ADDENDUM B **FEBRUARY 2, 2006**

SKAGIT
DRAINAGE AND FISH INITIATIVE

DRAINAGE MAINTENANCE PLAN

By and between

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
and
SKAGIT COUNTY
DRAINAGE AND IRRIGATION IMPROVEMENT DISTRICT #5

A. DISTRICT OVERVIEW

A1. Location
Skagit County Drainage And Irrigation Improvement District #5, hereafter referred to as DID #5, is located within the Samish River Delta of Skagit County, southwest of the Town of Edison, south of Samish Island, east of Padilla Bay and north of Joe Leary Slough (Figure 1).

A2. Boundaries
The jurisdictional boundaries of DID #5 are illustrated in Figure 2. DID #5 is bordered by Padilla Bay to the west, Joe Leary Slough to the south, the Samish River to the east and Samish Bay to the north.

A3. Area
DID #5 encompasses 2989 acres within its jurisdictional boundaries (Figure 2).

A4. Predominant Land Uses
Commercial agriculture and dairy farming are the predominant land use in DID #5. Hobby farms, gun clubs and residential housing are scattered within the districts boundaries.

Addendum B
Drainage Maintenance Plan
Drainage And Irrigation District #5

A5. Watercourse Classifications

The watercourse classifications used in this drainage management plan are defined in Part III-(A) of the appurtenant Drainage Maintenance Agreement. Figure 2 illustrates the watercourse classifications in DID #5. An 1887 U.S. Coast and Geodetic Survey Map (Figure 3) was used to determine the extent of the *Managed Watercourses With Headwaters* (green) and *Managed Watercourses Without Headwaters* (magenta) in DID #5. In total, DID #5 includes approximately 24.46 miles of watercourses covered by this agreement. These include the following classifications:

a) Artificial Watercourses (yellow): 124,400 feet, 23.56 miles.
b) Managed Watercourses Without Headwaters (magenta): 4766 feet, .9 miles.
c) Managed Watercourse With Headwaters (green): 0 feet, 0 miles.
d) Natural Watercourses (blue): 0 feet, 0 miles.

A6. Drainage Infrastructure

The drainage infrastructure for DID #5 includes 2 bridge sites, 4 tidegate sites, 1 floodgate site, 2 pump stations, 1 pump discharge tube, and associated trash racks (Figure 2) (Table 1and Table 2). The 2 bridge sites are owned and maintained by Skagit County. The majority of drainage from DID #5 is discharged into Padilla Bay and Samish Bay via conventional gravity flow culvert/tidegate infrastructure. The tidegates are typically equipped with top hinged "flap style" lids. DID #5 also maintains and operates two pump stations (#41 & #99). Pump station #41 discharges to Padilla Bay and a pump station #99that discharges to Samish Bay. Pump stations #41 and #99 each include a single pump.

TABLE 1. CULVERT INVENTORY – DID #5

Culvert Number	Culvert Shape	Culvert Material	Culvert Coating	Culvert Span/Dia (M)	Culvert Rise	Culvert Length (M)	Stream Name
*847	OTH	CPC	NON	69	5	9	Samish R
*853	OTH	CPC	NON	40.60	4.00	9.70	Samish R

*****bridge site

TABLE 2. TIDE GATE AND PUMP FACILITY INVENTORY – DID #5

Number	Type	Location	Description
36	Tidegate	Shroeder Place	1-48”
37	Tidegate	Alice Bay	4-48” Fiberglass
38	Flood Gate	Samish River west	4-48”
39	Pump Discharge Tube	Alice Bay	1-18”
40	Tidegate	Joe Leary Slough	1-36”
41	Pump Station	Joe Leary Slough	1-16” Pump
42	Tidegate	Joe Leary Slough	1-12”
99	Pump Station	Alice Bay	1-16” Tube and Gate

A7. DRAINAGE MAINTENANCE ACTIVITIES – GENERAL DESCRIPTION

A7-1. Trash Racks

Trash racks are systems designed to prevent foreign material from entering into a pump facility or tide gate. Foreign material is defined as any man made or natural material that could be carried by water and become lodged in the system or accumulate and cause flow disruption or prevent a pump or tide gate from functioning properly. Normal maintenance of trash racks includes removal of accumulated debris as necessary, replacement of worn or damaged trash rack components or replacement of the structure. Typical design of a trash rack includes a constructed lumber unit with vertically spaced 2-inch dimensional boards spaced approximately 3-5 inches apart. The unit is usually set in the water at an incline down to or near the bottom of the drainage ditch. The incline allows for cleaning debris by raking it to the top and removing it from the ditch.

