
Draft

Draft Willamette Subbasin Plan

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Prepared by
Willamette Restoration Initiative

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Contents

| Chapter | Page |
|---|------------|
| Acknowledgments | xxiii |
| Acronyms and Abbreviations | xxv |
| 1 Executive Summary | 1-1 |
| 1.1 Need for Habitat | 1-1 |
| 1.2 Focus on Conservation | 1-2 |
| 1.3 Plan Objectives | 1-2 |
| 1.4 Additional Information Needs | 1-4 |
| 1.5 Looking Ahead | 1-4 |
| 2 Introduction | 2-1 |
| 2.1 Description of Planning Entity | 2-1 |
| 2.2 List of Participants | 2-1 |
| 2.3 Stakeholder Involvement Process | 2-1 |
| 2.4 Overall Approach to the Planning Activity | 2-4 |
| 2.5 Process and Schedule for Revising/Updating the Plan | 2-6 |
| 3 Subbasin Assessment | 3-1 |
| 3.1 Subbasin Overview | 3-1 |
| 3.1.1 General Description | 3-1 |
| 3.1.1.1 Location | 3-1 |
| 3.1.1.2 Size | 3-2 |
| 3.1.1.3 Geology | 3-3 |
| 3.1.1.4 Climate and Weather | 3-7 |
| 3.1.1.5 Land Cover and Habitat | 3-9 |
| 3.1.1.6 Population and Land Use | 3-12 |
| 3.1.1.7 Economy | 3-15 |
| 3.1.1.8 Land Ownership | 3-16 |
| 3.1.1.9 Human Disturbances to the Aquatic and Terrestrial Environments | 3-18 |
| 3.1.2 Existing Subbasin Water Resources | 3-19 |
| 3.1.2.1 Watershed Hydrography | 3-19 |
| 3.1.2.2 Hydrologic Regime | 3-24 |
| 3.1.2.3 Groundwater | 3-25 |
| 3.1.2.4 Water Quality | 3-32 |
| 3.1.2.5 Riparian Resources | 3-36 |
| 3.1.2.6 Wetland Resources | 3-37 |
| 3.1.3 Hydrologic and Ecologic Trends in the Subbasin | 3-38 |
| 3.1.3.1 Influence of Human Use on Hydrology in the Subbasin | 3-38 |
| 3.1.3.2 Nonfederal Hydropower Facilities | 3-41 |
| 3.1.3.3 Influence of Human Use on Ecology in the Subbasin | 3-42 |

| Chapter | Page |
|---|-------------|
| 3.1.4 Regional Context..... | 3-47 |
| 3.1.4.1 Relation to the Columbia Basin..... | 3-47 |
| 3.1.4.2 NOAA Fisheries Evolutionary Significant Units..... | 3-47 |
| 3.1.4.3 USFWS-Designated Bull Trout Planning Units..... | 3-48 |
| 3.1.4.4 USFWS-Designated Oregon Chub Planning Units..... | 3-48 |
| 3.1.4.5 Priority Species and Habitats | 3-48 |
| 3.1.4.6 Summary of External Environmental Impacts on Fish and Wildlife..... | 3-48 |
| 3.2 Focal Species Characterization and Status | 3-48 |
| 3.2.1 Native/Nonnative Wildlife, Plant, and Resident/Anadromous Fish of Ecological Importance..... | 3-48 |
| 3.2.1.1 Special-Status Aquatic Species in the Willamette | 3-49 |
| 3.2.1.2 Special-Status Terrestrial Species in the Willamette Basin | 3-51 |
| 3.2.1.3 Other Species of Importance | 3-59 |
| 3.2.1.4 Introduced Species | 3-61 |
| 3.2.2 Scientific Foundation for Assessment of Willamette River Aquatic Habitats | 3-65 |
| 3.2.2.1 Application of NPCC’s Scientific Principles to the Willamette River Subbasin Plan | 3-65 |
| 3.2.2.2 Development of a Scientific Foundation for Portland Urban Streams | 3-76 |
| 3.2.2.3 The Use of EDT for Assessment of Aquatic Habitats..... | 3-77 |
| 3.2.2.4 Limitations of EDT Within the Willamette System..... | 3-79 |
| 3.2.3 Focal Species Selection | 3-80 |
| 3.2.3.1 Aquatic Focal Species Selection | 3-80 |
| 3.2.3.2 Terrestrial Focal Species Selection | 3-86 |
| 3.2.4 Aquatic Focal Species Population Delineation and Characterization | 3-93 |
| 3.2.4.1 Chinook Life History, Population Status, and Trends..... | 3-93 |
| 3.2.4.2 Winter Steelhead Life History, Population Status, and Trends.... | 3-115 |
| 3.2.4.3 Cutthroat Trout Life History, Population Status, and Trends | 3-129 |
| 3.2.4.4 Bull Trout Life History, Population Status, and Trends..... | 3-133 |
| 3.2.4.5 Oregon Chub Life History, Population Status, and Trends..... | 3-137 |
| 3.2.4.6 Pacific Lamprey | 3-142 |
| 3.2.4.7 Aquatic Introductions, Artificial Production, and Captive Breeding Programs | 3-145 |
| 3.2.5 Terrestrial Focal Species Population Delineation and Characterization | 3-152 |
| 3.2.5.1 Focal Habitat: Oak Woodlands | 3-153 |
| 3.2.5.2 Focal Habitat: Upland Prairie, Savanna, and Rock Outcrops | 3-165 |
| 3.2.5.3 Focal Habitat: Wetland Prairie and Seasonal Marsh..... | 3-186 |
| 3.2.5.4 Focal Habitat: Perennial Ponds and Their Riparian Areas..... | 3-199 |
| 3.2.5.5 Focal Habitat: Riparian Areas of Rivers and Streams..... | 3-210 |
| 3.2.5.6 Focal Habitat: Old-Growth Conifer Forest | 3-225 |

