

	Question	Hypothesis	Monitored Variable		Interpretive Guideline	Verification/Management
On Site	1. Does the deposited dredged material stay on site?	A. Dredged material remains within the site boundary	SPI Data Analysis <ul style="list-style-type: none"> Depth and extent of deposited dredged material On and off-site 		If >3 cm thickness of recent DM beyond any perimeter station, Hyp A is rejected.	<ul style="list-style-type: none"> Further evaluation of any offsite material (go to Q4) Consider changes to disposal management practices
	2. Are the biological effects conditions for site management [PSDDA-defined Site Condition II] exceeded at the site due to dredged material disposal? (PSDDA 1988b)	B. Sediment toxicity at onsite stations does not exceed the PSDDA Site Condition II biological response guidelines due to dredged material disposal.	Sediment Chemistry <ul style="list-style-type: none"> # samples TBD (> 3) Samples from top 10 cm of recent DM 	Sediment Bioassays <ul style="list-style-type: none"> Run on all samples w/ any COC > SL 	Compare Data to DMMP Guidelines <ol style="list-style-type: none"> If any COC > SL; go to Tier 2 If Bioassay toxicity test 1-hit response or two 2-hit responses, then Hyp B is rejected. 	<ul style="list-style-type: none"> Further evaluation to compare on-site toxicity with off-site toxicity (i.e. failure due to area-wide conditions?) Consider outcome of Q3 Consider changes to disposal evaluation guidelines
		C. Bioaccumulation at the onsite stations does not exceed the PSDDA Site Condition II biological response guidelines due to dredged material disposal.	Lab BA tests <ul style="list-style-type: none"> With composited on-site sediments COCs TBD based on recent DM and on-site sed chem results 		Compare data to Puget Sound disposal site environs tissue data set based on lab BA or analysis of field-collected tissues. <ul style="list-style-type: none"> What interpretation of this data would lead us to reject Hyp C? 	<ul style="list-style-type: none"> Further evaluation to compare on-site toxicity with off-site toxicity (i.e. failure due to area-wide conditions?) Consider outcome of Q3 Consider changes to disposal evaluation guidelines
	3. Are the disposal sites compliant with Part V of the SMS? <ul style="list-style-type: none"> This question added to 3 original monitoring questions Same samples and analyses as question 2, but different interpretation of data 	D. Sediment toxicity at onsite stations ≤ CSL due to dredged material disposal.	Sediment Chemistry <ul style="list-style-type: none"> Same samples as 2B, but compared to SMS Part 5 guidelines 	Sediment Bioassays <ul style="list-style-type: none"> Same samples as 2B, but compared to SMS Part 5 guidelines 	Compare Data to SMS Part V <ol style="list-style-type: none"> If SMS COC > CSL at 3 or more stations, consider outcome of toxicity tests. If SMS bioassay failures (any #?), then Hyp D is rejected 	<ul style="list-style-type: none"> Further evaluation to compare on-site toxicity with off-site toxicity (i.e. failure due to area-wide conditions?) Consider changes to disposal evaluation guidelines
		E. Bioaccumulation at onsite stations ≤ CSL due to dredged material disposal.	Lab BA tests <ul style="list-style-type: none"> Same samples and testing as 2C, but compared to SMS Part 5 guidelines COCs TBD based on recent DM and on-site sed chem results 		Compare data to highest of Risk-based/RB/PQL tissue data when/where available <ul style="list-style-type: none"> If SMS BCOC failures, then Hyp E rejected 	<ul style="list-style-type: none"> Further evaluation to compare on-site toxicity with off-site toxicity (i.e. failure due to area-wide conditions?) Consider outcome of Q2 Consider changes to disposal evaluation guidelines
Off Site	4. Are unacceptable adverse effects due to dredged material disposal occurring to biological resources off site? <ul style="list-style-type: none"> Focuses on chemical/biological impacts due to detection of significant amounts of dredged material in offsite sediments ("lobe") No analysis unless Hyp A rejected 	F. No significant decrease in benthic habitat quality due to dredged material disposal.	SPI Data Analysis Successional Stage? OSI? BHQ?		TBD/need help	<ul style="list-style-type: none"> Develop protocols to prevent lobe. Special studies on why lobe occurred, and how to prevent in future. If Hyp A rejected, 4F always conducted; G-H conducted per BPJ (e.g. based on extent of DM in off-site material, physical characteristics, significant reduction in benthic habitat quality)
		G. Chemistry/Toxicity in "Lobe" sediments ≤ SQS	Sediment Chemistry <ul style="list-style-type: none"> From "lobe" Archive environs ("beyond lobe") 	Sediment Bioassays <ul style="list-style-type: none"> "lobe" and "beyond lobe" All tox tests run in same batch 	Anti-degradation: <ul style="list-style-type: none"> Compare "lobe" chemistry to SQS Compare "lobe" tox to SCO If "lobe" tox > SCO, compare to "beyond lobe" tox (Anti-Deg) 	
		H. No significant increase in bioaccumulation potential in "lobe" sediments	Lab BA tests <ul style="list-style-type: none"> Using composites of "lobe" and "beyond lobe" sediments. COCs TBD based on recent DM and on-site sed chem results 		Anti-degradation: <ul style="list-style-type: none"> Compare "lobe" BA tissue chem to "beyond lobe" tissue chem (from monitoring or Special Study) (Chance help?) 	

Dark shading = Tier 1 Always conducted

Light shading = Tier 2 Conducted pending outcome of Tier 1

Acronym	Definition
BA	Bioaccumulation
BCOC	Bioaccumulative Chemical of Concern
BHQ	Benthic Habitat Quality index
COC	Chemical of Concern
DM	Dredged Material
DMMP	Dredged Material Management Program
Hyp	Hypothesis
ISM	Incremental Sampling Methodology
OSI	Organism Sediment Index
PQL	Practical Quantitation Limit
PSDDA	Puget Sound Dredged Disposal Analysis
RB	Regional Background
SCO	Sediment Cleanup Objective
SL	Screening Level
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
Tox	toxicity
TBD	To Be Determined