A7-2. Pump Facilities

Pump facilities are typically electric pump installations. Pumps are mounted on permanent structures with a suction pipe extending into the drainage ditch. Pumps are typically set to function on a remotely activated basis dependant upon water level in the ditch. Typical maintenance includes routine mechanical servicing of a pump and its electrical connections, as well as removal of any accumulated debris that may prevent or interfere with normal operation.

A7-3. Culverts

Culverts must be maintained to ensure normal flow passes through the culvert consistent with its design specifications. This typically includes dredging of a ditch adjacent to culvert openings and occasional cleaning-out of the culvert interior. Cleaning is usually performed through the use of high-pressure water, mechanical dredging or by hand. Repair or replacement is necessary when incidental damage occurs to the culvert that would prevent optimum water flow or an unsafe crossing situation.

A7-4. Flood Gates
Floodgates are one-way check valves that allow accumulated water to flow from a field into a drainage system during and after a high water event. The maintenance of such structures is the same as for tide gates and must include debris removal in order to allow the structure to function properly. Necessary repair and replacement must be performed as needed.

A7-5. Tide Gates
Tide gates are one-way check valves located at the end of a drainage system to allow water to flow outward from within the system to salt water areas during a low tide cycle and then close to prevent saltwater from entering the drainage system when the tide rises. Work on tide gates usually includes removal of any lodged debris that may prevent the gate from closing or operating properly. Other normal maintenance would be completed as needed to insure the gate operates normally. Replacement of tide gates is not covered by this agreement and would be addressed by application for and issuance of a separate HPA.

A7-6. Channel In-Water Bucket Mowing
Channel in-water bucket mowing is a technique that employs a hydraulically operated sickle bar mower mounted on the front edge of a dredging bucket. The machine mows vegetative material below the water line, with the mowed material accumulated in the bucket. The material is then deposited on the ground away from the ditch. This type of mowing provides removal of vegetative material but does not remove vegetative root systems or soil.

A7-7. Channel Out-of-Water Mowing
Channel out-of-water mowing involves the routine removal of vegetative material above the water line to the top of the bank. It is completed using various types of mechanical mowers (rotary or flail designs) and reduces vegetative material during normal growing periods.

A7-8. Dredging
Dredging is completed, as needed, by utilizing a hydraulically operated boom-type excavator. The excavator has a wide, flat-bottomed bucket that scrapes down one side of a watercourse, rounds out the bottom and comes up the opposite side in one continuous motion. Thus the result leaves the ditch with inclined sides and a round bottom feature that minimizes side sloughing and erosion into the bottom of a ditch. All dredged material is deposited landward of the ditch so that it will not return to the water and can later be moved back into the adjoining field or be hauled away when and where necessary. When work is completed in ditches that are too large for a boom-type excavator, a dragline-type excavator is utilized. The process is typically the same, except that a dragline excavator works from the middle of the ditch to one side and then works the opposite side in a separate similar manner.

A7-9. Bridges

Bridges must be properly maintained in order to ensure normal flow under the bridge while also continuing to provide equipment or foot access across a watercourse. Repair or replacement is necessary when incidental damage occurs to a bridge that prevents optimum water flow or results in an unsafe crossing situation. Repair or replacement activities typically occur above the high water line.