| Chapter | Page |
|---|-------------|
| 3.2.6 Future Conditions with No New Actions | 3-242 |
| 3.2.6.1 Plan Trend 2050 | 3-242 |
| 3.2.6.2 Environmental Conditions in 2050..... | 3-243 |
| 3.3 Out-of-Subbasin Effects | 3-245 |
| 3.3.1 Aquatic | 3-245 |
| 3.3.1.1 Estuary..... | 3-245 |
| 3.3.1.2 Nearshore..... | 3-246 |
| 3.3.1.3 Marine | 3-246 |
| 3.3.1.4 Mainstem Habitat | 3-248 |
| 3.3.1.5 Hydropower..... | 3-248 |
| 3.3.1.6 Out-of-Subbasin Harvest..... | 3-248 |
| 3.3.1.7 Hatcheries..... | 3-248 |
| 3.3.2 Terrestrial | 3-248 |
| 3.4 Environment/Population Relationships | 3-249 |
| 3.4.1 Riparian Planting..... | 3-254 |
| 3.4.2 Riparian Buffers | 3-255 |
| 3.4.3 Fencing Streams | 3-255 |
| 3.4.4 Stabilizing Streambanks | 3-255 |
| 3.4.5 Reconnecting Isolated Sloughs, Side Channels, and Oxbows | 3-255 |
| 3.4.6 Removing Barriers; Culvert Replacement | 3-256 |
| 3.5 Identification and Analysis of Limiting Factors/Conditions | 3-256 |
| 3.5.1 Historical Factors Leading to Decline of Aquatic Species and Ecological Functions and Processes..... | 3-256 |
| 3.5.1.1 Limiting Factors in the Calapooia Subbasin | 3-257 |
| 3.5.1.2 Limiting Factors in the Coast Fork Willamette Subbasin | 3-270 |
| 3.5.1.3 Limiting Factors in the Long Tom Subbasin..... | 3-283 |
| 3.5.1.4 Limiting Factors in the Luckiamute/Rickreall Subbasin..... | 3-294 |
| 3.5.1.5 Limiting Factors in the Marys Subbasin | 3-304 |
| 3.5.1.6 Limiting Factors in the Middle Fork Willamette Subbasin..... | 3-314 |
| 3.5.1.7 Limiting Factors in the Molalla/Pudding Subbasin..... | 3-331 |
| 3.5.1.8 Limiting Factors in the North Santiam Subbasin | 3-344 |
| 3.5.1.9 Limiting Factors in Salem-Area Watersheds | 3-362 |
| 3.5.1.10 Limiting Factors in the South Santiam Subbasin | 3-370 |
| 3.5.1.11 Limiting Factors in the Tualatin Subbasin | 3-389 |
| 3.5.1.12 Limiting Factors in the Upper Willamette River Mainstem..... | 3-398 |
| 3.5.1.13 Yamhill Subbasin | 3-411 |
| 3.5.1.14 Limiting Factors in the Clackamas Subbasin (with EDT Analysis)..... | 3-420 |
| 3.5.1.15 Limiting Factors in the Johnson Creek Subbasin (with EDT Analysis)..... | 3-469 |
| 3.5.1.16 Limiting Factors in the Lower Willamette River Mainstem (with EDT Analysis) | 3-499 |

