ADDENDUM B **FEBRUARY 26, 2005**

SKAGIT
DRAINAGE AND FISH INITIATIVE

DRAINAGE MAINTENANCE PLAN

By and between

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
and
SKAGIT COUNTY
DIKE AND DRAINAGE DISTRICT #25

A. DISTRICT OVERVIEW

A1. Location

Skagit County Dike and Drainage District #25, hereafter referred to as DDD#25, is located within the Samish River Delta of Skagit County, south of the Town of Edison, west of Interstate Highway 5, and north of Joe Leary Slough (Figure 1).

A2. Boundaries

The jurisdictional boundaries of DDD#25 are illustrated in Figure 2. DDD#25 is bordered by Farm To Market Road to the west, approximately Allen West and Bradley Road to the South, approximately Field Road to the north, the Burlington Northern Railroad grade and Interstate Highway 5 to the east and northeast.

A3. Area

DDD#25 encompasses 3457 acres within its jurisdictional boundaries (Figure 2).

A4. Predominant Land Uses

Commercial agriculture is the predominant land use in DDD#25. Hobby farms, residential housing and small retail businesses are scattered within the districts boundaries.

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 DDD#25. An 1887 U.S. Coast and Geodetic Survey Map (Figure 3) was used to determine the extent of the *Natural Watercourses* (blue), *Managed Watercourses With Headwaters* (green) and *Managed Watercourses Without Headwaters* (magenta) in DDD#25. In total, DDD#25 includes approximately 9.62 miles of watercourses covered by this agreement. These include the following classifications:

a) Artificial Watercourses (yellow): 21,177 feet, 4.01 miles.
b) Managed Watercourses Without Headwaters (magenta): 3273 feet, .62 miles.
c) Managed Watercourse With Headwaters (green): 0 feet, 0 miles.
d) Natural Watercourses (blue): 26,326 feet, 4.99 miles.

A6. Drainage Infrastructure

DDD#25 utilizes the Samish River (*Natural Watercourse)*, which flows in a west-northwest direction, to convey the districts drainage to Samish Bay. Consistent with the definition of a *Natural Watercourse* from Part III-(A) of the Drainage Maintenance Agreement, the Samish River does not have a flow control structure at its confluence with Samish Bay. The drainage from DDD#25 discharges into the Samish River via numerous floodgates. The drainage infrastructure in DDD#25 includes 1 culvert site, 4 bridge sites and 28 floodgate sites (Figure 2) (Table 1 and Table 2). The majority of the floodgates in DDD#25 are privately owned and are not maintained by the district (Table 3). Floodgates are one-way check valves with top hinged "flap style" lids. Two of the bridge sites are owned and maintained by Skagit County, one bridge site is owned and maintained by BNR and one bridge site is owned and maintained by the Washington Department of Transportation. The drainage infrastructure of DDD#25 does not include tide gates or pumps.

A6-1. Flood Management

Flood management in DDD#25 is unique among the Skagit County drainage districts in that flood flows in the Samish River and Thomas Creek regularly overtop their banks and flood a significant area of farmland in DDD#25. On an average year, the Samish River can overtop its banks 3-4 times between November and February. Figure 4 illustrates the flow dynamics of an average year flood event in DDD#25 and the approximate area of farmland that is inundated. Figure 4 also illustrates that flood flows from the Samish River can overtop its banks in a number of locations along the north and south shoreline where the river has not been diked. Figure 4 also illustrates the location of the dikes along the Samish River in DDD#25. Floodwater in DDD#25 can originate from Thomas Creek which is outside of the jurisdictional boundaries of the district. Thomas Creek, which is a tributary to the Samish River, can overtop

