Skagit River Flood Risk Management Study
Hydraulic Effectiveness of Measures
4-Nov-11

Measures performance matrix.

Units:
Elevation to NAVD88
Flow cfs
Volume acre-ft

Spill Tables Worksheet
The Spill Tables worksheet provides spill due to levee overtopping only excluding levee breaches and spill into bypass channels.
For spill into bypass channels see under relevant measures in worksheets "100yr Matrix" and "50yr Matrix".

Difference Worksheets
The difference worksheets ("100yr Matrix DIFF Q" etc) show differences relative to Existing Condition for measures MVFW, BURL, 3 BRD w/o mods, 3BRD w mods, Base w/o mods, and Base w mods.
For all others measures, differences are relative to the Base Condition (i.e. relative to Base w/o mods or Base w mods)

Several difference worksheets (e.g. 100yr Matrix DIFF Q) use color shading to show direction and magnitude of change.
Blue shading shows increase in discharge or elevation with darker shading showing larger increases.
Red shading shows decrease in discharge or elevation with darker shading showing larger

Worksheet and Workbook Protection
The worksheet contain hidden rows and columns from supseded variants of some measures. Unhiding rows and columns should be done with caution.
The workbook contains hidden worksheets
Worksheet and workbook are password protected. PW is "nhc".

100-yr

	Description	4-Nov-11 Location From	To	Parameter	Existing Condition	MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods	Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir + MtV BPS w/o mod v2	Fir + MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
1	Sedro Woolley WWTP	RM 23.2		Peak Elev	54.6	54.6	54.6	54.6	54.6	54.6	54.5	54.7	54.6	54.8	54.7	54.6	54.4	54.6	54.4	55.1	54.9	54.6	54.5	54.6	54.4	54.5	54.3
				Peak Q	222,665	222,661	222,436	222,641	222,468	222,419	222,378	222,446	222,807	222,265	222,375	222,609	222,508	222,465	222,414	221,210	221,153	222,420	222,379	222,452	222,399	222,842	222,662
2	United General Hospital	RM 22.0		Peak Elev	49.0	49.0	49.4	49.0	48.7	49.3	49.0	49.2	48.7	49.4	49.0	49.1	48.6	49.2	48.7	50.8	50.5	49.3	48.9	49.2	48.8	48.7	48.1
3	Lower Nookachamps Storage Area	1Skagit		Peak Elev	49.0	49.0	49.4	49.0	48.7	49.3	48.9	49.6	49.6	49.7	49.4	49.1	48.6	49.2	48.7	50.8	50.5	49.3	48.9	49.2	48.8	48.7	48.1
4	Clear Lake Storage Area	2ClearLake		Peak Elev	49.0	49.0	49.4	49.0	48.7	49.3	48.9	49.6	49.6	49.7	49.4	49.1	48.6	49.2	48.7	50.8	50.5	49.3	48.9	49.2	48.8	48.7	48.1
5	Spill right bank u/s DD12 levees to SR-9	RM20.9 (LS 22.269 - 21.59)	RM22.4	Peak Q	50,267	50,477	59,723	49,484	39,888	58,658	46,921	47,803	33,709	51,591	40,409	50,134	38,654	53,212	40,713	29,932	20,816	58,520	46,789	54,677	42,624	39,489	26,934
				Volume	136,373	136,927	154,879	131,893	82,842	149,952	101,681	141,311	90,468	183,702	130,746	131,427	81,902	131,984	84,076	46,972	23,978	149,417	101,191	135,616	88,595	88,565	48,396
6	Spill right bank DD12 levees u/s BNRR bridge	RM17.57 (LS 20.89 - 17.89)	RM20.9	Peak Q	18,566	18,970	0	17,282	6,363	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Volume	32,988	33,618	0	30,106	8,689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Elev	46.9	47.0	47.5	46.9	46.1	47.5	46.7	47.1	46.1	45.8	44.6	47.0	46.1	47.1	46.2	48.7	48.2	47.5	46.7	47.2	46.4	46.0	44.6
				Peak Q	154,203	153,568	160,749	156,097	172,939	161,454	170,950	155,756	164,365	142,148	150,580	171,066	180,631	166,926	177,281	191,783	194,420	161,594	171,052	165,459	175,264	182,257	192,942
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Elev	42.7	42.7	43.3	42.8	44.3	43.5	44.4	43.0	43.8	41.6	42.4	42.8	43.6	42.9	43.8	45.7	45.8	43.4	44.4	43.1	44.0	41.1	41.8
				Peak Q	154,156	153,509	160,752	156,093	172,925	161,451	170,924	155,750	164,362	142,138	150,577	171,007	180,419	166,922	177,250	191,773	194,380	161,588	171,023	165,457	175,259	182,251	192,936
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	RM16.6 (LS 16.779)		Peak Q	15,821											19,131	22,383											
				Volume	52,012											58,415	77,418											
10	Spill to Swinomish Bypass	SWIN u/s XS (LS 15.895, - 15.875)		Peak Q																						48,031	51,589
				Volume																						287,182	302,141
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Elev	38.6	38.7	39.1	38.8	40.0	39.4	40.2	38.9	39.7	37.6	38.4	39.5	40.4	39.2	40.0	41.2	41.3	39.4	40.2	38.5	39.2	37.1	37.5
				Peak Q	154,156	153,492	160,754	156,089	172,892	161,438	170,930	155,732	164,349	142,109	150,566	153,096	159,455	166,890	177,247	186,768	187,986	161,575	171,028	165,443	175,264	137,921	141,335
12	Riverbend Storage Area (existing condition with levee failure at RM 16.6) (Peak elevations in North Mt Vernon [MV-E] and Riverbend [MV-W] and spill from MV-W to MV-E across I-5)	MV-W MV-E Spill SA CON i-5		Peak Elev	39.9											40.3	40.5											
				Peak Elev	39.9											dry	dry											
				Peak Q	8,225											0	0											
				Volume	17,352											0	0											
13	Spill to Mt Vernon Bypass	Lat weir to Bypass (LS 14.59 or 13.79)		Peak Q																				29,131	31,844		
				Volume																				170,751	186,715		
14	Skagit River u/s Division Street bridge	RM13		Peak Elev	34.6	34.9	35.0	34.8	35.6	35.5	36.1	35.0	35.7	33.9	34.6	35.8	36.4	35.8	36.5	36.9	36.9	35.4	36.1	34.7	35.3	33.4	33.9
				Peak Q	154,150	153,480	160,748	156,081	172,892	161,415	170,927	155,711	164,329	142,082	150,548	166,040	176,791	166,838	177,230	184,713	185,592	161,550	171,021	136,284	143,413	137,602	141,311
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Elev	31.3	31.4	31.6	31.4	32.1	32.0	32.6	31.6	32.2	30.6	31.2	32.3	32.8	32.1	32.6	33.1	33.1	31.9	32.5	32.0	32.6	30.1	30.5
				Peak Q	150,858	153,442	155,392	152,230	162,636	161,325	169,446	155,689	164,037	142,062	150,499	165,481	173,750	166,684	175,099	179,301	179,950	161,484	169,907	165,627	174,355	137,045	141,268
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Elev	28.2	28.3	28.5	28.3	28.9	28.8	29.3	28.5	29.0	27.5	28.1	29.1	29.5	28.7	29.2	29.7	29.7	28.6	29.1	28.9	29.4	27.0	27.4
				Peak Q	150,838	153,430	155,374	152,216	162,634	161,318	169,366	155,678	164,003	142,040	150,475	165,392	173,503	166,680	174,963	178,545	179,111	161,479	169,859	165,627	174,092	136,717	141,244
17	Spill left bank blw Division Street bridge	RM11.7 (LS 12.91 - 12.39)	RM12.92	Peak Q	3,265	0	5,331	3,824	10,176	0	0	0	61	0	0	0	0	23	-	1,752	1,839	0	0	0	0	0	0
				Volume	6,531	0	9,912	7,737	23,854	0	0	0	42	0	0	0	0	9	-	2,297	3,485	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.68		Peak Q	0	0	0	0	84	29	985	0	188	0	0	0	0	83	-	4198	4590	0	0	12	824	0	0
				Volume	0	0	0	0	55	10	945	0	163	0	0	0	0	37	-	5102	7850	0	0	3	749	0	0
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.098		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	6440	7954	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	3813	7219	0	0	0	0	0	0
20	Spill to Fir Island Bypass option 2 (near confluence)	Lat Weir into Fir (LS 914)		Peak Q																							
				Volume																							
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Elev	26.5	26.7	26.9	26.6	27.5	27.3	27.7	26.9	27.5	25.9	26.5	27.5	27.9	27.3	27.8	28.1	28.1	26.9	27.3	27.1	27.6	25.3	25.8
				Peak Q	77,620	78,804	79,697	78,254	82,845	82,293	85,834	79,829	83,325	73,304	77,365	84,042	87,814	89,167	92,919	90,251	90,552	84,380	88,464	86,243	89,901	70,283	72,985
22	Spill to Fir Island Bypass option 1 (near RM 7.2, as in 2008 measures report	Lat Weir into Fir (LS 682)		Peak Q																		11,703	12,362	12,096	12,830		
				Volume																		90,758	95,475	92,602	97,808		
23	North Fork Skagit River blw Fir Island Bypass	N FK RM620		Peak Elev	20.6	20.7	20.8	20.7	21.3	21.2	21.6	20.9	21.4	20.1	20.6	20.5	21.8	21.4	21.8	21.9	22.0	18.9	19.4	20.0	20.4	19.4	19.8
				Peak Q	77,652	78,832	79,716	78,285	82,865	82,299	85,327	79,788	83,211	73,219	77,299	83,939	86,536	89,167	92,871	87,723	87,891	72,713	76,134	74,171	76,930	70,130	72,998
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 809		Peak Q	0	0	0	0	1	1	524	0	36	0	0	71	1,314	-	74	2762	2887	0	0	0	159	0	0
				Volume	0	0	0	0	0	0	436	0	14	0	0	26	1,205	-	39	3255	5131	0	0	0	97	0	0
25	Sum of spills N Fork R bank	LS 883		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Elev	27.3	27.5	27.6	27.4	28.1	28.0	28.5	27.7	28.2	26.7	27.3	28.3	28.7	27.9	28.3	28.8	28.9	27.8	28.3	28.1	28.5	26.1	26.6
				Peak Q	73,237	74,632	75,672	73,978	79,781	79,022	83,516	75,818	80,687	68,717	73,111	81,318	85,635	77,491	82,021	88,103	88,329	77,089	81,372	79,372	84,174	65,779	68,233
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Elev	18.2	18.2	18.3	18.2	18.4	18.4	18.4	18.3	18.4	17.6	18.2	18.4	18.5	18.3	18.4	18.5	18.5	18.3	18.4	18.4	18.4	17.1	17.6
				Peak Q	69,671	70,748	71,499	70,261	73,972	73,574	75,548	71,627	74,442	67,102	69,614	74,677	76,220	72,694	74,984	76,900	76,934	72,439	74,715	73,755	75,772	64,031	66,383
28	Spill left bank South Fork blw Fisher Slough	S FK RM465 (LS 464)		Peak Q	3,435	3,695	3,899	3,572	4,661	4,529	5,218	3,919	4,791	1,595	3,405	4,910	5,477	4,252	5,016	5,718	5,753	4,175	4,919	4,590	5,302	745	1,569
				Volume	9,394	10,227	10,950	10,203	16,931	12,839	18,050	11,669	17,920	4,245	10,435	13,847	18,899	10,930	15,925	22,460	23,773	10,882	15,642	12,825	17,777	1,315	2,632
29	Sum of spills left bank S Fork, other than at LS 464	LSs 874, 779, 705, 627, 339		Peak Q	628	786	932	709	1,967	1,703	3,618	946	2,298	11	609	2,568	4,723	1,269	2,898	6,041	6,168	1,181	2,582	1818	3956	0	0
				Volume	880	1,224	1,491	1,122	4,130	2,602	6,657	1,598	5,055	11	939	3,482	8,301	1,821	4,947	13,238	16,396	1,721	4,433	2717	6971	0	0