| Chapter | Page |
|----------------|--|
| 3.5.1.17 | Limiting Factors in the McKenzie Subbasin (with EDT Analysis)..... 3-508 |
| 3.5.1.18 | Limiting Factors in the Tryon Creek Subbasin (with EDT Analysis)..... 3-529 |
| 3.5.2 | Historical Factors Leading to Decline of Terrestrial Species and Ecological Functions and Processes..... 3-556 |
| 3.5.2.1 | Status and Trends of Terrestrial Wildlife, Rare Plants, and Habitat in the Willamette Subbasin..... 3-556 |
| 3.5.2.2 | Factors Known or Hypothesized To Be Limiting Within the Willamette Basin 3-557 |
| 3.5.2.3 | Limiting Factors Outside the Subbasin 3-558 |
| 3.6 | Synthesis and Interpretation 3-568 |
| 3.6.1 | Subbasin-Wide Working Hypotheses 3-569 |
| 3.6.1.1 | Aquatic Hypothesis 3-569 |
| 3.6.1.2 | Aquatic and Terrestrial Hypotheses That Overlap 3-574 |
| 3.6.1.3 | Terrestrial Hypotheses..... 3-583 |
| 3.6.2 | Opportunities 3-586 |
| 3.6.2.1 | Habitat for High-Priority Protection..... 3-586 |
| 3.6.2.2 | Habitat to Reestablish Access 3-586 |
| 3.6.2.3 | Habitat for Restoration 3-586 |
| 4 | Inventory and Assessment of Conservation Efforts..... 4-1 |
| 4.1 | Background..... 4-1 |
| 4.2 | WRI Approach to Evaluation of Conservation Efforts..... 4-2 |
| 4.3 | Overview of Conservation Efforts Now Having Significant Impacts 4-3 |
| 4.3.1 | State and Federal Approaches 4-3 |
| 4.3.2 | Local Approaches..... 4-6 |
| 4.3.2.1 | Examples of Geographically Concentrated Efforts..... 4-8 |
| 4.3.3 | Projects 4-14 |
| 4.3.3.1 | Projects Funded by Bonneville Power Administration 4-14 |
| 4.3.3.2 | OWEB Project Assessment for Willamette Basin 4-15 |
| 4.4 | Conservation Efforts Expected to Have Significant Impacts in the Near Future ... 4-15 |
| 4.4.1 | NOAA Fisheries Salmon Recovery Planning 4-15 |
| 4.4.2 | Willamette Basin Project Biological Opinion 4-17 |
| 4.4.3 | Total Maximum Daily Load Allocations 4-17 |
| 4.4.4 | ODFW Comprehensive Wildlife Conservation Strategy (Conservation Plan)..... 4-18 |
| 4.4.5 | Northwest Oregon Invasive Weed Management Partnership 4-18 |
| 4.5 | Synthesis 4-19 |
| 4.5.1 | Conservation Efforts Strong Points 4-19 |
| 4.5.2 | Conservation Effort Improvements 4-20 |
| 4.5.2.1 | General Findings 4-20 |

| Chapter | Page |
|--|-------------|
| 4.5.2.2 Needs Relating to Limiting Factors..... | 4-21 |
| 5 Management Plan..... | 5-1 |
| 5.1 Vision..... | 5-1 |
| 5.2 Key Findings: Basinwide Priorities | 5-1 |
| 5.2.1 Key Findings | 5-1 |
| 5.2.2 Basinwide Priorities | 5-2 |
| 5.2.2.1 Deal with the Dams | 5-2 |
| 5.2.2.2 Fix Culverts and Diversions to Allow Fish Passage | 5-2 |
| 5.2.2.3 Focus on Valley and Foothills Wildlife | 5-2 |
| 5.2.2.4 Restore Lowland Riparian Areas* | 5-2 |
| 5.2.2.5 Restore Low-Cost, High-Return Areas of the Willamette River Floodplain*..... | 5-3 |
| 5.2.2.6 Let the River Cool Itself* | 5-3 |
| 5.2.2.7 Ensure That All of the Priority Themes Above Are Taken Up in an Organized Way at the Local Level..... | 5-3 |
| 5.3 Aquatic and Terrestrial Biological Objectives | 5-3 |
| 5.3.1 Aquatic Biological Objectives..... | 5-3 |
| 5.3.1.1 Biological Performance Objectives..... | 5-3 |
| 5.3.1.2 Aquatic Habitat Objectives | 5-7 |
| 5.3.2 Terrestrial Biological Objectives..... | 5-8 |
| 5.3.2.1 Biological Performance Objectives..... | 5-8 |
| 5.3.2.2 Habitat Objectives | 5-9 |
| 5.4 Aquatic and Terrestrial Strategies | 5-17 |
| 5.4.1 Principles and Approaches | 5-17 |
| 5.4.2 Aquatic Strategies..... | 5-22 |
| 5.4.2.1 Restore Processes That Maintain Watershed Health..... | 5-22 |
| 5.4.2.2 Connect Favorable Habitats | 5-23 |
| 5.4.3 Terrestrial Strategies..... | 5-25 |
| 5.4.3.1 Restore Processes That Maintain Watershed Health..... | 5-25 |
| 5.4.3.2 Connect Favorable Habitats | 5-26 |
| 5.5 Institutional Strategies | 5-27 |
| 5.6 Applying the Strategies Locally | 5-29 |
| 5.6.1.1 Use EDT or Other Modeling..... | 5-30 |
| 5.6.1.2 Terrestrial Utility Tool | 5-30 |
| 5.6.1.3 Fish-Floodplain Connectivity | 5-33 |
| 5.6.1.4 Riparian Areas..... | 5-34 |
| 5.6.1.5 Steps in Restoring Fish Passage | 5-35 |
| 5.7 Research, Monitoring, and Evaluation | 5-35 |
| 5.7.1 A Strategic Monitoring and Evaluation Framework for the Willamette Basin..... | 5-36 |
| 5.7.2 Framework for Implementation..... | 5-38 |