its south bank between the Samish River and Avalon Road. Floodwater from Thomas Creek inundates farmland east of I-5 and then flows west under I-5 via a system of artificial drainage watercourses into DDD#25 on the south side of the Samish River. Floodwater from the Samish River can inundate adjacent farmland to the north and south of the river. Food water in DDD#25 generally flows to the west and returns to the Samish River via the districts ditch and floodgate infrastructure. Flood water on the south side of the Samish River that does not returned to the river before reaching Farm To Market Road continues to flow west across Farm to Market Road and floods farmland to the west of DID#25. Flood water on the north side of the Samish River that does not returned to the river before reaching Farm To Market Road continues to flow west via a historic watercourse under Farm To Market at Skagit County's bridge #852 where it returns the Samish River without flooding farmland to the west of the district. There are advantages and disadvantages for the agriculture community that result from the floodwater inundating the farmlands adjacent to the Samish River. Advantages of the floodwater include the enrichment of the farmland through the introduction of new sediments and nutrients. The primary disadvantage of the floodwater is that the soil is saturated for a longer period of time which can result in a shorter growing season and a shorter harvest season. The saturated soil can also negatively impact winter cover crop production and winter livestock grazing. Residential septic systems can also be negatively impacted.

TABLE 1. CULVERT INVENTORY – DDD#25

Culvert Number	Culvert Shape	Culvert Material	Culvert Coating	Culvert Span/Dia (M)	Culvert Rise	Culvert Length (M)	Stream Name
*853	OTH	CPC	NON	40.60	4.00	9.70	Samish R
*854	OTH	CPC	NON	27.00	5.00	9.20	Samish R
*855	OTH	CPC	NON	19.40	7.40	4.00	Samish R
856	RND	CST	NON	0.61	0.61	13.70	unnamed
*857	OTH						Samish R

* bridges

TABLE 2. FLOODGATE INVENTORY – DDD#25

Number	Type	Location	Description
70	Floodgate	Samish River/Hampel	1-12" Floodgate
72	Floodgate	Samish River/Pickett	1-48" Return Floodgate
113	Floodgate	Samish River/Egbert/E. Thomas Rd	1-48" Return Floodgate
115	Floodgate	Samish River/Farm To Market Rd	1-48" Floodgate
121	Floodgate	Samish River/S.Side/Omdal Lane	1-48" Floodgate w/pipe
123	Floodgate	Samish River/S. Side/Lautenbach	1-36" Floodgate

TABLE 3. PRIVATELY OWNED FLOODGATES – DDD#25

Number	Type	Location	Description
63	Floodgate	Samish River/W.Thomas Road	1-12” Floodgate
64	Open Tube	Samish River/E.Thomas Road	1-6” Capped
65	Floodgate	Egbert/SC Ditch/E.Thomas Road	1-24” Floodgate
66	Floodgate	Samish River/Nelson-Loop	1-24” Floodgate
67	Floodgate	Samish River Loop Farm	1-24” Floodgate
68	Floodgate	Samish River/N. Side/Loop	1-18” Floodgate
69	Floodgate	Samish River/Nelson	1-18” Floodgate
71	Floodgate	Samish River/Jurgensen/Nelson	1-18” Floodgate
73	Floodgate	Samish River/Nelson	1-18” Floodgate
74	Floodgate	Farm To Market/SC Ditch/E. Side	1-36” Floodgate
75	Floodgate	Samish River/ N. Side	1-12” Floodgate
114	Floodgate	Samish River/S. Side/Jensen	1-12’ Floodgate
116	Floodgate	Samish River/Nelson	1-12” Floodgate
117	Floodgate	Samish River/Nelson	1- 8” Floodgate
118	Floodgate	Samish River/Loop/E. Thomas Rd	1-18” Floodgate
119	Floodgate	Samish River/Loop/E. Thomas Rd	1-12” Floodgate
120	Floodgate	Samish River/Loop/E. Thomas Rd	1-12” Floodgate
122	Floodgate	Samish River/Chuckanut Hwy	1-36” Floodgate
124	Floodgate	Samish River/S. Side/E. of BNR	1-36” Floodgate
01	Floodgate	Samish River/S. Side/W. of BNR	1-24” Floodgate
02	Floodgate	Samish River/S. Side/Magenta	1-24” Floodgate
03	Floodgate	Samish River/S. Side/Magenta	1-12” Floodgate

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 way 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 cold-water fish. 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 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 Char can either be freshwater resident or anadromous.

