

Table 11-1 Summary of Comparative Analysis

FS Step	Analysis Parameters	Site-wide Remedial Alternative										
		1	2	3a	3b	3c	3d	4a	4b	4c	4d	
Quantities and Costs	Capital & O&M Costs (in \$MM)	50	215	250	265	310	345	420	475	525	645	
	Remediation footprint (area in acres)											
	EAs	34	34	34	34	34	34	34	34	34	34	
	Dredge	0	35	38	42	50	72	77	89	105	131	
	Isolation Capping	0	0	4	5	9	14	0	0	0	0	
	ENR	0	0	35	41	46	45	0	0	0	0	
	MNR	0	96	54	43	26	0	54	42	26	0	
	Verification Monitoring	0	28	28	28	28	28	28	28	28	28	
	Subtotal Actively Managed	34	69	111	122	139	165	111	123	139	165	
Total Acres Managed	34	193	193	193	193	193	193	193	193	193		
Total Volume Dredged (1,000 cubic yards)	n/a	450	420	450	560	630	840	980	1100	1400		
Detailed Evaluation	Construction Period and Restoration Time Frames (RTF) in years⁽¹⁾											
	Construction Period	3	5	5	6	7	8	10	12	14	17	
	Implementation Time from Issuance of the ROD	5	10	10	11	12	13	15	17	19	22	
	RAO 1	RTF - Seafood Consumption 10 ⁻⁴ ^a	15	19	12	13	14	15	18	20	21	24
		RTF - Background ^b	30-35	20 - 25	20-25	20-25	20-25	20-25	25-30	25-30	25-30	25-30
	RAO 2	Cumulative Direct Contact 10 ⁻⁵ risk range	5	5	5	5	5	5	5	5	5	5
		RTF- Direct Contact - all PRGs ^c	30-35	20-25	10-15	10-15	10-15	10-15	15-20	15-20	15-20	15-20
	RAO 3	% of Original SQS Points Managed After 10 Years of Recovery ^d	87%	93%	95%	97%	99%	100%	95%	97%	99%	100%
		Area (acres) Associated with Point Exceedances After 10 Years of Recovery ^d	29	19	10	5	2	0	10	5	2	0
		RTF	>30	20 - 25	20-25	15-20	10-15	25-30	25-30	25-30	20-25	15 - 20
RAO 4	RTF - Ecological (years) ^e	15 - 20	15 - 20	15 - 20	15 - 20	15 - 20	15 - 20	20-25	20-25	20-25	20-25	
Does the alternative meets threshold criteria?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Comparative Analysis	Relative Ranking of Alternatives against NCP Criteria^f											
	Overall protection of Human Health & the Environment	**	***	*****	*****	****	****	***	***	***	***	
	Compliance w/ ARARs	**	*****	*****	*****	*****	*****	*****	*****	*****	*****	
	Long Term Effectiveness	*	**	****	****	****	****	*****	*****	*****	*****	
	Reduction in Mobility, Toxicity, and Volume	*	*	*	*	*	*	*	*	*	**	
	Short-term Effectiveness: Protection of community, workers, and the environment	*****	*****	*****	*****	****	****	***	***	**	**	
	Time to achieve RAOs	*	**	****	****	*****	*****	**	**	**	*	
	Implementability	*****	**	*****	*****	****	****	****	***	***	**	
Costs	*****	*****	*****	*****	****	****	***	***	**	**		

Notes:

^[1] Estimated times required to achieve RAOs. The restoration time frame combines the construction time-frames and BCM predicted times to reach RAO-associated preliminary remediation goals.

^a Time to reach a seafood consumption risk of 10⁻⁴ for the Adult Tulalip RME scenario for total PCBs includes 3 years after active remediation to accommodate tissue recovery following the acute impacts of dredging. Risk estimates based on Food Web Model (Windward 2008).

^b Approximate time frame for sediment concentrations (Total PCB SWAC) to converge to within 10% of a central tendency value approximating the steady state for the mid range BCM input parameter values.

^c The cumulative direct contact risk applies to the site-wide (netfishing) exposure scenario as well as potential tribal clamming and beach play areas. Alternative 2 is above the background PRG for cPAH for Beach 6 after remediation construction.

^d See Table 9-2 for number of points meeting SQS after 10 and 30 years. Percentage based on original number of points exceeding SQS. Alts 2 through 5 have isolated SQS exceedances after 10 years of natural recovery. Some recontamination may occur, and is not included in this analysis.

^e Time to reach a total PCB concentration in surface sediments in the range of 128 to 159 ug/kg Total PCBs which is protective of otters and other ecological receptors.

^f Relative ranking by comparing alternatives to each other:

* - Ranks low compared to other Alternatives

** - Ranks low-moderate compared to other Alternatives

*** - Ranks average compared to other Alternatives

**** - Ranks relatively high compared to other Alternatives

***** - Ranks very high compared to other Alternatives

ARARs = applicable or relevant and appropriate requirement; BCM = bed composition model; EAA = Early Action Area; ENR = enhanced natural recovery; MNR = monitored natural recovery; NCP = National Oil and Hazardous Substances Pollution Contingency Plan; O&M = operations and maintenance; PRG = preliminary remediation goal; RAO = remedial action objective; RME = reasonable maximum exposure; ROD = record of decision; RTF = restoration time frame; SQS = sediment quality standards

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