A8. General Fish and Fish Habitat Information

For the purpose of this Drainage Maintenance Plan, the term "fish" includes all species of native cold-water fishes. However, particular emphasis is placed on salmonid species that are managed by WDFW as commercially and recreationally important fisheries. These include Pink salmon, Chum salmon, Sockeye salmon, Coho salmon, Chinook salmon, Rainbow trout (including Steelhead), Cutthroat trout, and native Char. Pink salmon, Chum salmon, Sockeye salmon, Coho salmon, and Chinook salmon are Anadromous, in that they return to freshwater habitats to spawn after spending the majority of their lives in salt-water environments. Rainbow trout, Cutthroat trout, and native Char can either be freshwater resident or anadromous.

A8-1. Fish Passage

Fish passage to and from the district waterways is restricted by several features within the drainage infrastructure. A dike system protecting the district from flood and tidal flows generally blocks the passage of adult and juvenile fish. In those cases where waterways intersect the levee system, passage is restricted by a culvert fitted with some sort of tide regulating mechanism or is blocked entirely by the dike system. Either of these features strictly limits the access of fish to and from the system except in those instances where floodwaters top or breach the system. In some cases, waterways that intersect the dike system are fitted with pump stations that facilitate the export of water over and through the dike. These pump stations are often used as backup mechanisms to conventional gravity discharge so that heavy storm related flows can be managed more effectively. Adult and juvenile fish can be entrained into the pumps during their downstream migration where they can be injured or killed. The majority of drainage pump facilities are associated with culvert/tide gate complexes through which upstream and downstream passage of adult and juvenile fish is possible, though limited.

The primary point of access for fish to and from the system is located at those intersections where the gravity flow drainage is managed by a culvert fitted with some sort of tide regulating feature. Though tide gates do not completely block the upstream passage of adult and juvenile fish, upstream passage is restricted to very narrow windows of the tide cycles during which the tide gate is open and the discharge velocity does not exceed the upstream swimming capabilities of the individual fish. The window for upstream passage is greater for adult fish than for juvenile fish because of their stronger swimming capabilities. Tide gates do not completely block the downstream passage of adult and juvenile fish though downstream passage is limited to

the low tide cycles when the water surface elevation upstream of the tide gate is sufficiently greater than the water surface elevation downstream of the tide gate to create the head differential to open the tide gate.

A8-2. Fish Habitat Distribution

Watercourses With Headwaters (green) typically include suitable spawning, rearing and migration habitats for Coho salmon and Cutthroat trout. Spawning habitats typically occur in those reaches that have gradients between 1-3% and are fed by flowing water and a steady supply of suitable sediments. These reaches tend to be found at the junction between low gradient tidally influenced reaches and the steeper gradient headwater reaches of the system

Rearing habitats can be distributed throughout these watercourses but are primarily located where there is sufficient channel complexity, riparian canopy, water quality and invertebrate productivity (fish prey/forage). Though upstream and downstream fish migration typically occurs throughout these watercourses, both natural and manmade barriers can and do restrict or block fish passage.

Watercourses Without Headwaters (magenta) can provide suitable rearing habitat immediately upstream of the terminal culvert/tide gates for a variety of fish species that immigrate into the watercourse from the estuary to forage on available prey. The accessibility of this rearing habitat to fish depends on the type of tide gate present and the degree to which it allows upstream fish passage and the exchange of key habitat forming processes, such as hydrology and sediment. The suitability of this habitat for rearing depends largely on water quality and prey/forage production factors which in part is governed by the interaction of hydrology, sediment, woody debris, riparian processes and other natural forces. Spawning habitat is typically not present in this watercourse type.

Artificial Watercourses (yellow) are wholly manmade systems constructed to convey water from a local surface or subsurface area for the purpose of improving the soil conditions for agriculture. Typically these watercourses are seasonal and do not have the habitat characteristics or natural processes necessary to support the rearing and spawning requirements of native cold water fishes.

A8-3. Fish Distribution - General

Fish survey data is primarily available for only the headwater reaches of the *Watercourses With Headwaters* (green) within the drainage districts. Very limited fish survey data is available for the lowland reaches of the *Watercourses With Headwaters* (green) and for *Watercourses Without Headwaters* (magenta). Fish survey data has not been collected for *Artificial Watercourses* (yellow).