A8-1. Fish Passage - General

Fish passage to and from the district waterways is typically 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 floodgate or tide gate. 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 a floodgate or tide gate. Though floodgates and tide gates do not completely block the upstream passage of adult and juvenile fish, upstream passage is restricted to very narrow windows of the flood or tide cycles during which the 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. Floodgates and 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 floodgate or tide gate is sufficiently greater than the water surface elevation downstream of the floodgate or tide gate to create the head differential to open the tide gate.

A8-2. Fish Habitat Distribution - General

Natural Watercourses (blue) typically include suitable spawning, rearing and migration habitats for Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. Spawning habitats typically occur in those reaches that have gradients between 1-3%, are fed by flowing water and are fed by a steady supply of suitable sediments. These steeper gradient reaches tend to be found in the upper watershed areas of these watercourses. Rearing habitats can be distributed throughout these watercourses. 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 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 cold-water fishes.

A8-3. Fish Distribution - General

Fish survey data is generally available for *Natural Watercourses* (blue). Fish survey data is typically 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).

Natural Watercourses (blue) typically support reproducing populations of Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. The reproducing populations of Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout can be either anadromous or resident. The resident populations of Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout are typically found in the upper most reaches of the watershed. Spawning typically occurs in the mid to upper watershed areas of these watercourses. Adult Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon and Bull Trout typically spawn in the fall whereas Steelhead Trout and Cutthroat Trout typically spawn in the spring. Juvenile Chum and Pink salmon rear in the watershed for a very brief period before out migrating to marine waters. Juvenile Chinook salmon can have multiple life history strategies where juveniles can rear in the watershed from a few days to 18 months before out migrating to marine waters. Juvenile Coho salmon, Sockeye salmon, Bull Trout, Steelhead Trout, and Cutthroat Trout typically rear in the watershed for 18 months or longer before out migrating to marine waters.

Watercourses With Headwaters (green) typically support reproducing populations of Coho salmon and Cutthroat trout. The reproducing populations of Cutthroat trout can be either anadromous 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 25 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 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 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 cold-water fish for rearing and spawning are not supported by these artificial watercourses. It is

therefore assumed that the presence of cold-water fish is either very limited or absent in this watercourse type.

A8-4. Fish Survey Data - DDD#25

Fish survey data has not been collected for the watercourses within the jurisdictional boundaries of DDD#25. However, fish survey data is available for the Samish River and its tributaries upstream of WDOT Interstate 5 (Figure 5). The fish survey data available for the Samish River and its tributaries are presented below in Table 4.