30	Sum of spills South Fork R bank, other than at LS 464	**LSs 873, 778, 694, 628, 577, 523**	Peak Q	30	49	66	66	160	140	307	68	182	0	29	206	479	103	231	786	821	94	206	149	352	0	0
			Volume	31	58	83	83	302	184	517	91	380	0	33	251	711	120	370	1,326	1,781	110	329	195	554	0	0

100-yr

	Description	4-Nov-11 Location From	To	Parameter	Existing	MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods	"Base" w/o mods	"Base" w/ mods	Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir+ MtV BPS w/o mod v2	Fir + MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
1	Sedro Woolley WWTP	RM 23.2		Peak Elev	54.6	0.0	0.1	0.0	0.0	0.1	-0.1	54.6	54.5	0.1	0.1	0.2	0.2	-0.1	-0.1	-0.1	0.0	0.5	0.4	0.0	0.0	0.0	0.0	-0.2	-0.1
2	United General Hospital	RM 22.0		Peak Elev	49.0	0.0	0.3	0.0	-0.4	0.3	-0.1	49.3	49.0	-0.2	-0.3	0.1	0.1	-0.2	-0.3	-0.2	-0.2	1.4	1.5	0.0	0.0	-0.1	-0.2	-0.6	-0.8
3	Lower Nookachamps Storage Area	1Skagit		Peak Elev	49.0	0.0	0.4	0.0	-0.4	0.3	-0.1	49.3	48.9	0.3	0.6	0.4	0.4	-0.3	-0.3	-0.2	-0.2	1.4	1.5	0.0	0.0	-0.1	-0.2	-0.7	-0.8
4	Clear Lake Storage Area	2ClearLake		Peak Elev	49.0	0.0	0.3	0.0	-0.4	0.3	-0.1	49.3	48.9	0.3	0.6	0.4	0.4	-0.3	-0.3	-0.2	-0.2	1.4	1.5	0.0	0.0	-0.1	-0.2	-0.7	-0.8
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Elev	46.9	0.0	0.6	0.0	-0.8	0.6	-0.2	47.5	46.7	-0.4	-0.7	-1.8	-2.2	-0.5	-0.6	-0.4	-0.5	1.2	1.5	0.0	0.0	-0.3	-0.4	-1.6	-2.1
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Elev	42.7	0.0	0.6	0.1	1.7	0.8	1.7	43.5	44.4	-0.5	-0.6	-1.9	-2.0	-0.7	-0.7	-0.5	-0.6	2.2	1.5	0.0	0.0	-0.4	-0.4	-2.3	-2.6
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Elev	38.6	0.1	0.5	0.1	1.4	0.8	1.6	39.4	40.2	-0.5	-0.5	-1.8	-1.8	0.1	0.1	-0.2	-0.2	1.8	1.1	0.0	0.0	-0.9	-1.0	-2.3	-2.7
14	Skagit River u/s Division Street bridge	RM13		Peak Elev	34.6	0.2	0.4	0.1	0.9	0.8	1.5	35.5	36.1	-0.4	-0.4	-1.6	-1.5	0.3	0.3	0.4	0.4	1.4	0.8	-0.1	0.0	-0.8	-0.8	-2.1	-2.3
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Elev	31.3	0.2	0.3	0.1	0.9	0.8	1.3	32.0	32.6	-0.4	-0.3	-1.5	-1.3	0.3	0.2	0.1	0.1	1.1	0.6	-0.1	-0.1	0.0	0.0	-2.0	-2.1
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Elev	28.2	0.2	0.3	0.1	0.8	0.7	1.1	28.8	29.3	-0.4	-0.3	-1.3	-1.2	0.2	0.2	-0.1	-0.1	0.9	0.4	-0.2	-0.2	0.1	0.1	-1.8	-1.9
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Elev	26.5	0.2	0.3	0.1	0.9	0.7	1.2	27.3	27.7	-0.4	-0.3	-1.4	-1.2	0.3	0.2	0.1	0.1	0.8	0.4	-0.4	-0.4	-0.1	-0.1	-2.0	-2.0
23	North Fork Skagit River blw Fir Island Bypass	N FK RM620		Peak Elev	20.6	0.2	0.3	0.1	0.7	0.6	1.0	21.2	21.6	-0.2	-0.1	-1.1	-0.9	-0.7	0.2	0.2	0.2	0.8	0.4	-2.3	-2.2	-1.2	-1.2	-1.7	-1.7
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Elev	27.3	0.2	0.3	0.1	0.8	0.7	1.1	28.0	28.5	-0.4	-0.3	-1.4	-1.2	0.2	0.2	-0.2	-0.1	0.8	0.4	-0.2	-0.2	0.0	0.1	-1.9	-1.9
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Elev	18.2	0.0	0.1	0.0	0.2	0.2	0.2	18.4	18.4	-0.1	-0.1	-0.7	-0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-1.2	-0.8