Watercourses With Headwaters (green) typically support reproducing populations of Coho salmon and Cutthroat trout. The reproducing populations of Cutthroat trout can be either anadroumous or resident. Anadromous adult Coho and Cutthroat typically enter the lower reaches of the watercourse to begin their upstream migration to the spawning habitats in late fall. Spawning occurs in the upper reaches of the watercourse where suitable spawning substrate is present and accessible. Coho spawn in the late fall and Cutthroat spawn in early spring. Coho adults die after spawning whereas Cutthroat can survive to spawn in successive years. Anadromous adult Cutthroat that survive spawning out migrate the watercourse from mid to late spring. After hatching from gravel nests (redds), emerging juvenile Coho and Cutthroat will distribute themselves to suitable rearing habitats in the watercourse. Anadromous juvenile Coho and Cutthroat generally spend 22 to 18 months rearing in freshwater before migrating to the marine environment. Generally, juvenile anadromous Coho and Cutthroat are present in the accessible reaches of the watercourse throughout the year. Resident adult and juvenile Cutthroat are typically present in the upper reaches of the watercourses throughout the year.

In addition to fish originating from this watercourse type, it is generally assumed that between February and July, fish from other watercourses may immigrate from the estuary into the lower reaches of the watercourse via the culvert/tide gates to forage on available prey. It is generally assumed that the upstream distribution and duration of residence for these immigrating fish is limited by water quality, prey availability and their physiological affinity for salt water. In addition to salmonid species, forage fish species such as surf smelt and sand lance also use the estuary habitats for rearing and could potentially immigrate into the lower reaches of the watercourse. Adult native char and cutthroat could also be expected to immigrate into the lower reaches of the watercourse in pursuit of juvenile salmon and forage fish species. Generally elevated water temperatures found in these low land systems have also led to colonization by exotic species of fish that prefer warm water habitats. Surveys have identified Pumpkinseed, Crappie, and Smallmouth Bass, among others, as being year around residents in the lower reaches of these systems. Many of these warm water species are voracious predators and could be considered deleterious to salmonid productivity.

Watercourses Without Headwaters (magenta) generally do not support resident populations of cold-water game fish. This is largely attributed to the presence of drainage infrastructure that limits the exchange of tidal hydrology and/or connection to riverine hydrology. It is generally assumed that between January and July, fish from other watercourses may immigrate from the estuary into the lower reaches of this watercourse type via the culvert/tide gates to forage on available prey. It is generally assumed that the upstream distribution and duration of residence for these immigrating fish is limited by water quality, prey availability and their physiological affinity for salt water.

Artificial Watercourses (yellow) are manmade and designed to convey water from local surface and subsurface areas in order to improve the soil conditions for agriculture. These watercourses are typically dry in the summer. Water quality and quantity can negatively affect the suitability of the potential rearing habitat. The habitat characteristics and natural processes required by native cold water fish for rearing and spawning are not supported by these artificial watercourses. It is therefore assumed that the presence of native cold water fish is either very limited or absent in this watercourse type.

A8-4. Fish Survey Data - DID #5

Fish survey data has not been collected for the watercourses within the jurisdictional boundaries of DID #5.

A8-5. Fish Distribution - DID #5

It is presumed that the presence of cold water fish species is very limited in the watercourses in DID #5 for the following reasons:

a. DID #5 does not include a *Watercourse With Headwaters* (green) and therefore does not have spawning or resident populations of fish.

b. The upstream passage of adult and juvenile fish through the tidegates in DID #5 is restricted to very narrow windows of the tide cycles during which the tide gate is open and the discharge velocity does not exceed the upstream swimming capabilities of the individual fish.

c. The upstream distribution and duration of residence of fish immigrating upstream of the tidegates in DID #5 is limited by water quality, prey availability and their physiological affinity for salt water.

