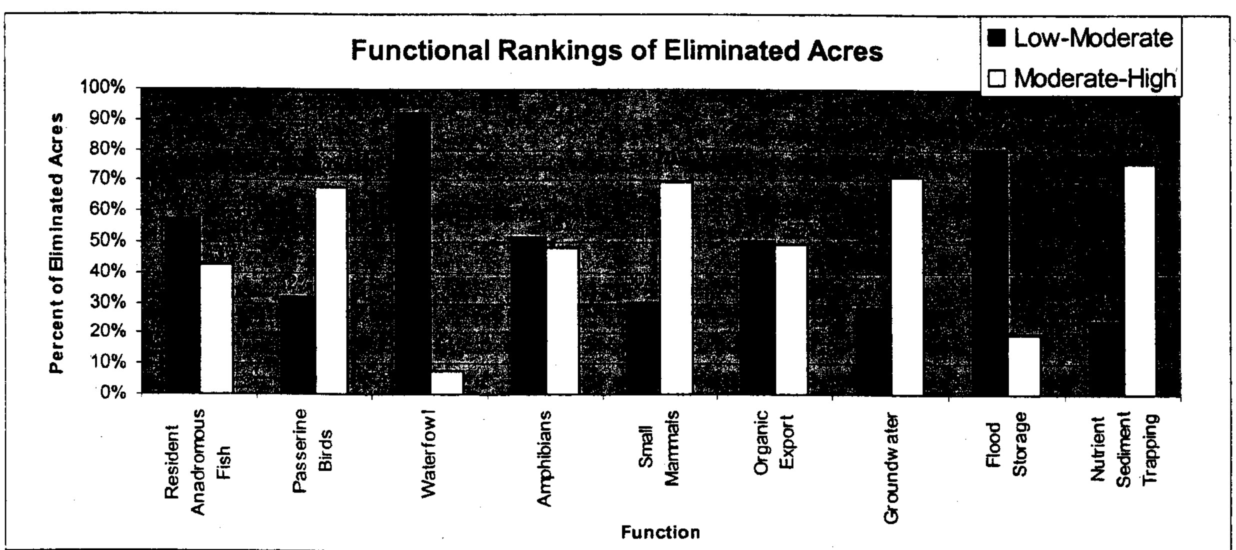

Figure 1. Functional rankings assigned to wetlands being eliminated for the Third Runway Project.

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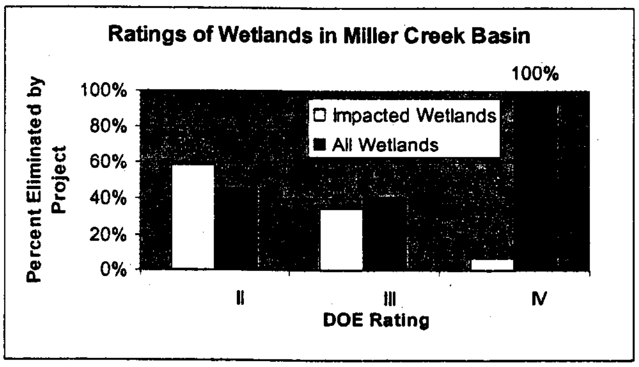
Figure 1 shows that the highest-ranking functions being eliminated from the watershed in the greatest proportion are habitat for passerine birds (68%), small mammals (70%), groundwater discharge/recharge (71%), and nutrient sediment trapping (76%). Forty-three percent of the wetland acres being eliminated 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]



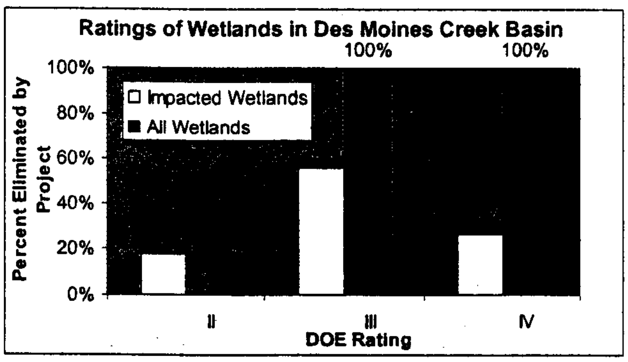


Figure 2. Department of Ecology (DOE) ratings for wetland acres eliminated.[4]

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.