50-yr

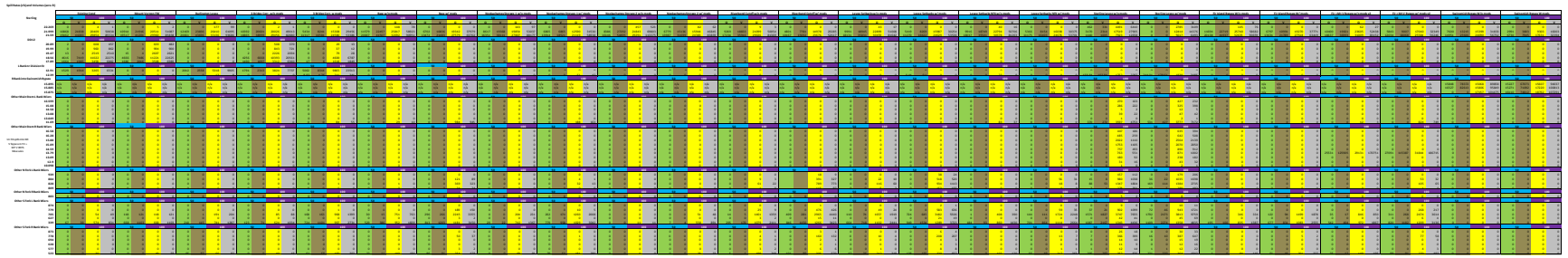
	Description	22-Jul-11 Location From	To	Parameter		MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods			Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir+ MtV BPS w/o mod v2	Fir + MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
1	Sedro Woolley WWTP	RM 23.2		Peak Elev	52.5	0.0	0.0	0.0	-0.4	0.0	-0.3	52.5	52.2	0.3	0.6	0.3	0.6	0.0	0.0	-0.1	-0.1	0.4	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1
2	United General Hospital	RM 22.0		Peak Elev	48.2	0.0	0.1	-0.1	-0.8	0.1	-0.6	48.3	47.7	-0.2	0.3	-0.1	0.4	-0.3	-0.3	-0.2	-0.2	1.5	1.0	0.0	0.0	-0.1	-0.1	-0.5	-0.7
3	Lower Nookachamps Storage Area	1Skagit		Peak Elev	48.2	0.0	0.1	0.0	-0.8	0.1	-0.5	48.3	47.6	-0.9	1.3	-0.5	-1.0	-0.2	-0.3	-0.2	-0.2	1.5	1.0	0.0	0.0	-0.1	-0.1	-0.5	-0.7
4	Clear Lake Storage Area	2ClearLake		Peak Elev	48.2	0.0	0.1	0.0	-0.8	0.1	-0.5	48.3	47.6	-0.9	1.3	-0.5	-1.0	-0.2	-0.3	-0.2	-0.2	1.5	1.0	0.0	0.0	-0.1	-0.1	-0.4	-0.7
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Elev	46.3	0.0	0.2	0.0	-1.4	0.2	-0.9	46.4	45.3	-0.4	0.0	-1.8	-1.8	-0.6	-0.8	-0.4	-0.5	1.5	1.1	0.0	0.0	-0.3	-0.4	-1.1	-2.0
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Elev	41.9	0.0	0.2	0.1	1.3	0.4	1.2	42.3	43.1	-0.5	0.0	-2.0	-1.7	-0.8	-0.9	-0.5	-0.6	1.7	1.0	0.0	0.0	-0.4	-0.4	-1.4	-2.0
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Elev	38.0	0.1	0.2	0.1	1.1	0.4	1.1	38.4	39.1	-0.5	0.0	-1.9	-1.5	-0.3	-0.1	-0.2	-0.3	1.5	0.9	0.0	0.0	-0.9	-0.9	-1.4	-2.0
14	Skagit River u/s Division Street bridge	RM13		Peak Elev	34.2	0.1	0.2	0.1	0.8	0.4	1.0	34.6	35.2	-0.5	-0.1	-1.6	-1.3	-0.1	0.1	0.3	0.3	1.3	0.8	0.0	-0.1	-0.7	-0.7	-1.2	-1.7
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Elev	30.8	0.1	0.2	0.1	0.8	0.4	0.9	31.2	31.7	-0.4	-0.1	-1.6	-1.2	-0.1	0.1	0.0	0.0	1.2	0.7	-0.1	-0.1	0.0	0.0	-1.2	-1.7
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Elev	27.7	0.1	0.1	0.1	0.7	0.3	0.8	28.1	28.6	-0.4	0.0	-1.4	-1.1	0.0	0.1	-0.2	-0.2	1.1	0.6	-0.2	-0.2	0.0	0.0	-1.1	-1.6
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Elev	26.1	0.1	0.1	0.1	0.7	0.4	0.9	26.4	27.0	-0.4	0.0	-1.5	-1.2	-0.1	0.1	0.0	0.1	1.1	0.6	-0.4	-0.5	-0.1	-0.2	-1.2	-1.7
23	North Fork Skagit River blw Fir Island Bypass	N FK RM620		Peak Elev	20.1	0.1	0.1	0.1	0.7	0.3	0.8	20.4	20.9	-0.3	0.1	-1.3	-1.0	0.1	0.2	0.1	0.1	1.1	0.7	-2.2	-2.2	-2.1	-2.1	-1.0	-1.4
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Elev	26.9	0.1	0.2	0.1	0.7	0.4	0.9	27.2	27.8	-0.4	0.0	-1.5	-1.2	-0.1	0.1	-0.2	-0.2	1.1	0.6	-0.2	-0.3	0.0	0.0	-1.2	-1.6
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Elev	17.8	0.1	0.2	0.1	0.4	0.3	0.5	18.2	18.3	-0.4	0.0	-1.3	-0.7	-0.1	0.0	-0.2	-0.1	0.2	0.1	-0.2	-0.1	0.0	0.0	-1.2	-1.2