| Chapter | Page |
|---|-------------|
| 5.7.3 Key Aquatic and Terrestrial Monitoring and Research Issues..... | 5-39 |
| 5.8 ESA-CWA Requirements..... | 5-45 |
| 6 References | 6-1 |

Appendixes

| | |
|---|--|
| A | Interim Viability Criteria Overview of Threatened Willamette/Lower Columbia Pacific Salmonids |
| B | Draft Bull Trout Recovery Criteria |
| C | Oregon Chub Recovery Criteria |
| D | Protection, Restoration, and Management of Terrestrial Habitats and Species of the Willamette Subbasin: Technical Appendix |
| E | Fish Species Distribution Maps |
| F | Terrestrial Wildlife Species Range Maps |
| G | Fish Species Barrier Maps |
| H | Subbasin Overview Maps |
| I | Reach Break Maps |
| J | Draft EDT Assessment of Aquatic Habitat in the Lower Willamette Mainstem |
| K | Draft EDT Assessment of Aquatic Habitat in the McKenzie Subbasin |
| L | Inventory of State and Federal Fish and Wildlife Plans and Programs |
| M | Summary of Existing Conservation Efforts in the Willamette Basin |
| N | Municipal and County Efforts to Support Fish and Wildlife in the Willamette Basin |
| O | Inventory of Existing Programs and Activities in the Lower Willamette Subbasin |
| P | Draft EDT Assessment of Aquatic Habitat in the Clackamas Subbasin |
| Q | Indicators of Basin Condition for the Oregon Plan for Salmon and Watersheds |
| R | Overlay Map of The Nature Conservancy Priority Conservation Areas and Pacific Northwest Ecosystem Research Consortium Conservation and Restoration Opportunity Areas |

Tables

| | |
|---|------|
| 2-1: Participants in the Development of the <i>Willamette Subbasin Plan</i> | 2-2 |
| 2-2: Stakeholder Groups Consulted Regarding Subbasin Planning | 2-3 |
| 3-1: Oregon Counties with Acreage in the Willamette Basin..... | 3-1 |
| 3-2: Descriptions of Ecoregions in the Willamette Basin..... | 3-10 |
| 3-3: Habitat Types in the Willamette Basin..... | 3-12 |
| 3-4: Ethnic Diversity in the Willamette Valley | 3-14 |
| 3-5: Land Use in the Willamette Basin..... | 3-15 |
| 3-6: Changes in Land Cover in the Willamette Basin | 3-18 |
| 3-7: Willamette Basin Project Dams..... | 3-21 |
| 3-8: General Characteristics of Hydrogeologic Units in the Willamette Basin..... | 3-27 |