B. MANAGED WATERCOURSE WITH HEADWATERS - CLARIFICATIONS

DID #5 does not include a Managed *Watercourse With Headwaters* (green) and as such, resident and spawning populations of fish are not present within the jurisdictional boundaries of the district. Fish presence within the jurisdictional boundaries of DID #5 is presumed to be limited to the immediate vicinity of the tidegates. Given the limited presence of fish in the district's watercourses, habitat improvement projects (mitigation measures) associated with the maintenance of the district's existing drainage infrastructure as identified in the Drainage Maintenance Plan are not required. When fish habitat improvements are proposed, they will be voluntary and contingent upon the participation of a willing landowner. In addition, fish habitat improvements will maintain flood protection, guard against salt-water intrusion and maintain the drainage capabilities of the district.

Photographs of the drainage infrastructure in DID #5 are presented in Figure 5.

C. OTHER ASSESSMENTS WITHIN DID #5

1. House Bill 1418 Report: Tidegates and Intertidal Salmon Habitat in the Skagit Basin, Carol Smith and Ed Manary, 2004.
2. Skagit Chinook Recovery Plan, Skagit River System Cooperative and Washington Department of Fish and Wildlife, 2005.
3. Delta And Nearshore Restoration For The Recovery of Wild Skagit River Chinook Salmon; Linking Estuary Restoration To the Wild Chinook Salmon Populations, Eric Beamer, 2005
4. Preliminary Assessment Of Historic Conditions Of The Skagit River In The Fir Island Area: Implications For Salmonid Habitat Restoration, Brian Collins, 1998.
5. Priority Fish and Wildlife Projects Identified by Washington Department of Fish and Wildlife within the Greater Skagit River Ecosystem Planning Area, WDFW, 2002.
6. Application Of The Skagit Watershed Council's Strategy: River Basin Analysis of the Skagit and Samish Basins, Skagit Watershed Council, 1999.
7. FY 1995 Skagit River Chinook Restoration Research, Hayman, Beamer, McClure, 1996.
8. Skagit County Baseline Monitoring Project, 2001-2003

D. BEST MANAGEMENT PRACTICES – DISTRICT UNIQUE CIRCUMSTANCES

D1. General

DID #5 is typical of a drainage district in Skagit County that does not include a Watercourse With Headwaters (green). The drainage infrastructure and maintenance activities in DID #5 are not unique or significantly different from the infrastructure and maintenance activities contemplated in the development of the Drainage Maintenance Agreement and the Best Management Practices (Addendum A). Therefore, for the above reasons and consistent with Part III (C) of the Drainage Maintenance Agreement for DID #5, the Best Management Practices identified in Addendum A of the Drainage Maintenance Agreement for Watercourses Without Headwaters and Artificial Watercourses will apply as written and without modification.

Drainage maintenance activities that occur in Samish Bay or Padilla Bay will require individual site specific Hydraulic Project Approvals. Unavoidable habitat impacts associated with drainage maintenance activities in these *Natural Watercourses* will be addressed through fish habitat improvements (mitigation) identified via the individual site specific permit process.

D2. Beaver Dams

Best Management Practices (BMPs) for beaver dam management were not included with the BMPs in Addendum A of the Drainage Maintenance Agreement and are therefore included here as part of the Drainage Maintenance Plan. Consistent with Part III – (E) of the Drainage Maintenance Agreement, the following beaver dam management BMPs, where appropriate, will be included in the Hydraulic Project Approval issued for the district's general drainage maintenance activities.

Artificial Watercourses – Yellow

1. TIMING LIMITATIONS: When water is present in the channel, beaver dam removal/modifications below the waterline and within 300 feet of a confluence with a marine water body, natural watercourse or an managed watercourse with headwaters, the removal/modification of beaver a dam will only occur from August 1 through October 15 of any year for the protection of migrating juvenile and adult salmon.

2. The general HPA provisions for Artificial Watercourses (Addendum A) will apply.

3. Work will only be conducted during low flow conditions.

4. Under no circumstances will explosives be used to remove the beaver dam.

5. The beaver dam will be removed or modified gradually to provide for a controlled, slow release of the impounded water.

6. Removal or modification of the beaver dam will be accomplished by hand, with hand tools, winches and/or motorized equipment.

7. The woody materials removed from the beaver dam will be deposited landward of the top of the channel bank.

8. A list of beaver dam removal/modification activities will be included in the district's annual Drainage Maintenance Activity Report as specified in Part III- (H) of the districts Drainage Maintenance Agreement.