100-yr

	Description	4-Nov-11 Location From	To	Parameter	Existing	MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods	"Base" w/o mods	"Base" w/ mods	Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir + MtV BPS w/o mod v2	Fir+ MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
1	Sedro Woolley WWTP	RM 23.2		Peak Q	222,665	-4	-229	-24	-197	-246	-287	222,419	222,378	27	429	-154	-3	190	130	47	36	-1,209	-1,225	1	1	33	21	424	283
5	Spill right bank u/s DD12 levees to SR-9	RM20.9	RM22.4	Peak Q	50,267	209	9,456	-783	-10,379	8,390	-3,346	58,658	46,921	-10,854	-13,212	-7,067	-6,512	-8,523	-8,267	-5,446	-6,208	-28,725	-26,105	-138	-132	-3,981	-4,297	-19,168	-19,987
6	Spill right bank DD12 levees u/s BNRR bridge	RM17.57	RM20.9	Peak Q	18,566	403	-18,566	-1,285	-12,203	-18,566	-18,566	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Q	154,203	-635	6,546	1,894	18,736	7,251	16,747	161,454	170,950	-5,697	-6,585	-19,305	-20,370	9,613	9,681	5,472	6,332	30,329	23,471	140	102	4,006	4,314	20,804	21,993
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Q	154,156	-647	6,596	1,937	18,770	7,295	16,769	161,451	170,924	-5,700	-6,562	-19,313	-20,347	9,557	9,494	5,471	6,326	30,322	23,456	138	99	4,007	4,335	20,800	22,012
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	RM16.6		Peak Q	15,821													19,131	22,383										
10	Spill to Swinomish Bypass	SWIN u/s XS		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48,031	51,589
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Q	154,156	-664	6,598	1,934	18,736	7,282	16,775	161,438	170,930	-5,705	-6,581	-19,329	-20,364	-8,342	-11,475	5,453	6,317	25,330	17,056	137	97	4,006	4,333	-23,516	-29,595
13	Spill to Mt Vernon Bypass	Lat weir to Bypass		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29,131	31,844	0	0
14	Skagit River u/s Division Street bridge	RM13		Peak Q	154,150	-670	6,599	1,931	18,743	7,265	16,777	161,415	170,927	-5,704	-6,598	-19,332	-20,378	4,625	5,864	5,424	6,304	23,299	14,666	136	95	-25,131	-27,514	-23,813	-29,616
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Q	150,858	2,584	4,534	1,372	11,778	10,467	18,588	161,325	169,446	-5,636	-5,408	-19,263	-18,947	4,156	4,305	5,359	5,654	17,976	10,505	159	461	4,302	4,910	-24,280	-28,178
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Q	150,838	2,593	4,536	1,378	11,796	10,481	18,528	161,318	169,366	-5,640	-5,363	-19,278	-18,891	4,074	4,137	5,361	5,597	17,227	9,745	160	493	4,308	4,726	-24,601	-28,122
17	Spill left bank blw Division Street bridge	RM11.7	RM12.92	Peak Q	3,265	-3,265	2,065	559	6,910	-3,265	-3,265	0	0	0	61	0	0	0	0	23	0	1,752	1,839	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.68		Peak Q	0	0	0	0	84	29	985	29	985	-29	-797	-29	-985	-29	-985	55	-985	4,169	3,606	-29	-985	-17	-160	-29	-985
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.098		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,440	7,954	0	0	0	0	0	0
20	Spill to Fir Island Bypass option 2 (near confluence)	Lat Weir into Fir		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Q	77,620	1,184	2,077	634	5,226	4,673	8,214	82,293	85,834	-2,465	-2,509	-8,989	-8,469	1,749	1,980	6,874	7,085	7,958	4,718	2,087	2,630	3,949	4,067	-12,010	-12,849
22	Spill to Fir Island Bypass option 1 (near RM 7.2, as in 2008 measures report)	Lat Weir into Fir		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,703	12,362	12,096	12,830	0	0
23	North Fork Skagit River blw Fir Island Bypass	N FK RM620		Peak Q	77,652	1,180	2,065	634	5,213	4,648	7,675	82,299	85,327	-2,511	-2,116	-9,080	-8,028	1,640	1,209	6,868	7,544	5,424	2,564	-9,586	-9,193	-8,128	-8,396	-12,169	-12,329
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 809		Peak Q	0	0	0	0	1	1	524	1	524	-1	-488	-1	-524	70	790	-1	-449	2,761	2,363	-1	-524	-1	-365	-1	-524
25	Sum of spills N Fork R bank	LS 883		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0	0	0	0	0	0
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Q	73,237	1,395	2,435	741	6,544	5,785	10,279	79,022	83,516	-3,203	-2,829	-10,305	-10,405	2,296	2,119	-1,531	-1,495	9,082	4,813	-1,933	-2,143	351	659	-13,243	-15,283
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Q	69,671	1,077	1,828	590	4,301	3,903	5,877	73,574	75,548	-1,947	-1,106	-6,472	-5,934	1,103	672	-880	-564	3,326	1,386	-1,135	-833	181	224	-9,543	-9,165
28	Spill left bank South Fork blw Fisher Slough	S FK RM465		Peak Q	3,435	260	464	137	1,226	1,094	1,783	4,529	5,218	-610	-428	-2,934	-1,813	381	259	-277	-203	1,189	534	-354	-299	61	84	-3,784	-3,649
29	Sum of spills left bank S Fork, other than at LS 464	LSs 874, 779, 705, 627, 339		Peak Q	628	158	304	80	1,338	1,075	2,990	1,703	3,618	-757	-1,320	-1,692	-3,009	865	1,105	-435	-720	4,338	2,550	-523	-1,036	115	338	-1,703	-3,618
30	Sum of spills South Fork R bank, other than at LS 464	LSs 873, 778, 694, 628, 577, 523		Peak Q	30	19	36	36	129	109	277	140	307	-72	-125	-140	-278	66	172	-37	-76	646	514	-46	-101	9	45	-140	-307
5	Spill right bank u/s DD12 levees to SR-10	(LS 22.269 - 21.59)		Volume	136,373	554	18,506	-4,480	-53,531	13,579	-34,692	149,952	101,681	-8,641	-11,213	33,749	29,065	-18,525	-19,779	-17,968	-17,605	-102,980	-77,703	-536	-490	-14,336	-13,086	-61,387	-53,285
6	Spill right bank DD12 levees u/s BNRR bridge	(LS 20.89 - 17.89)		Volume	32,988	630	-32,988	-2,882	-24,299	-32,988	-32,988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	(LS 16.779)		Volume	52,012							0	0	0	0	0	0	58,415	77,418	0	0	0	0	0	0	0	0	0	0
10	Spill to Swinomish Bypass	(LS 15.895, - 15.875)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287,182	302,141
13	Spill to Mt Vernon Bypass	(LS 14.59)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	170,751	186,715	0	0
17	Spill left bank blw Division Street bridge	(LS 12.91 - 12.39)		Volume	6,531	-6,531	3,381	1,206	17,323	-6,531	-6,531	0	0	0	42	0	0	0	0	9	0	2,297	3,485	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.69		Volume	0	0	0	0	55	10	945	10	945	-10	-782	-10	-945	-10	-945	27	-945	5,092	6,905	-10	-945	-7	-196	-10	-945
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.099		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,813	7,219	0	0	0	0	0	0
22	Spill to Fir Island Bypass option 1 (near RM 7.2)	(LS 682)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90,758	95,475	92,602	97,808	0	0
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 810		Volume	0	0	0	0	0	0	436	0	436	0	-422	0	-436	26	769	0	-398	3,255	4,695	0	-436	0	-340	0	-436
25	Sum of spills N Fork R bank	LS 884		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0
28	Spill left bank South Fork blw Fisher Slough	(LS 464)		Volume	9,394	833	1,556	809	7,537	3,444	8,656	12,839	18,050	-1,169	-130	-8,594	-7,615	1,008	849	-1,909	-2,125	9,621	5,722	-1,957	-2,408	-14	-274	-11,524	-15,419
29	Sum of spills left bank S Fork, other than at LS 465	LSs 874, 779, 705, 627, 340		Volume	880	344	611	242	3,250	1,722	5,777	2,602	6,657	-1,004	-1,602	-2,591	-5,718	880	1,644	-781	-1,710	10,636	9,739	-881	-2,224	116	314	-2,602	-6,657
30	Sum of spills South Fork R bank, other than at LS 465	LSs 873, 778, 694, 628, 577, 524		Volume	31	27	52	52	271	153	486	184	517	-94	-137	-184	-484	67	195	-64	-146	1,142	1,264	-75	-188	10	38	-184	-517