| Chapter | Page |
|--|-------------|
| 3-9: Designated Groundwater Areas and Areas of Supply Concern in Willamette Valley Counties..... | 3-29 |
| 3-10: Willamette TMDLs by Subbasin..... | 3-33 |
| 3-11: Known and Regulated Water Quality Pollution Sources | 3-36 |
| 3-12: Active FERC Hydroelectric Power Projects (identified by the Oregon Department of Fish and Wildlife)..... | 3-41 |
| 3-13: Summary of Federal Columbia River Power System Impacts on Anadromous Fish..... | 3-42 |
| 3-14: Estimated Spawning Habitat Quantities Above and Below Willamette Project Dams (for mainstems of streams shown, not tributaries) | 3-43 |
| 3-15: Approximate Miles* of River Habitat Inundated by Willamette Project Reservoirs | 3-44 |
| 3-16: Estimated Wildlife Losses Attributable to Willamette Basin Project Hydropower Construction* | 3-45 |
| 3-17: Threatened and Endangered Fish Species of the Willamette Basin* | 3-50 |
| 3-18: Willamette/Lower Columbia Domain Core and Genetic Legacy Chinook and Steelhead Populations and Required Recovery Populations for Bull Trout and Oregon Chub..... | 3-51 |
| 3-19: Threatened and Endangered Plant Species* of the Willamette Basin..... | 3-51 |
| 3-20: Threatened and Endangered Wildlife Species and Species of Concern in the Willamette Basin..... | 3-52 |
| 3-21: Willamette Basin Species Significant to Tribes | 3-60 |
| 3-22: Introduced Fishes | 3-63 |
| 3-23: Focal Fish Species Selection and Assessment Tool by Planning Unit..... | 3-82 |
| 3-24: Comparison of Focal Habitats in This Plan with Habitats Identified by Selected Previous Plans and Assessments That Address Wildlife in the Willamette Basin..... | 3-89 |
| 3-25: Terrestrial Focal Species Selected for This Plan..... | 3-90 |
| 3-26: Comparison of Focal Species with Species Identified as “Indicators” or “Focal Species” by Previous Wildlife Plans and Assessments in the Willamette Basin, Grouped by the Most Similar Focal Habitat Type..... | 3-91 |
| 3-27: Hatchery Releases to the Calapooia, 1981-2002..... | 3-96 |
| 3-28: Hatchery Releases in the Clackamas River, 1975-2002..... | 3-98 |
| 3-29: Hatchery Releases in the McKenzie, 1902-2002 | 3-100 |
| 3-30: Estimated Return of Spring Chinook Salmon to the McKenzie River and Leaburg Dam | 3-101 |
| 3-31: Hatchery Releases in the Middle Fork Willamette, 1902-2002 | 3-103 |
| 3-32: Hatchery Releases in the Molalla River, 1964-1999..... | 3-104 |
| 3-33 Hatchery Releases in the North Santiam, 1991-2002..... | 3-106 |
| 3-34: Hatchery Releases in the North Santiam, 1918-1994..... | 3-107 |
| 3-35: Hatchery Releases 1991-2002 | 3-108 |
| 3-36: Winter Steelhead Hatchery Releases in the Mollala, 1957–1997 | 3-119 |
| 3-37: Winter Steelhead Hatchery Releases in the North Santiam, 1931–2002 | 3-121 |

| Chapter | Page |
|--|-------------|
| 3-38: Winter Steelhead Hatchery Releases in the South Santiam | 3-123 |
| 3-39: Winter Steelhead Hatchery Releases in Westside Tributaries, 1958-1996 | 3-126 |
| 3-40: Winter Steelhead Hatchery Releases in the McKenzie and Middle Fork | 3-127 |
| 3-41: Aquatic/Riparian Conditions and Other Metrics Used to Develop a Cutthroat Trout Habitat Suitability Index for 2nd- to 4th-Order Streams in the Willamette Basin..... | 3-132 |
| 3-42: Number of Bull Trout Redds Observed in Spawning Areas of the McKenzie River, 1989–2003..... | 3-135 |
| 3-43: Willamette Subbasin Hatcheries..... | 3-148 |
| 3-44: Annual Release Goals of Hatchery Fish by Location and Species from Artificial Propagation Programs in the Upper Willamette River ESUs | 3-150 |
| 3-45: Acreage Estimates of Land Cover Types That Include Oak Woodland | 3-154 |
| 3-46: HUC6 Units with the Most Suitable Habitat for Acorn Woodpecker..... | 3-157 |
| 3-47: HUC6 Units with the Most Suitable Habitat for Chipping Sparrow..... | 3-158 |
| 3-48: HUC6 Units with the Most Suitable Habitat for Western Wood-Pewee | 3-160 |
| 3-49: HUC6 Units with the Most Suitable Habitat for White-Breasted Nuthatch | 3-161 |
| 3-50: HUC6 Units with the Most Suitable Habitat for Sharptail Snake..... | 3-162 |
| 3-51: HUC6 Units with the Most Suitable Habitat for Southern Alligator Lizard..... | 3-163 |
| 3-52: HUC6 Units with the Most Suitable Habitat for Western Gray Squirrel | 3-165 |
| 3-53: Acreage Estimates of Land Cover Types That Include Upland Prairie-Savanna | 3-166 |
| 3-54: Remaining Upland Prairies of the Willamette Valley* | 3-166 |
| 3-55: HUC6 Units with ORNHIC Database Records for White Rock Larkspur | 3-170 |
| 3-56: HUC6 Units with ORNHIC Database Records for White-Topped (Curtus’s) Aster..... | 3-171 |
| 3-57: HUC6 Units with ORNHIC Database Records for Kincaid’s Lupine | 3-173 |
| 3-58: HUC6 Units with ORNHIC Database Records for Fender’s Blue Butterfly | 3-174 |
| 3-59: HUC6 Units with ORNHIC Database Records for Taylor’s Checkerspot Butterfly | 3-176 |
| 3-60: HUC6 Units with the Most Suitable Habitat for American Kestrel | 3-177 |
| 3-61: HUC6 Units with the Most Suitable Habitat for Horned Lark..... | 3-178 |
| 3-62: HUC6 Units with the Most Suitable Habitat for Vesper Sparrow | 3-180 |
| 3-63: HUC6 Units with the Most Suitable Habitat for Western Meadowlark..... | 3-182 |
| 3-64: HUC6 Units with the Most Suitable Habitat for Western Bluebird..... | 3-183 |
| 3-65: HUC6 Units with the Most Suitable Habitat for Black-Tailed Jackrabbit..... | 3-185 |
| 3-66: HUC6 Units with the Most Suitable Habitat for Western Rattlesnake | 3-186 |
| 3-67: Acreage Estimates of Land Cover Types That Include Wetland Prairie and Seasonal Marsh | 3-187 |
| 3-68: HUC6 Units with the Most Suitable Habitat for Bradshaw’s Lomatium..... | 3-189 |
| 3-69: HUC6 Units with the Most Suitable Habitat for Nelson’s Checkermallow..... | 3-191 |
| 3-70: HUC6 Units with the Most Suitable Habitat for Willamette Valley Daisy | 3-192 |
| 3-71: HUC6 Units with ORNHIC Database Records for Peacock Larkspur | 3-192 |
| 3-72: HUC6 Units with the Most Suitable Habitat for Red-Legged Frog..... | 3-194 |

