TABLE OF CONTENTS

FIGURES IV

TABLES V

DEFINITIONS VI

LIST OF ACRONYMS XII

1 INTRODUCTION 1-1

1.1 History of the DMMP 1-1
1.2 User Manual 1-1
1.3 The Dredged Material Management Office (DMMO) 1-1

2 DREDGING PROJECT PERMITTING 2-3

2.1 Regulatory Process Overview 2-3
2.2 DNR Disposal Site Use Authorization 2-4

3 DREDGED MATERIAL EVALUATION PROCESS 3-7

4 TIER 1: EVALUATION/SITE HISTORY 4-12

4.1 Site Histories 4-12
4.2 Sources of Information 4-13
4.3 Testing Exclusions Based on Tier 1 Analysis 4-13
4.4 Tier 1 Suitability Determinations 4-13

5 DEVELOPING SAMPLING AND ANALYSIS REQUIREMENTS 5-14

5.1 Determine Project Rank 5-14
5.2 Recency Guidelines 5-19
5.3 Developing a Conceptual Dredging Plan 5-20
5.4 Determining Volume of Material to be Dredged 5-20
5.5 Determining the Number of DMMUs and Field Samples 5-21
5.6 Determining the Chemicals of Concern (coc) list 5-23
5.7 Special Project Considerations 5-24
5.8 Partial Characterization for Down-Ranking 5-25
5.9 Post-Dredge Sediment Surface (Z-Samples) 5-26

6 PREPARING THE SAMPLING AND ANALYSIS PLAN (SAP) 6-28

6.1 Project Overview 6-28
6.2 Tier 1 Evaluation 6-28
6.3 Characterization Plan 6-29
6.4 Sampling 6-29

6.5 Chemical Analysis 6-30
6.6 Biological Analysis 6-30
6.7 Reporting Requirements 6-31
6.8 Health and Safety Plan 6-32

7 SAMPLING 7-33

7.1 Timing of Sampling 7-33
7.2 Sampling Approach 7-33
7.3 Positioning Methods 7-34
7.4 Sampling Methods 7-34
7.5 Sample Collection and Handling Procedures 7-35
7.6 Pre-Sampling Conference Call 7-40

8 TIER 2: CHEMICAL TESTING 8-41

8.1 Sediment Conventional Parameters 8-41
8.2 Standard List of Chemicals of Concern 8-42
8.3 Dioxins 8-49
8.4 Chemicals/Constituents of Concern for Limited Areas 8-55
8.5 Quality Control 8-57

9 TIER 3 BIOLOGICAL TESTING: BIOASSAYS 9-67

9.1 Marine Bioassays 9-67
9.2 Quality Assurance/Quality Control in marine Bioassays 9-69
9.3 Marine Bioassay Interpretive Criteria 9-71
9.4 Reference Sediment Collection Sites 9-74
9.5 Freshwater Bioassays 9-75
9.6 Freshwater Bioassay Performance Standards and Interpretive Criteria 9-75
9.7 Elutriate Bioassay Testing 9-79
9.8 Ammonia and Sulfide Non-Treatment EFFECTS 9-79

10 TIER 3 BIOLOGICAL TESTING: BIOACCUMULATION 10-83

10.1 Bioaccumulative Contaminants of Concern (BCOCs) and Triggers for Bioaccumulation Testing 10-83
10.2 Bioaccumulation Test Species Selection 10-85
10.3 Bioaccumulation Test Protocol 10-86
10.4 Bioaccumulation Test Interpretation 10-88

11 TIER 4 EVALUATIONS 11-92

11.1 Steady State Bioaccumulation Test 11-92
11.2 Other Case-Specific Studies 11-93

12 ANTIDEGRADATION EVALUATIONS 12-94

12.1 When to Test Z-Samples 12-94
12.2 Determining Analysis Requirements 12-94

12.3 Evaluating Compliance with the Antidegradation Policy 12-95
12.4 What Happens if the Sediment is not Compliant? 12-95
12.5 Other Considerations 12-96
12.6 Post-Dredge Evaluations 12-96

13 DREDGING AND DISPOSAL 13-97

13.1 Preparing to Dredge 13-97
13.2 Dredging and Disposal Quality Control Plan (QCP) 13-97
13.3 Pre-Dredge Conference 13-98
13.4 Debris Management 13-99
13.5 Dredged Material Volume Estimates 13-99
13.6 Dredging and Disposal Closures 13-100
13.7 Disposal Site Information 13-102
13.8 Disposal Positioning 13-102