Table 4. Samish River and Tributaries – Fish Survey Data

Data No.	Watercourse	Fish Species	Observer	Observations
1	Un named	Coho, Cutthroat	JJ	Depressed
2	Un named	Coho, Cutthroat	JJ	Depressed
3	Samish River	Char	DH	Healthy
4	Un named	Coho, Cutthroat	JJ	Depressed
5	Samish River	Sockeye	DH	Healthy
6	Samish River	Pink	DH	Healthy
7	Un named	Chinook, Chum	DH, KB	Healthy
8	Un named	Cutthroat	DH	Healthy
9	Bob Smith Creek	Chum, Coho, Cutthroat	JJ	Depressed
10	Un named	Coho, Cutthroat	JJ	Depressed
11	Ware Creek	Coho, Cutthroat	KB	Healthy
12	Un named	Coho, Cutthroat	DH	Healthy
13	Un named	Coho, Cutthroat	JJ	Depressed
14	Skaarup Creek	Chum	DH	Healthy
15	Un named	Coho, Cutthroat	DH, KB	Healthy
16	Swede Creek	Chum	DH	Healthy
17	Un named	Coho, Cutthroat	SGSDB	Healthy
18	Swede Creek	Steelhead	DH	Healthy
19	Un named	Coho, Cutthroat	JJ	Depressed
20	Un named	Coho, Cutthroat	DH, KB	Healthy
21	Un named	Coho, Cutthroat	JJ	Depressed
22	Un named	Coho	DH, KB	Healthy
23	Un named	Coho, Cutthroat	SGSDB, DH	Depressed
24	Thomas Creek	Chinook, Chum	SGSDB, DH	Healthy
25	Un named	Coho, Cutthroat	JJ	Depressed
26	Thomas Creek	Chum	DH	Depressed
27	Thomas Creek	Coho	DH, KB	Healthy
28	Un named	Coho, Cutthroat	JJ	Depressed
29	Un named	Coho	DH, KB	Healthy
30	Un named	Cutthroat	DH, KB	Healthy
31	Un named	Cutthroat	DH	Healthy
32	Thomas Creek	Cutthroat	DH	Healthy
33	Un named	Cutthroat	DH	Healthy
34	Wollard Creek	Coho, Cutthroat, Chum	BB	Healthy

35	Un named	Coho, Cutthroat	BB	Healthy
36	Un named	Coho, Cutthroat	JJ	Depressed
37	Un named	Coho	KB	Healthy
38	Un named	Coho, Cutthroat	MO	Depressed
39	Un named	Coho, Cutthroat	MO	Depressed
40	Un named	Coho, Cutthroat	MO	Depressed
41	Un named	Coho	KB	Healthy
42	Un named	Coho, Cutthroat, Rainbow	MO	Depressed
43	Un named	Coho, Cutthroat	MO	Depressed

A8-5. Fish Distribution - DDD#25

Natural Watercourses (blue)

The Samish River meets the definition of a *Natural Watercourse* as presented in Part III-(A) of the Drainage Maintenance Agreement for DDD#25. Consistent with the definition of a *Natural Watercourse*, the Samish River does not have a flow control structure (tide gates, pump stations) at its confluence with Samish Bay. Consequently, fish access between the Samish River and Samish Bay is not impeded by drainage infrastructure. The distribution of cold-water fish in DDD#25 is primarily limited to the Samish River. Within the jurisdictional boundaries of DDD#25, the Samish River is a migratory pathway for juvenile and adult cold-water fish between Samish Bay and the Samish River watershed. Based on the fish data presented above in Table 3 and data from WDFW's Samish River Hatchery, the following cold-water fish have been observed in the Samish River: Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout.

WDFW's Samish Hatchery is currently culturing only Chinook salmon. The stock of Chinook salmon cultured at the Samish Hatchery was originally imported from Soos Creek in the Green River watershed. WDFW annually captures adult Chinook salmon from the Samish River at a fish trap located upstream of Old State Highway 9 for the purpose of harvesting their eggs and sperm. WDFW typically operates the trap from September 15 to October 31. Adult Chinook salmon in excess of what is required to meet the hatchery's culture targets are released into the Samish River upstream of the trap where they are allowed to spawn naturally. The harvested eggs are fertilized, incubated and hatched at WDFW's Samish Hatchery. The juveniles that hatch from these eggs are reared at the hatchery and are subsequently released into the Samish River. WDFW annually releases approximately 4 million sub-yearling juvenile Chinook salmon and 400,000 yearling juvenile Chinook salmon into the Samish River. All of the Chinook salmon cultured at the Samish Hatchery is marked either with an embedded coded wire tag, an adipose fin clip, or both.

After decades of culturing the Soos Creek Chinook salmon stock at WDFW's Samish Hatchery, it is presumed that the majority Chinook salmon in the Samish River are not part of the Puget Sound Endangered Species Unit (PSESU). However, given that not all of the Chinook salmon released from the hatchery are visibly marked (adipose fin clipped), that the progeny of Chinook salmon released above WDFW's fish trap to spawn naturally are not marked, and the tendency for adult salmon to stray between river systems, it is possible that Chinook salmon from the PSESU may be present in the Samish River.