| Chapter | Page |
|--|-------------|
| 3-73: HUC6 Units with the Most Suitable Habitat for Common Yellowthroat | 3-196 |
| 3-74: HUC6 Units with the Most Suitable Habitat for Northern Harrier | 3-198 |
| 3-75: HUC6 Units with the Most Suitable Habitat for Sora..... | 3-199 |
| 3-76: Acreage Estimates of Land Cover Types That Include Lentic Habitat..... | 3-200 |
| 3-77: HUC6 Units with the Most Suitable Habitat for Western Pond Turtle..... | 3-203 |
| 3-78: HUC6 Units with the Most Suitable Habitat for Cascades Frog..... | 3-204 |
| 3-79: HUC6 Units with the Most Suitable Habitat for Purple Martin..... | 3-206 |
| 3-80: HUC6 Units with the Most Suitable Habitat for Green Heron | 3-207 |
| 3-81: HUC6 Units with the Most Suitable Habitat for Wood Duck..... | 3-208 |
| 3-82: HUC6 Units with the Most Suitable Habitat for Yellow Warbler | 3-209 |
| 3-83: Acreage Estimates of Land Cover Types That Include Stream Riparian Habitat..... | 3-210 |
| 3-84: Changes in Acres of Channel Habitat of the Willamette River, Eugene to Portland..... | 3-211 |
| 3-85: Area of the Willamette Valley Inundated by Major Floods Since 1860 | 3-211 |
| 3-86: HUC6 Units with the Most Suitable Habitat for American Dipper | 3-213 |
| 3-87: HUC6 Units with ORNHIC Database Records for Harlequin Duck | 3-214 |
| 3-88: Mean and Maximum (Among-Year) Counts of Bald Eagles from USFWS Mid-Winter Survey Routes in the Willamette Basin, 1988-2000..... | 3-216 |
| 3-89: HUC6 Units with ORNHIC Database Records for Bald Eagle | 3-217 |
| 3-90: HUC6 Units with the Most Suitable Habitat for Red-Eyed Vireo | 3-219 |
| 3-91: HUC6 Units with the Most Suitable Habitat for Willow Flycatcher | 3-221 |
| 3-92: HUC6 Units with ORNHIC Database Records for Coastal Tailed Frog | 3-222 |
| 3-93: HUC6 Units with the Most Suitable Habitat for American Beaver | 3-224 |
| 3-94: HUC6 Units with the Most Suitable Habitat for River Otter..... | 3-225 |
| 3-95: Watersheds with the Most Old-Growth Conifer Forest in the Early 1990s, Based on The EC90 Land Cover Layer | 3-226 |
| 3-96: HUC6 Units with the Most Suitable Habitat for Pileated Woodpecker..... | 3-229 |
| 3-97: HUC6 Units with the Most Suitable Habitat for Olive-Sided Flycatcher..... | 3-232 |
| 3-98: HUC6 Units with the Most Suitable Habitat for Vaux's Swift..... | 3-233 |
| 3-99: HUC6 Units with the Most Suitable Habitat for Great Gray Owl | 3-236 |
| 3-100: HUC6 Units with ORNHIC Database Records for Oregon Slender Salamander | 3-238 |
| 3-101: HUC6 Units with the Most Suitable Habitat for American (Pine) Marten | 3-239 |
| 3-102: HUC6 Units with the Most Suitable Habitat for Red Tree Vole..... | 3-241 |
| 3-103: Wildlife Species of the Willamette Basin Documented to Feed on (Or Are Otherwise Functionally Linked to) Live or Dead Salmonid Fish*..... | 3-249 |
| 3-104: Calapooia Subbasin: Watershed Attributes Affecting Cutthroat Trout, Spring Chinook Salmon and Winter Steelhead Life Stages | 3-259 |
| 3-105: Qualitative Rating of EDT Attributes Related to Limiting Factors for Winter Steelhead, Spring Chinook, and Cutthroat Trout in the Lower Calapooia Subbasin..... | 3-269 |