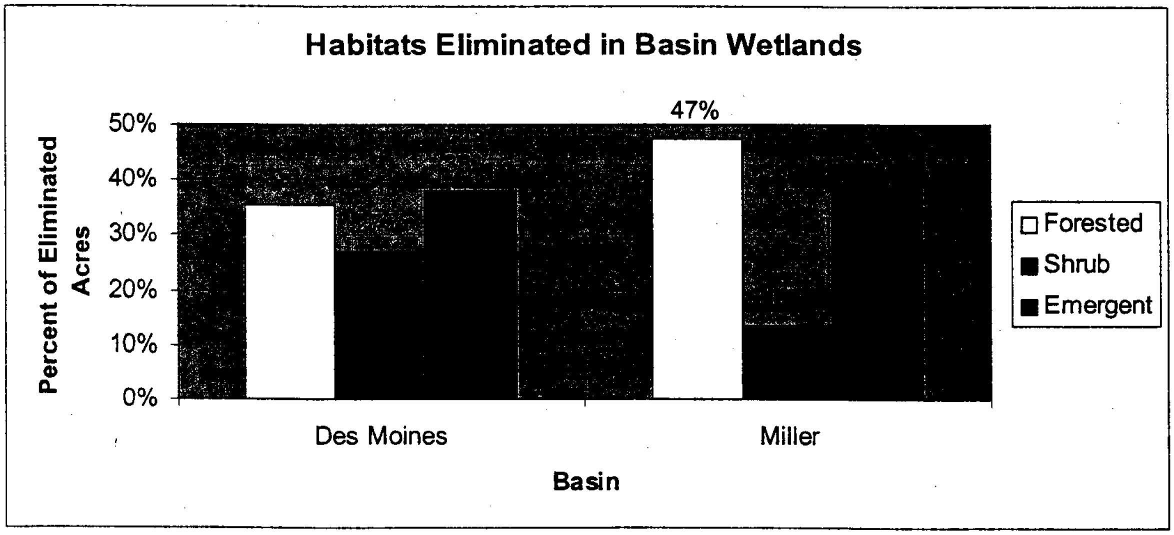

Figure 3. Proportion of wetland habitats eliminated.

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.

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.

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.

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

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.

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

[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 STIA-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.

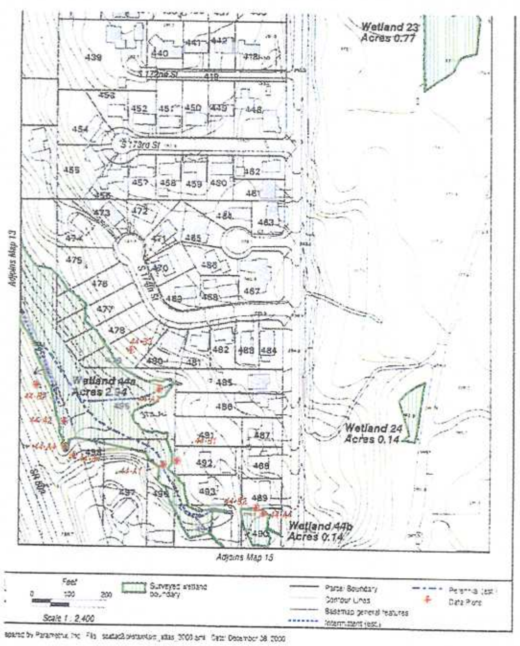

Figure 5a. Wetland 44 boundaries.