Adult Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout captured by WDFW's fish trap are returned to the Samish River where they are allowed to distribute into the watershed and spawn naturally.

WDFW has documented a small contingent of reproducing riverine sockeye in the Samish River. Spawning riverine sockeye have been observed between Interstate Highway 5 and WDFW's fish trap. Though Pink salmon have been captured at WDFW's fish trap, naturally spawning Pink salmon have not been observed in the Samish River.

Watercourse With Headwaters (green)
DDD#25 does not include a Managed Watercourse With Headwaters (green).

Watercourses Without Headwaters (magenta)
There is only one *Watercourses Without Headwaters (magenta)* in DDD#25. The district's magenta watercourse is located in the eastern quarter of DDD#25, drains in a northerly direction under Sam Bell Road (856) and discharges into the Samish River via two floodgates (01, 02) that are located immediately downstream of the Burlington Northern Railroad bridge (857). Floodgates 01 and 02 are located below the ordinary high water line of the Samish River and are one-way check valves designed to prohibit water from the Samish River to flow into the district's *Managed Watercourse Without Headwaters (magenta)*. However, it is presumed that fish passage between the Samish River and the district's *Managed Watercourse Without Headwaters (magenta)* may be possible when the floodgates are open and the discharge velocity does not exceed the upstream swimming capabilities of the individual fish. It is also presumed that the upstream distribution and duration of residence for cold-water fish immigrating into the district's *Managed Watercourse Without Headwaters (magenta)* is limited by water quantity, water quality and prey availability. Though fish survey data has not been collected for the watercourses within the jurisdictional boundaries of DDD#25, the SalmonScape database, which represents the best professional opinion of WDFW's biologist staff, indicates that cold-water fish may be present in the district's *Managed Watercourse Without Headwaters (magenta)*(Figure 6).

Artificial Watercourses (yellow)
Within the jurisdictional boundaries of DDD#25, there is a floodgate structure wherever an artificial watercourse intersects with the Samish River. The majority of the district's floodgates are located at or below the ordinary high water line of the Samish River. The district's floodgates are one-way check valves designed to prohibit water from the Samish River to flow into the district's artificial watercourses. However, it is presumed that the passage of coldwater fish between the Samish River and the district's artificial watercourses may be possible when the floodgates are open and the discharge velocity does not exceed the upstream swimming capabilities of the individual fish. It is also presumed that the upstream distribution and duration of residence for cold-water fish immigrating into the district's artificial watercourses is limited by water quantity, water quality and prey availability. Though fish surveys have not been

collected for the watercourses within the jurisdictional boundaries of DDD#25, WDFW's SalmonScape database does not indicate that cold-water fish are present in the district's artificial watercourses (Figure 6).

A8-6. Fish Habitat Distribution - DDD#25

Natural Watercourses (blue)

Within the jurisdictional boundaries of DDD#25, the district's *Natural Watercourse* (Samish River) provides migration habitat for juvenile and adult Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. Within the jurisdictional boundaries of DDD#25, the Samish River provides rearing habitat for juvenile Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. Within the district's boundaries, the Samish River may also provide rearing habitats for adult Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. Though spawning surveys have not been conducted within the jurisdictional boundaries of DDD#25, WDFW's SalmonScape database indicates that suitable spawning habitat may be present in the Samish River upstream of Chuckanut Drive (Figure 6). Four Conservation Reserve Enhancement Program (CREP) projects, administered by the Skagit Conservation District, have been implemented along the Samish River within the district's boundaries for the purpose of enhancing the riparian habitat. Figure 7 illustrates the location and extent of these four CREP projects.