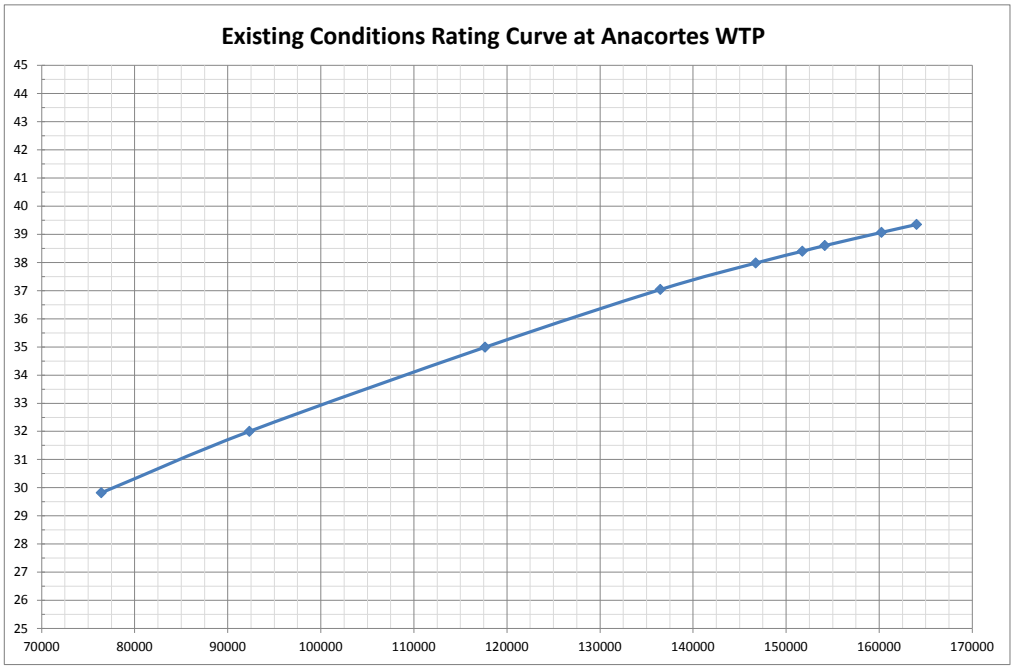
50-yr		4-Nov-11 Location			Existing	MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods	Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir + MtV BPS w/o mod v2	Fir + MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
	Description	From	To	Parameter	Condition																						
1	Sedro Woolley WWTP	RM 23.2		Peak Elev	52.5	52.5	52.5	52.5	52.1	52.5	52.2	52.8	52.8	52.8	52.8	52.5	52.1	52.4	52.1	52.9	52.3	52.5	52.2	52.5	52.2	52.4	52.1
				Peak Q	187,490	187,489	187,425	187,496	187,517	187,440	187,463	188,834	188,049	189,005	188,559	187,554	187,581	187,522	187,558	186,765	187,264	187,446	187,467	187,507	187,547	187,881	187,900
2	United General Hospital	RM 22.0		Peak Elev	48.2	48.2	48.3	48.2	47.4	48.3	47.7	48.1	47.9	48.2	48.1	48.0	47.3	48.1	47.4	49.7	48.6	48.3	47.7	48.2	47.5	47.8	46.9
3	Lower Nookachamps Storage Area	1Skagit		Peak Elev	48.2	48.2	48.3	48.1	47.4	48.3	47.6	47.4	49.0	47.8	46.7	48.0	47.3	48.1	47.4	49.7	48.6	48.3	47.7	48.1	47.5	47.8	46.9
4	Clear Lake Storage Area	2ClearLake		Peak Elev	48.2	48.2	48.3	48.1	47.4	48.3	47.6	47.4	49.0	47.8	46.7	48.0	47.3	48.1	47.4	49.7	48.6	48.3	47.7	48.1	47.5	47.8	46.9
5	Spill right bank u/s DD12 levees to SR-9	RM20.9 (LS 22.269 - 21.59)	RM22.4	Peak Q	30,330	30,431	32,830	29,257	16,751	31,586	20,175	24,969	20,780	24,532	20,766	26,504	14,967	27,953	16541.57	5,072	-	31,833	20,428	29,037	17,878	22,551	9,721
				Volume	62,922	63,117	67,532	59,600	24,822	63,964	32,319	57,479	25,387	82,186	46,836	54,749	23,473	54,250	24557	3,680	-	64,655	32,780	56,655	27,075	39,141	11,748
6	Spill right bank DD12 levees u/s BNRR bridge	RM17.57 (LS 20.89 - 17.89)	RM20.9	Peak Q	6,294	6,369	0	5,748	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Volume	9,408	9,506	0	8,365	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Elev	46.3	46.3	46.5	46.2	44.9	46.4	45.3	46.0	45.3	44.6	43.5	45.9	44.5	46.1	44.8	48.0	46.4	46.4	45.3	46.2	45.0	45.3	43.3
				Peak Q	146,736	146,477	149,154	148,077	160,086	149,976	157,521	145,064	157,723	131,201	141,893	157,660	165,776	153,822	161,703	166,475	167,783	150,266	157,900	153,234	160,953	163,919	175,242
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Elev	41.9	42.0	42.2	42.0	43.2	42.3	43.1	41.8	43.1	40.3	41.4	41.5	42.2	41.8	42.5	43.9	44.1	42.3	43.1	41.9	42.7	40.9	41.1
				Peak Q	146,738	146,469	149,145	148,075	160,053	149,954	157,488	144,976	157,768	131,100	141,902	157,635	165,773	153,800	161,674	166,454	167,767	150,247	157,871	153,217	160,931	163,910	175,235
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	RM16.6 (LS 16.779)		Peak Q	13,453											14,476	17,103										
				Volume	25,395											27,407	40,667										
10	Spill to Swinomish Bypass	SWIN u/s XS (LS 15.895, - 15.875)		Peak Q																						32,375	46,608
				Volume																						160,985	212,978
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Elev	38.0	38.0	38.2	38.1	39.1	38.4	39.1	37.8	39.0	36.5	37.6	38.1	38.9	38.2	38.8	39.9	40.0	38.4	39.1	37.5	38.2	37.0	37.1
				Peak Q	146,733	146,459	149,111	148,061	160,059	149,890	157,441	144,780	157,646	130,938	141,738	143,140	149,150	153,701	161,566	166,422	167,750	150,192	157,802	153,166	160,864	136,484	138,100
12	Riverbend Storage Area (existing condition with levee failure at RM 16.6) (Peak elevations in North Mt Vernon [MV-E] and Riverbend [MV-W] and spill from MV-W to MV-E across I-5)	MV-W MV-E Spill SA CON i-5		Peak Elev	39.6											40.06	40.23										
				Peak Elev	39.6											dry	dry										
				Peak Q	9,399																						
				Volume	10,014																						
13	Spill to Mt Vernon Bypass	Lat weir to Bypass (LS 14.59)		Peak Q																				25,531	27,091		
				Volume																				125,905	115,387		
14	Skagit River u/s Division Street bridge	RM13		Peak Elev	34.2	34.3	34.3	34.3	35.0	34.6	35.2	34.1	35.1	32.9	33.9	34.5	35.3	34.8	35.5	35.8	35.9	34.5	35.1	33.9	34.4	33.3	33.5
				Peak Q	146,717	146,434	149,068	148,039	160,053	149,858	157,426	144,616	157,325	130,845	141,875	149,605	159,162	153,655	161,538	166,420	167,750	150,146	157,792	127,603	133,750	136,234	137,788