| Chapter | Page |
|--|-------------|
| 3-106: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout, Winter Steelhead, and Spring Chinook in the Upper Calapooia River Subbasin..... | 3-269 |
| 3-107: Coast Fork Willamette Subbasin: Subbasin Attributes Affecting Cutthroat Trout and Spring Chinook Salmon Life Stages | 3-272 |
| 3-108: Coast Fork Willamette Subbasin: Subbasin Attributes Affecting Oregon Chub Life Stages | 3-277 |
| 3-109: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Spring Chinook Salmon and Cutthroat Trout in the Lower Coast Fork Willamette River Subbasin..... | 3-280 |
| 3-110: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Lower Coast Fork Willamette River Subbasin | 3-281 |
| 3-111: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout and Spring Chinook Salmon in the Upper Coast Fork Willamette River Subbasin | 3-282 |
| 3-112: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Upper Coast Fork Willamette River Subbasin..... | 3-283 |
| 3-113: Long Tom Subbasin: Subbasin Attributes Affecting Cutthroat Trout And Juvenile Spring Chinook Salmon Life Stages | 3-286 |
| 3-114: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout and Juvenile Spring Chinook in the Lower Long Tom Subbasin..... | 3-292 |
| 3-115: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout in the Upper Long Tom River Subbasin..... | 3-293 |
| 3-116: Percent Gradient for Major Segments of the Lower and Upper Luckiamute River and Rickreall Creek..... | 3-296 |
| 3-117: Luckiamute/Rickreall subbasin: Subbasin Attributes Affecting Cutthroat Trout and Juvenile Spring Chinook Salmon Life Stages..... | 3-297 |
| 3-118: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout and Juvenile Spring Chinook in the Lower Luckiamute/Rickreall Subbasin | 3-302 |
| 3-119: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout in the Upper Luckiamute/Rickreall Subbasin..... | 3-303 |
| 3-120: Marys Subbasin: Subbasin Attributes Affecting Cutthroat Trout and Juvenile Spring Chinook Salmon Life Stages..... | 3-306 |
| 3-121: Marys Subbasin: Subbasin Attributes Affecting Oregon Chub Life Stages | 3-308 |
| 3-122: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout and Juvenile Spring Chinook in the Lower Marys Subbasin..... | 3-311 |
| 3-123: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Lower Marys Subbasin | 3-312 |
| 3-124: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout in the Upper Marys Subbasin..... | 3-314 |

| Chapter | Page |
|---|-------------|
| 3-125: Middle Fork Willamette Subbasin: Subbasin Attributes Affecting Cutthroat Trout, Spring Chinook Salmon, Bull Trout, and Oregon Chub Life Stages..... | 3-317 |
| 3-126: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Spring Chinook Salmon and Cutthroat Trout in the Lower Middle Fork Willamette River Subbasin | 3-328 |
| 3-127: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Lower Middle Fork Willamette River Subbasin | 3-329 |
| 3-128: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout, Spring Chinook Salmon, and Bull Trout in the Upper Middle Fork Willamette River Subbasin | 3-331 |
| 3-129: Molalla/Pudding Subbasin: Subbasin Attributes Affecting Cutthroat Trout, Spring Chinook Salmon, and Winter Steelhead Life Stages | 3-334 |
| 3-130: Qualitative Ratings of EDT Attributes for Winter Steelhead, Spring Chinook, and Cutthroat Trout in the Lower Molalla/Pudding Subbasin..... | 3-341 |
| 3-131: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout, Winter Steelhead, and Spring Chinook in the Upper Molalla/Pudding Subbasin | 3-343 |
| 3-132: North Santiam Subbasin: Subbasin Attributes Affecting Cutthroat Trout, Spring Chinook Salmon, and Winter Steelhead Life Stages | 3-347 |
| 3-133: North Santiam Subbasin: Subbasin Attributes Affecting Oregon Chub | 3-357 |
| 3-134: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Winter Steelhead, Spring Chinook Salmon, and Cutthroat Trout in the Lower North Santiam River | 3-359 |
| 3-135: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Lower North Santiam River Subbasin | 3-360 |
| 3-136: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat, Spring Chinook, and Winter Steelhead in the Upper North Santiam River Subbasin | 3-361 |
| 3-137: Salem Area Watersheds: Watershed Attributes Affecting Cutthroat Trout, Spring Chinook Salmon, and Winter Steelhead Life Stages | 3-365 |
| 3-138: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout, Winter Steelhead, and Spring Chinook in the Salem-Area Watersheds: Mill, Claggett, Pringle, and Glenn-Gibson Creeks | 3-369 |
| 3-139: South Santiam Subbasin: Subbasin Attributes Affecting Cutthroat Trout, Spring Chinook Salmon, and Winter Steelhead Life Stages | 3-373 |
| 3-140: South Santiam Subbasin: Subbasin Attributes Affecting Oregon Chub | 3-383 |
| 3-141: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Winter Steelhead, Spring Chinook Salmon, and Cutthroat Trout in the Lower South Santiam River Subbasin | 3-386 |
| 3-142: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon Chub in the Lower South Santiam River Subbasin | 3-387 |