Watercourses Without Headwaters – Magenta

1. TIMING LIMITATIONS: When water is present in the channel, beaver dam removal or modification below the waterline and within 300 feet of a confluence with a marine water body, natural watercourse or an managed watercourse with headwaters, the removal or

2. modification of a beaver dam shall only occur from August 1 through October 15 of any year for the protection of migrating juvenile and adult salmon.

3. When water is present in the channel and the removal or modification of a beaver dam within 300 feet of a confluence with a marine water body, natural watercourse or an managed watercourse with headwaters out side of the above referenced August 1 through October 15 window is necessary, modifications to the provisions below may be required to adequately protect fish.

4. The general HPA Provisions for a Managed Watercourse Without Headwaters (Addendum A) shall apply.

5. Work shall only be conducted during low flow conditions.

6. Under no circumstances shall explosives be used to remove the beaver dam.

7. The beaver dam shall be removed or modified gradually to provide for a controlled, slow release of the impounded water.

8. Removal or modification of the beaver dam may be accomplished by hand, with hand tools, winches and/or motorized equipment.

9. Existing large woody material embedded in the channel bank or streambed shall be left undisturbed and intact.

10. The woody materials removed from the beaver dam shall be deposited landward of the top of the channel bank.

11. The removal of and damage to existing woody stem riparian vegetation within 200 feet of the channel shall be held to the absolute minimum necessary to remove the beaver dam.

12. Beaver dam removal activities within 300 feet of a confluence with a marine water body, natural watercourse or an managed watercourse with headwaters shall be included in the districts' annual Drainage Maintenance Activity Report as specified in Part III- (H) of the districts Drainage Maintenance Agreement. The district's annual record of beaver dam removal or modification activities shall include the following information for each beaver dam site: location, reason for removal/modification, removal/modification start date, removal/modification end date, method of removal/modification, removal/modification problems, future removal/modification recommendations, are beaver dams at the site a reoccurring problem, before and after photographs.

D3. Pumps

For the purpose of this Drainage Maintenance Plan, fish bearing waters shall be defined as any part of a natural watercourse, marine water body, managed watercourse with headwaters (green) and that part of a managed watercourse without headwaters (magenta) or artificial watercourse (yellow) that is within 300 feet of a functioning tidegate or floodgate confluence with a natural watercourse, marine water body or managed watercourse with headwaters (green).

Surface water pumps in fish bearing waters as defined above shall be fitted with a screen or otherwise be approved by WDFW per RCW 77.55.040, 77.55.070, 77.55.310 and 77.55.320. Within five years from the effective date of the Drainage Maintenance Agreement, incorporating the provisions of this Drainage Maintenance Plan, each pump facility in fish bearing waters as defined above that is owned, operated and maintained by DID #5 shall be in compliance with the pump screening provisions stipulated in the General Hydraulic Project Approval (GHPA) issued to the district specific to the Drainage Maintenance Agreement and this Drainage Maintenance Plan.

In the event that the established pump screen criteria cannot be met, the Drainage Maintenance Plan shall be modified within 5 years from the effective date of the district's Drainage Maintenance Agreement to identify a mutually acceptable alternative technology that meets or exceeds these criteria and a mutually acceptable strategy and timeline for implementation.

E. HYDRAULIC PROJECT APPROVALS - COMPLIANCE

DID #5 is bound to comply with the provisions and conditions of any and all Hydraulic Project Approvals (HPA's) issued pursuant to this Agreement. Failure to do so can result in revocation of the General Hydraulic Project Approval (GHPA) and may result in other penalties as provided by law. In the event a General Five-Year HPA issued pursuant to this Agreement is revoked or rescinded, DID #5 will henceforth be required to secure an individual site and/or project specific HPA for each drainage maintenance activity that will occur below the ordinary high water line in watercourses (other than those that are wholly artificial) within the legally established boundaries of the District. Unavoidable impacts to fish and fish habitat occurring as a result of these individually permitted activities will be mitigated on a case-by-case basis.