14 BENEFICIAL USE 14-116

14.1 Beneficial Uses Guidelines 14-116
14.2 Sediment Characterization of Beneficial-Use Material 14-116

15 REFERENCES 15-117

FIGURES

Figure 2-1. DMMP/Regulatory Process (new permit required) 2-5

Figure 2-2. Regulatory Process (new permit not required e.g. dredging under an existing multi-year permit) 2-6

Figure 3-1. Dredged Material Evaluation Process 3-9

Figure 3-2. Tiered Testing Decision Diagram for Marine Sediment 3-10

Figure 3-3. Tiered Testing Decision Diagram for Freshwater Sediment 3-11

Figure 13-1. Disposal Zone vs. Target Area 13-102

Figure 13-2. Designated Dredged Material Disposal Sites in Western Washington 13-106

Figure 13-3. Anderson-Ketron Non-Dispersive Disposal Site 13-107

Figure 13-4. Bellingham Bay Non-Dispersive Disposal Site (Inactive) 13-108

Figure 13-5. Commencement Bay Non-Dispersive Disposal Site 13-109

Figure 13-6. Elliott Bay Non-Dispersive Disposal Site 13-110

Figure 13-7. Port Gardner Non-Dispersive Disposal Site 13-111

Figure 13-8. Port Angeles Dispersive Disposal Site 13-112

Figure 13-9. Port Townsend Dispersive Disposal Site 13-113

Figure 13-10. Rosario Strait Dispersive Disposal Site 13-114

Figure 13-11. Grays Harbor Dispersive Disposal Sites 13-115

TABLES

Table 5-1. Dredged Material Ranking Guidelines 5-15
Table 5-2. Current general rankings for Puget Sound 5-16
Table 5-3. Current area and project-specific rankings for Puget Sound 5-16
Table 5-4. Current rankings for Grays Harbor and Willapa Bay....5-17
Table 5-5. Current rankings for projects on the Columbia River and other waterbodies 5-18
Table 5-6. Recency Guidelines for DMMP Projects 5-19
Table 5-7. Maximum sediment volume represented by each DMMU....5-23
Table 5-8. Maximum sediment volume represented by a single field sample....5-23
Table 5-9. "No Test" volumes for small projects 5-24f
Table 5-10. Ranking Guidelines Based On Partial Characterization Data 5-26
Table 7-1. Required accuracy for sample positioning 7-34
Table 7-2. Sample storage criteria 7-39
Table 8-1. Sediment Conventionals and Recommended Analytical Methods....8-41
Table 8-2. DMMP COCs and regulatory guidelines....8-43
Table 8-3. Analytical Methods for Standard COCs 8-47
Table 8-4. Toxicity Equivalency Factors (TEFs) for PCDDs and PCDFs....8-50
Table 8-5. Laboratory QA/QC Requirements for Conventionals and COCs 8-60
Table 8-6. Summary of Dioxin Quality Control Procedures....8-61
Table 8-7. QC Acceptance Criteria for PCDD/F 8-63
Table 8-8. Target Reporting Limits for Dioxins/Furans 8-64
Table 8-9. CDD/CDF Acceptance Limits for Puget Sound SRM 8-65
Table 9-1. Marine Bioassay Performance Standards and Evaluation Guidelines....9-73
Table 9-2. Reference Sediment Collection Areas for Puget Sound. 9-74
Table 9-3. Reference Sediment Collection Sites for Grays Harbor and Willapa Bay 9-74
Table 9-4. Freshwater biological tests, species and applicable endpoints....9-76
Table 9-5. Freshwater biological criteria (test performance standards) for each biological test. 9-78
Table 9-6. Reference Toxicant and Purging Triggers for Marine Bioassays....9-80
Table 10-1. List 1 Bioaccumulative Chemicals of Concern 10-85
Table 10-2. Percent of Steady-State Tissue Residues of Selected Metals and Neutral Organics from 10 and 28 day Exposures to Bedded Sediment 10-87
Table 10-3. Species-specific sediment volume requirements for MARINE bioaccumulation testing....10-88
Table 10-4. Target Tissue Concentration Values for Chemicals of Concern....10-91
Table 13-1. Puget Sound DMMP Site Closure Periods (Non ESA)....13-100
Table 13-2. In-water Disposal Windows 13-101
Table 13-3. Puget Sound Disposal Site Descriptions....13-104
Table 13-4. Grays Harbor and Willapa Bay Disposal Site Descriptions....13-105