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Elev	30.8	30.9	30.9	30.9	31.6	31.2	31.7	30.7	31.7	29.6	30.5	31.1	31.8	31.2	31.7	32.3	32.4	31.1	31.6	31.2	31.7	30.0	30.1
				Peak Q	145,137	146,357	147,043	146,194	154,948	149,816	157,367	144,305	156,886	130,601	141,719	149,268	158,854	153,599	161,462	165,871	166,962	150,116	157,741	153,363	161,092	135,772	137,200
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Elev	27.7	27.8	27.9	27.8	28.4	28.1	28.6	27.7	28.6	26.6	27.5	28.0	28.7	27.9	28.4	29.1	29.2	27.9	28.4	28.1	28.6	26.9	27.0
				Peak Q	145,097	146,333	147,024	146,169	154,922	149,777	157,324	144,236	156,798	130,577	141,576	149,194	158,792	153,555	161,410	165,852	166,936	150,086	157,701	153,319	161,049	135,512	136,889
17	Spill left bank blw Division Street bridge	RM11.7 (LS 12.91 - 12.39)	RM12.92	Peak Q	1,529	0	2,012	1,791	5,071	0	0	0	0	0	0	0	0	0	0	158.84	244.01	0	0	0	0	0	0
				Volume	1,914	0	2,558	2,313	8,319	0	0	0	0	0	0	0	0	0	0	102.84	179.61	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.68		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	370	531	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	272	427	0	0	0	0	0	0
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.098		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Spill to Fir Island Bypass option 2 (near confluence)	Lat Weir into Fir (LS 914)		Peak Q																							
				Volume																							
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Elev	26.1	26.2	26.2	26.2	26.8	26.4	27.0	26.0	27.0	24.9	25.8	26.4	27.1	26.5	27.0	27.5	27.6	26.1	26.5	26.3	26.8	25.2	25.3
				Peak Q	74,844	75,425	75,761	75,352	79,515	77,101	80,591	74,280	80,124	67,849	72,919	76,647	81,147	82,352	86,338	84,240	84,701	78,841	82,966	80,480	84,185	69,816	70,396
22	Spill to Fir Island Bypass option 1 (near RM 7.2, as in 2008 measures report	Lat Weir into Fir (LS 682)		Peak Q																		10,520	11,218	10,859	11,625		
				Volume																		68,745	71,911	69,959	73,366		
23	North Fork Skagit River blw Fir Island Bypass 1	N FK RM620		Peak Elev	20.1	20.2	20.2	20.2	20.8	20.4	20.9	20.1	21.0	19.1	19.9	20.5	21.1	20.6	21.0	21.5	21.6	18.2	18.7	18.4	18.8	19.4	19.5
				Peak Q	74,856	75,441	75,778	75,370	79,521	77,101	80,589	74,175	80,152	67,861	72,921	76,522	81,055	82,346	86,321	84,112	84,465	68,347	71,751	69,629	72,572	69,633	70,171
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 809		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106	215	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	141	0	0	0	0	0	0
25	Sum of spills N Fork R bank	LS 883		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Elev	26.9	27.0	27.0	27.0	27.6	27.2	27.8	26.8	27.7	25.7	26.6	27.2	27.9	27.0	27.6	28.3	28.4	27.0	27.5	27.3	27.8	26.1	26.1
				Peak Q	70,239	70,878	71,226	70,793	75,373	72,634	76,712	69,865	76,452	62,732	68,314	72,349	77,475	71,154	75,053	81,583	82,220	71,197	74,695	72,795	76,812	65,147	65,822
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Elev	17.8	17.9	18.0	17.9	18.3	18.2	18.3	17.7	18.3	16.9	17.6	18.1	18.3	18.0	18.3	18.4	18.4	18.0	18.2	18.2	18.3	17.0	17.1
				Peak Q	67,979	68,331	68,486	68,297	71,274	69,062	72,193	67,713	72,011	62,244	66,751	69,176	72,700	68,401	71,037	74,819	75,093	68,447	70,776	69,214	72,257	63,692	64,080
28	Spill left bank South Fork blw Fisher Slough	S FK RM465 (LS 464)		Peak Q	2,087	2,371	2,600	2,339	3,847	3,308	4,107	1,819	3,932	452	1,493	2,832	4,228	2,530	3,783	4,947	5,027	2,560	3,715	3,342	4,126	601	667
				Volume	3,985	4,251	4,600	4,402	9,216	5,656	9,364	4,016	8,388	1,044	3,330	5,110	9,243	4,080	7,638	12,774	13,158	4,233	7,650	5,659	9,088	820	711
29	Sum of spills left bank S Fork, other than at LS464	LSs 874, 779, 705, 627, 339		Peak Q	67	786	212	123	892	559	1,109	29	1,042	0	7	309	1,255	185	845	2,695	2,973	197	799	577	1131	0	0
				Volume	39	1,224	116	71	1,264	400	1,469	22	1,132	0	4	175	1,430	94	975	4,014	4,493	101	926	421	1450	0	0
30	Sum of spills South Fork R bank	LSs 873, 778, 694, 628, 577, 523		Peak Q	0	0	66	0	61	22	86	0	79	0	0	5	101	1	56	214	238	1	51	25	88	0	0
				Volume	0	0	83	0	68	11	91	0	64	0	0	1	89	0	49	301	341	0	44	12	91	0	0