The following description of the Samish River is from the Limiting Factors 2003 Report authored by Dr. Carol Smith: "The Samish watershed is a relatively small drainage with approximately 29 miles of low gradient main stem habitat and additional tributaries which also provide accessible low gradient habitat (USFWS 2004). The main stem is predominantly a continuous, slow moving, moderately deep watercourse 30-40 feet wide (LLTK 2003). Tidal influence extends upstream to river mile four, where the channel bottom is mostly sand and silt (LLTK 2003). Much of the lower Samish River is diked, resulting in a loss of estuarine and freshwater habitat (USFWS 2004). Continuous dikes confine the river up to river mile five (LLTK 2004). Intermittent diking occurs between river miles 5 and 12. Most banks are cleared and steep sloped, having been stabilized by riprap or artificial sloping (LLTK 2003). The floodplain loss is an important impact to Coho salmon. The loss in the Samish has not been quantified or assessed. The Samish is described as generally having "poor" riparian condition due to conversion to non-forest uses (USFWS 2004) Except for immediate stream bank cover, adjacent land is cleared for grazing and annual crops. Summer home construction is beginning along the upper tributary reaches (LLTK 2003). Water quality is "poor" also, with water temperatures, increased nitrogen, phosphorus, and turbidity throughout the Samish River."

Watercourse With Headwaters (green)
DDD#25 does not include a *Managed Watercourse With Headwaters (green).*

Watercourses Without Headwaters (magenta)
As noted above in section A8-5, the district's only *Watercourses Without Headwaters (magenta)* is located in the eastern quarter of the district, drains in a northerly direction and discharges into the Samish River via two floodgates (01, 02) that are located immediately downstream of the Burlington Northern Railroad bridge (857). The channel and riparian corridor of the district's *Watercourses Without Headwaters (magenta)* is dominated by reid canary grass. Despite the absence of channel structure and overhanging riparian vegetation, the district's *Watercourses Without Headwaters (magenta)* may provide limited rearing habitat for juvenile Chinook salmon, Coho salmon, Chum salmon, Pink salmon, Sockeye salmon, Steelhead Trout (rainbow), Bull Trout, and Cutthroat Trout. However, it is presumed that the rearing potential is severely limited by water quantity, water quality and the absence of prey/forage production factors which are in part governed by the interaction of hydrology, sediment, woody debris, riparian processes and other natural forces. Spawning habitat for cold-water fish is not present in this watercourse type. A CREP riparian habitat enhancement project along the Samish River near the confluence of the district's *Watercourses Without Headwaters (magenta)* will also benefit approximately 300 feet of the district's magenta watercourse.

Artificial Watercourses (yellow)
As noted above in section A8-5, it is presumed that passage of coldwater fish between the Samish River and the district's *Artificial Watercourses (yellow)* may be possible when the floodgates are open and the discharge velocity does not exceed the upstream swimming capabilities of the individual fish. However, it is presumed that the rearing potential of the district's *Artificial Watercourses (yellow)* is severely limited by water quality, water quantity, and the absence of prey/forage production factors which are in part governed by the interaction of hydrology, sediment, woody debris, riparian processes and other natural forces. Spawning habitat for cold-water fish is not present in the district's *Artificial Watercourses (yellow).*

B. MANAGED WATERCOURSE WITH HEADWATERS - CLARIFICATIONS

Artificial Watercourses (yellow) and Managed Watercourse Without Headwaters (magenta)
The presence of coldwater fish in the district's *Managed Watercourse Without Headwaters (magenta)* and *Artificial Watercourses (yellow)* is presumed to be limited to the immediate vicinity of the floodgates. Given the limited presence of coldwater fish in the district's *Managed Watercourse Without Headwaters (magenta)* and *Artificial Watercourses (yellow),* habitat improvement projects (mitigation measures) associated with the maintenance of the districts

existing drainage infrastructure in these watercourse types is not required. When fish habitat improvements are proposed for the district's *Managed Watercourse Without Headwaters (magenta)* and *Artificial Watercourses (yellow)*, they will be voluntary, contingent upon the participation of a willing landowner, will maintain flood protection, guard against salt-water intrusion and maintain the drainage capabilities of the district.