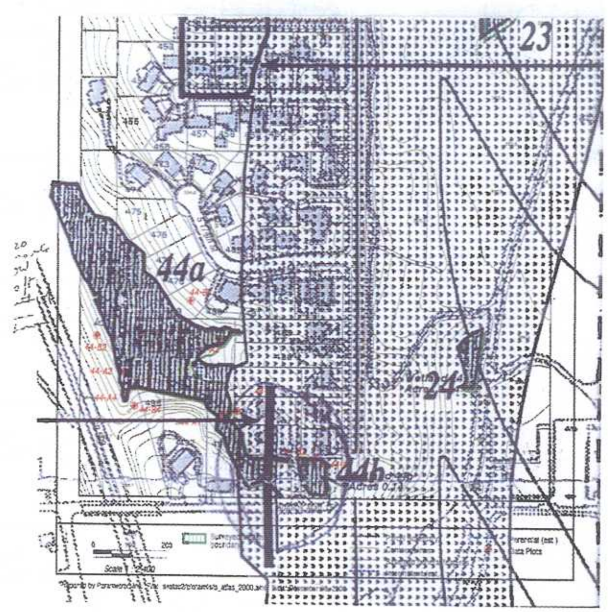

Figure 5b. Embankment footprint in relation to Wetland 44 boundaries.

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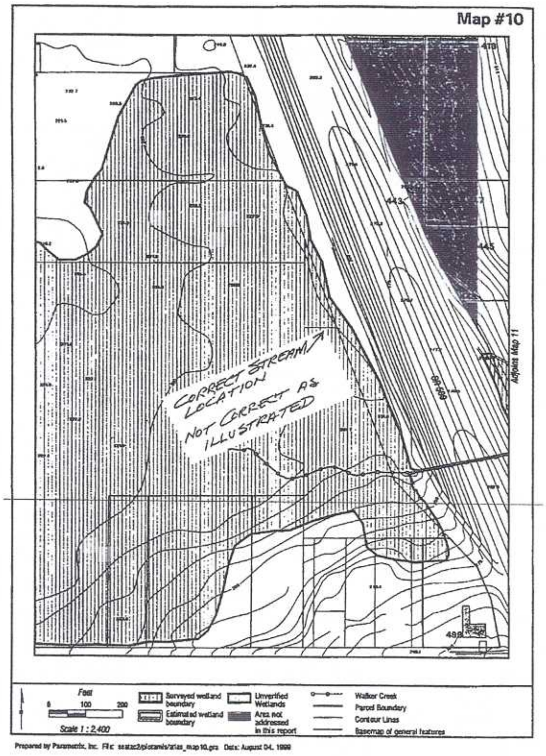

Figure 6a. Map 10 from August 1999 NRMP shows Walker creek channel.

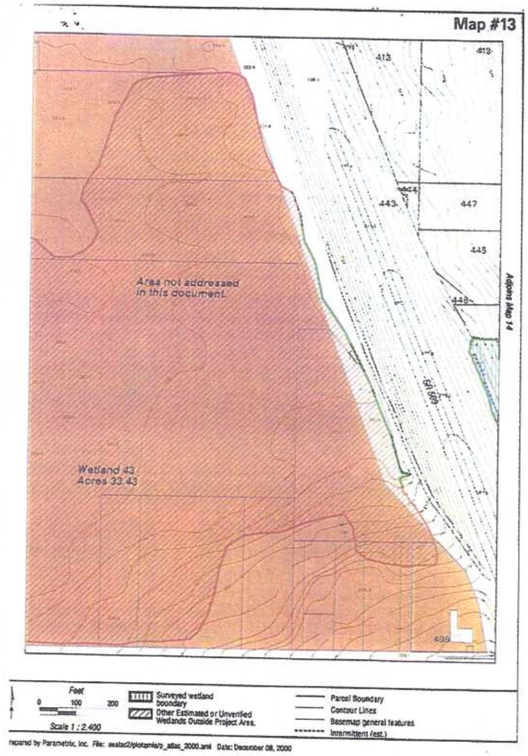

Figure 6b. Map 13 from December 2000 NRMP shows no creek channel.

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.

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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