50-yr		4-Nov-11 Location			Existing	MVFW	BURL	3brd w/o mods	3brd w/ mods	"Base" w/o mods	"Base" w/ mods	"Base" w/o mods	"Base" w/ mods	Nkchmps1 w/o mods	Nkchmps1 w mods	Nkchmps2 w/o mods	Nkchmps2 w mods	Riverbend cutoff w/o mods	Riverbend cutoff w/ mods	Levee Setbacks w/o mods	Levee Setbacks w/ mods	Sterling Lev w/o mods	Sterling Lev w/ mods	Fir Island Bypass w/o mod	Fir Island Bypass w mods	Fir + MtV BPS w/o mod v2	Fir + MtV BPS w/ mod v2	Swin. Bypass w/o mod	Swin. Bypass w/ mod
	Description	From	To	Parameter																									
1	Sedro Woolley WWTP	RM 23.2		Peak Q	187,490	-1	-65	6	27	-50	-27	187,440	187,463	1,394	586	1,565	1,096	114	118	82	95	-675	-200	6	4	67	83	441	437
5	Spill right bank u/s DD12 levees to SR-9	RM20.9	RM22.4	Peak Q	30,330	101	2,500	-1,073	-13,579	1,256	-10,156	31,586	20,175	-6,617	605	-7,053	592	-5,082	-5,207	-3,633	-3,633	-26,514	-20,175	247	253	-2,548	-2,297	-9,034	-10,453
6	Spill right bank DD12 levees u/s BNRR bridge	RM17.57	RM20.9	Peak Q	6,294	74	-6,294	-546	-6,278	-6,294	-6,294	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Skagit River u/s BNRR Bridge	RM17.56		Peak Q	146,736	-259	2,418	1,341	13,350	3,240	10,785	149,976	157,521	-4,912	202	-18,775	-15,628	7,684	8,255	3,846	4,182	16,499	10,262	290	379	3,258	3,432	13,942	17,721
8	Skagit River nr Mount Vernon (USGS gage)	RM17.04		Peak Q	146,738	-269	2,408	1,337	13,316	3,216	10,751	149,954	157,488	-4,978	280	-18,854	-15,586	7,681	8,285	3,846	4,186	16,500	10,279	294	383	3,263	3,443	13,956	17,747
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	RM16.6		Peak Q	13,453													14,476	17,103										
10	Spill to Swinomish Bypass	SWIN u/s XS		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32,375	46,608
11	Anacortes WTP (blw Swinomish Bypass)	RM14.6		Peak Q	146,733	-274	2,378	1,328	13,326	3,158	10,708	149,890	157,441	-5,110	206	-18,953	-15,703	-6,751	-8,290	3,811	4,126	16,532	10,310	302	361	3,275	3,424	-13,407	-19,341
13	Spill to Mt Vernon Bypass	Lat weir to Bypass		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,531	27,091	0	0
14	Skagit River u/s Division Street bridge	RM13		Peak Q	146,717	-283	2,351	1,322	13,336	3,141	10,709	149,858	157,426	-5,242	-101	-19,014	-15,551	-253	1,736	3,797	4,113	16,562	10,324	288	367	-22,256	-23,675	-13,624	-19,638
15	Skagit River below Mount Vernon Bypass	RM11.2		Peak Q	145,137	1,220	1,905	1,056	9,811	4,678	12,229	149,816	157,367	-5,511	-481	-19,215	-15,648	-548	1,487	3,783	4,095	16,055	9,595	301	375	3,547	3,725	-14,044	-20,167
16	Skagit River abv N Fk/S Fk distributary point	RM9.9		Peak Q	145,097	1,236	1,927	1,072	9,825	4,680	12,227	149,777	157,324	-5,542	-526	-19,201	-15,748	-583	1,468	3,778	4,086	16,075	9,612	309	377	3,542	3,725	-14,266	-20,435
17	Spill left bank blw Division Street bridge	RM11.7	RM12.92	Peak Q	1,529	-1,529	484	263	3,543	-1,529	-1,529	0	0	0	0	0	0	0	0	0	0	159	244	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.68		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	370	531	0	0	0	0	0	0
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.098		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	North Fork Skagit River blw distributary point	N FK RM871.4		Peak Q	74,844	581	917	508	4,671	2,257	5,747	77,101	80,591	-2,821	-467	-9,252	-7,672	-454	555	5,251	5,747	7,139	4,109	1,740	2,375	3,379	3,593	-7,285	-10,195
22	Spill to Fir Island Bypass option 1 (near RM 7.2, as in 2008 measures report	Lat Weir into Fir		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,520	11,218	10,859	11,625	0	0
23	North Fork Skagit River blw Fir Island Bypass	N FK RM620		Peak Q	74,856	585	923	515	4,665	2,245	5,733	77,101	80,589	-2,926	-437	-9,240	-7,668	-579	466	5,245	5,732	7,011	3,876	-8,754	-8,838	-7,471	-8,017	-7,467	-10,418
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 809		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106	215	0	0	0	0	0	0
25	Sum of spills N Fork R bank	LS 883		Peak Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	South Fork Skagit River blw distributary point	S FK RM895.5		Peak Q	70,239	639	987	554	5,134	2,395	6,473	72,634	76,712	-2,768	-260	-9,902	-8,398	-285	763	-1,480	-1,659	8,949	5,508	-1,437	-2,017	161	99	-7,487	-10,890
27	South Fork Skagit River blw Fisher Slough	S FK RM340		Peak Q	67,979	352	507	318	3,295	1,083	4,214	69,062	72,193	-1,349	-182	-6,818	-5,442	114	506	-661	-1,157	5,757	2,900	-614	-1,418	152	63	-5,370	-8,113
28	Spill left bank South Fork blw Fisher Slough	S FK RM465		Peak Q	2,087	284	514	252	1,760	1,221	2,021	3,308	4,107	-1,489	-175	-2,856	-2,614	-476	121	-777	-324	1,639	920	-747	-392	35	18	-2,706	-3,440
29	Sum of spills left bank S Fork, other than at LS 464	LSs 874, 779, 705, 627, 339		Peak Q	67	719	145	56	824	492	1,042	559	1,109	-530	-68	-559	-1,102	-250	145	-374	-264	2,136	1,864	-362	-310	18	21	-559	-1,109
30	Sum of spills South Fork R bank, other than at LS 464	LSs 873, 778, 694, 628, 577, 523		Peak Q	0	0	66	0	61	22	86	22	86	-22	-8	-22	-86	-18	15	-22	-30	191	152	-22	-36	2	2	-22	-86
5	Spill right bank u/s DD12 levees to SR-10	(LS 22.269 - 21.59)		Volume	62,922	195	4,610	-3,321	-38,100	1,043	-30,603	63,964	32,319	-6,485	-6,933	18,222	14,517	-9,215	-8,846	-9,715	-7,762	-60,285	-32,319	691	461	-7,309	-5,244	-24,823	-20,571
6	Spill right bank DD12 levees u/s BNRR bridge	(LS 20.89 - 17.89)		Volume	9,408	98	-9,408	-1,043	-9,403	-9,408	-9,408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Spill to Riverbend (MV-W) Storage Area (via breach d/s of I-5	(LS 16.779)		Volume	25,395	-25,395	-25,395	-25,395	-25,395	-25,395	-25,395	0	0	0	0	0	0	27,407	40,667	0	0	0	0	0	0	0	0	0	0
10	Spill to Swinomish Bypass	(LS 15.895, - 15.875)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160,985	212,978
13	Spill to Mt Vernon Bypass	(LS 14.59)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125,905	115,387	0	0
17	Spill left bank blw Division Street bridge	(LS 12.91 - 12.39)		Volume	1,914	-1,914	644	399	6,405	-1,914	-1,914	0	0	0	0	0	0	0	0	0	0	103	180	0	0	0	0	0	0
18	Sum of spills Skagit Mainstem L bank other than nr Division St	LSs 16.599, 15.08, 14.58, 13.08, 13.049, 11.69		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	272	427	0	0	0	0	0	0
19	Sum of spills Skagit Mainstem R bank, other than @ Sterling and DD12 & bypass flow	LSs 16.58, 16.28, 15.88, 15.09, 14.59, 13.79, 13.09, 12.9, 10.099		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Spill to Fir Island Bypass option 1 (nr RM 7.2)	(LS 682)		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68,745	71,911	69,959	73,366	0	0
24	Sum of spills N Fork L bank	LSs 939, 884, 828, 810		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	141	0	0	0	0	0	0
25	Sum of spills N Fork R bank	LS 884		Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Spill left bank South Fork blw Fisher Slough	(LS 464)		Volume	3,985	266	615	417	5,231	1,671	5,379	5,656	9,364	-1,640	-976	-4,612	-6,034	-546	-120	-1,576	-1,726	7,118	3,794	-1,424	-1,714	3	-276	-4,836	-8,653
29	Sum of spills left bank S Fork, other than at LS 465	LSs 874, 779, 705, 627, 340		Volume	39	1,184	76	32	1,225	361	1,430	400	1,469	-378	-338	-400	-1,465	-225	-39	-307	-494	3,614	3,024	-300	-543	21	-19	-400	-1,469
30	Sum of spills South Fork R bank, other than at LS 465	LSs 873, 778, 694, 628, 577, 524		Volume	0	0	83	0	68	11	91	11	91	-11	-27	-11	-91	-9	-2	-11	-42	290	249	-11	-47	1	-1	-11	-91