Managed Watercourse With Headwaters (green)
DDD#25 does not include a *Managed Watercourse With Headwaters (green)*.

Natural Watercourse (blue)
The presence of coldwater fish in DDD#25 is primarily limited to the district's *Natural Watercourse* (Samish River). Habitat improvement projects (mitigation measures) associated with the repair and maintenance of the district's existing drainage infrastructure in the Samish River may be required through the issuance of Individual Hydraulic Project Approvals (HPAs) as provided for in RCW 77.55 and as specified in PART III (D) of the Drainage Maintenance Agreement for DDD#25.

Photographs of the drainage infrastructure in DDD#25 are presented in Figure 8.

C. OTHER ASSESSMENTS WITHIN DDD#25

1. House Bill 1425 Report: Tide gates 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. Preliminary Assessment Of Historic Conditions Of The Skagit River In The Fir Island Area: Implications For Salmonid Habitat Restoration, Brian Collins, 1998.
4. Priority Fish and Wildlife Projects Identified by Washington Department of Fish and Wildlife within the Greater Skagit River Ecosystem Planning Area, WDFW, 2002.
5. Application Of The Skagit Watershed Council's Strategy: River Basin Analysis of the Skagit and Samish Basins, Skagit Watershed Council, 1999.
6. Skagit County Baseline Monitoring Project, 2001-2003.
7. Skagit River Limiting Factor Analysis, Carol Smith 2003.

D. BEST MANAGEMENT PRACTICES – DISTRICT UNIQUE CIRCUMSTANCES

D1. General

Artificial Watercourses (yellow)

The drainage infrastructure and maintenance activities in the district's *Artificial Watercourses (yellow)* 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, consistent with Part III (C) of the Drainage Maintenance Agreement for DDD#25, the Best Management Practices identified in Addendum A of the Drainage Maintenance Agreement *Artificial Watercourses (yellow)* will apply as written and without modification. Consistent with PART III – (D) of the Drainage Maintenance Agreement for DDD#25, the district will voluntarily comply with the Best Management Practices for *Artificial Watercourses (yellow)* identified in Addendum A of the Drainage Maintenance.

Managed Watercourses Without Headwaters (magenta)

The drainage infrastructure and maintenance activities in the district's *Managed Watercourses Without Headwaters (magenta)* 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, consistent with Part III (C) of the Drainage Maintenance Agreement for DDD#25, the Best Management Practices identified in Addendum A of the Drainage Maintenance Agreement for *Watercourses Without Headwaters (magenta)* will apply as written and without modification. Consistent with PART III (D) of the Drainage Maintenance Agreement for DDD#25, a General Five-Year Hydraulic Project Approval (HPA) will be issued and will apply to the repair and maintenance of existing drainage infrastructure associated with the district's W*atercourse Without Headwaters (magenta)*. Given the limited presence of fish in the district's W*atercourse Without Headwaters (magenta)*, habitat improvement projects (mitigation measures) associated with the maintenance of the district's existing drainage infrastructure in this watercourse type as identified in the Drainage Maintenance Plan are not required.

Managed Watercourse With Headwaters (green)

DDD#25 does not include a *Managed Watercourse With Headwaters (green)*.

Natural Watercourse (blue)

DDD#25 utilizes the Samish River (*Natural Watercourse)* to convey the district's drainage to Samish Bay. Consistent with PART III – (D) of the Drainage Maintenance Agreement for DDD#25, the repair and maintenance of the district's existing drainage infrastructure <u>below</u> the ordinary high water line of the Samish River (*Natural Watercourse*) will require Individual

Hydraulic Project Approvals as provided for in RCW 77.55. 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.

The repair and maintenance of the district's existing drainage infrastructure above the ordinary high water line of the Samish River will not be subject to the requirements of RCW 77.55 and as such the Best Management Practices identified in Addendum A of the Drainage Maintenance Agreement for *Artificial Watercourses (yellow)* will be voluntarily applied by the district as written and without modification.