For Anacortes WTP

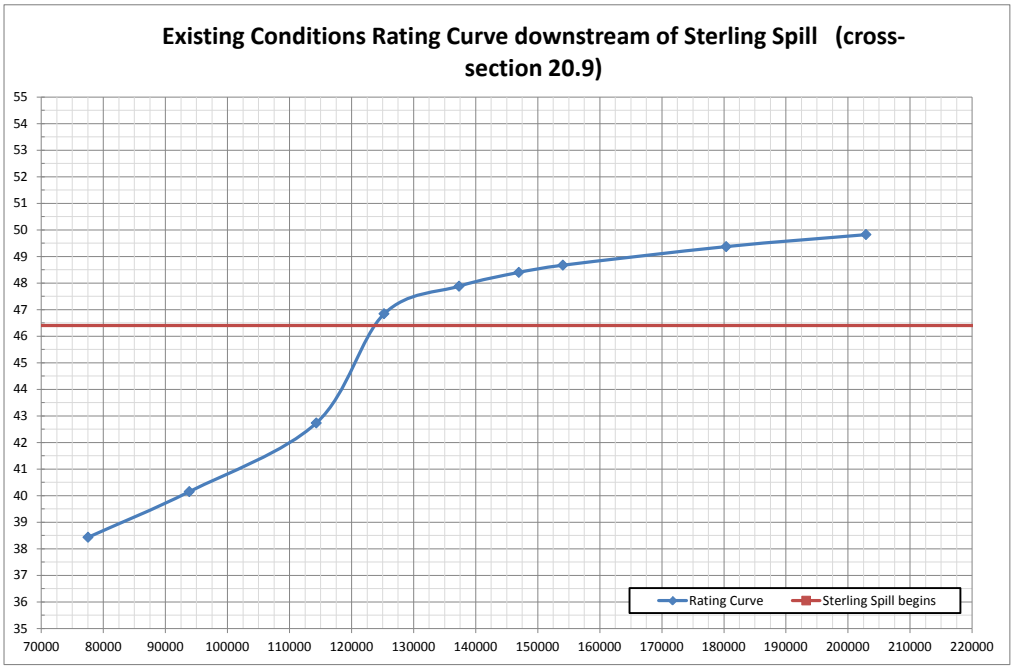
	Q	Rating Curve
2	76417.36	29.82
5	92320.93	32
10	117650	34.99
25	136492.4	37.04
50	146732.9	37.98
75	151753.1	38.4
100	154155.6	38.6
250	160261	39.07
500	164019.4	39.35



Downstream of Sterling

	Q	Rating Curve
2	77529.53	38.43
5	93862.26	40.15
10	114311.9	42.73
25	125250.7	46.84
50	137321.4	47.88
75	146971.9	48.4
100	154066.3	48.67
250	180373	49.37
500	202902.2	49.82

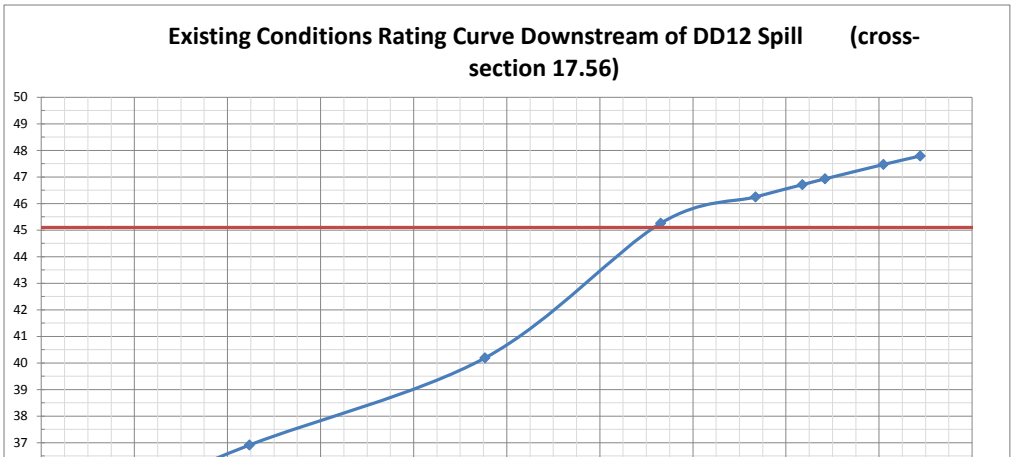
Sterling Spill begins	
65000	46.4
250000	46.4

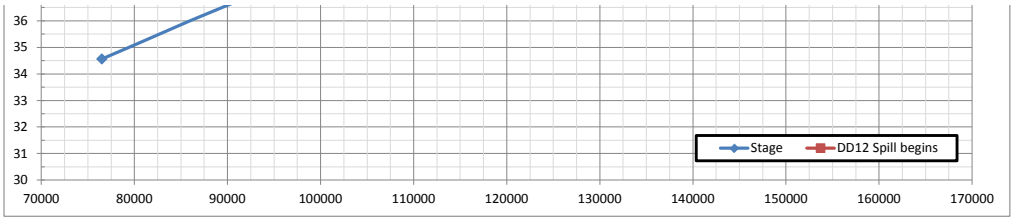


Downstream of DD12

	Q	Stage
2	76499.9	34.56
5	92365.59	36.91
10	117671.6	40.19
25	136546.4	45.26
50	146736.1	46.25
75	151775	46.71
100	154203	46.93
250	160477.1	47.47
500	164429.5	47.79

DD12 Spill begins	
65000	45.1
250000	45.1





Downstream of Fisher Slough

Q		Stage
2	34579.57	14.26
5	42957.49	14.94
10	56090.16	16.05
25	64605.87	17.22
50	67979.09	17.83
75	69115.49	18.16
100	69671.16	18.2
250	71449.06	18.26
500	72353.03	18.3

Fisher Slough Spill

25000	16
250000	16