The majority of the floodgates along the Samish River in DDD#25 are privately owned and are not maintained by the district (Table 3). The repair and maintenance of these privately owned floodgates below the ordinary high water line of the Samish River (*Natural Watercourse*) will require an Individual Hydraulic Project Approvals as provided for in RCW 77.55. 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.

The ordinary high water line (OHW) as it relates to RCW 77.55 is defined by WAC 220-110-020(57) as "the mark on the shores of all waters that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual and so long continued in ordinary years, as to mark upon the soil or vegetation a character distinct from that of the abutting upland: Provided, that in any area where the ordinary high water line cannot be found the ordinary high water line adjoining saltwater shall be the line of mean higher high water and the ordinary high water line adjoining freshwater shall be the elevation of the mean annual flood. "

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 (D) of the Drainage Maintenance Agreement, the following beaver dam management BMPs will apply. The beaver dam management BMPs for the district's *artificial watercourses (yellow)* will be voluntarily applied by the district. The beaver dam management BMPs for the district's W*atercourse Without Headwaters (magenta)* will be included in the district's 5-Year General Hydraulic Project Approval. Also, consistent with the intent of PART III (D) of the Drainage Maintenance Agreement, beaver dam management in the district's *Natural Watercourse* (Samish River) will require Individual Hydraulic Project Approvals as provided for in RCW 77.55.

Addendum B
Drainage Maintenance Plan
Dike and Drainage District #25

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 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.

2. 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.

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

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

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

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

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

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

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

10. 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.

11. 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

The drainage infrastructure for DDD#25 does not include pumps.

E. HYDRAULIC PROJECT APPROVALS - COMPLIANCE

DDD#25 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 Five-Year GHPA issued pursuant to this Agreement is revoked or rescinded, DDD#25 will henceforth be required to secure a 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.

F. POTENTIAL DRAINAGE AND HABITAT IMPROVEMENT OPPORTUNITIES

WDFW is willing to work collaboratively with DDD #25 to identify and implement Drainage and Habitat Improvement Project that are mutually beneficial to both parties. In addition, WDFW is willing to consider incorporating the district's floodgate repair and maintenance activities along the Samish River into the General Five-Year GHPA issued for the purpose of implementing the district's Drainage Maintenance Agreement when, with the assistance of WDFW, DDD #25 implements a Drainage and Habitat Improvement Project that sufficiently offsets the direct and indirect impacts to fish and fish habitat in the Samish River that may occur as a result of the district's floodgate repair and maintenance activities. Potential Drainage and Habitat Improvement Projects Ideas include:

1. Dike Pull Back:

Project Description: Strategically relocate sections of the dike bordering the Samish River for the purpose of providing greater flood flow storage and restoring natural riverine processes.

2. Strategic Riparian Planting

Project Description: Plant deciduous and evergreen trees along the left bank (south) of the Samish River along those reaches that have not been diked. The riparian plantings will improve the stability of the river bank, will help control reed canary grass, knot weed and blackberries, will improve the water quality and will improve fish habitat.

3. Knot Weed Eradication

Project Description: Strategically remove areas along the banks of the Samish River where knot weed has become established. Replant the areas where knot weed has been removed with native plant species that will discourage re-establishment of the knot weed. Continue to remove the knot weed in the replanted areas until the native plant species are able to dominate the sites.

4. Side Channel Habitat

Project Description: Strategically identify areas along the Samish River where the dikes can be sufficiently pulled back to provide wetland and blind channel habitats. These sites will provide additional flood flow storage. The constructed wetland area could be planted with native wetland plants. A riparian buffer could be planted around the perimeter of the constructed wetland. A low flow channel could be constructed to connect the wetland to the Samish River. Large woody debris could be included in the constructed wetland to provide habitat structure and complexity. These sites will provide fish rearing habitat and will improve the water quality in the Samish River.