| Chapter | Page |
|---|-------------|
| 3-143: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Winter Steelhead, Spring Chinook Salmon, and Cutthroat Trout Life Stages in the Upper South Santiam River Subbasin | 3-388 |
| 3-144: Tualatin Subbasin: Subbasin Attributes Affecting Cutthroat Trout and Juvenile Spring Chinook Life Stages..... | 3-392 |
| 3-145: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout and Juvenile Spring Chinook in the lower Tualatin Subbasin..... | 3-395 |
| 3-146: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout in the Upper Tualatin Subbasin..... | 3-397 |
| 3-147: Percent Changes* in Channel Habitat Features from 1850 to 1995 for the Willamette River from Portland to Eugene. | 3-400 |
| 3-148: Percent Changes in Length for Channel Habitat Features from 1850 to 1995 for the Willamette River from Portland to Eugene | 3-401 |
| 3-149: Percent Composition of Land Use/Land Cover along the Willamette River* from Portland to Eugene, 1850 to 1990 | 3-402 |
| 3-150: Maximum Discharges Recorded at the Albany Gage for Four Major Willamette River Floods | 3-403 |
| 3-151: Willamette River Basin Planning Atlas Reaches (Lower, Middle, and Upper) and the Corresponding EDT Assessment Reaches and Geographic Areas | 3-404 |
| 3-152: Percent Changes* in Channel Habitat Features from 1850 to 1995 for the Middle Reach of the Willamette River from Newberg to Albany..... | 3-404 |
| 3-153: Percent Changes* in Length for Channel Habitat Features from 1850 to 1995 for the Middle Reach of the Willamette River from Newberg to Albany | 3-405 |
| 3-154: Percent Composition of Land Use/Land Cover along the Middle Reach of the Willamette River (within 393 feet of both sides of the channel) from Newberg to Albany, 1850 to 1990..... | 3-406 |
| 3-155: Percent Changes* in Channel Habitat Features from 1850 to 1995 for the Upper Reach of the Willamette River from Albany to Eugene. | 3-407 |
| 3-156: Percent Changes* in Length for Channel Habitat Features from 1850 to 1995 for the Upper Reach of the Willamette River from Albany to Eugene. | 3-407 |
| 3-157: Percent Composition of Land Use/Land Cover along the Upper Reach of the Willamette River (within 393 feet of both sides of the channel) from Albany to Eugene, 1850 to 1990 | 3-408 |
| 3-158: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Winter Steelhead, Spring Chinook Salmon, Cutthroat Trout, and Oregon Chub Life Stages in the Lower Middle Reach of the Willamette River..... | 3-409 |
| 3-159: Qualitative Ratings of EDT Attributes Related to Limiting Factors For Winter Steelhead, Spring Chinook Salmon, Cutthroat Trout, And Oregon Chub in the Upper Reach of the Willamette River | 3-410 |
| 3-160: Percent Gradient for Major Segments of the North and South Yamhill River | 3-413 |
| 3-161: Yamhill Subbasin: Subbasin Attributes Affecting Cutthroat Trout and Juvenile Chinook | 3-415 |

| Chapter | Page |
|--|-------------|
| 3-162: Qualitative Rating of EDT Attributes for Cutthroat Trout and Juvenile Spring Chinook in the Lower Yamhill Subbasin..... | 3-418 |
| 3-163: Qualitative Rating of EDT Attributes for Cutthroat Trout Life Stages in the Upper Yamhill Subbasin..... | 3-420 |
| 3-164: Focal Species and EDT Populations in the Clackamas River..... | 3-421 |
| 3-165: Overall Protection and Restoration Ranks for Each of 15 Geographic Areas in the Clackamas River Across Three Species and Six Populations..... | 3-424 |
| 3-166: Geographic Structure of EDT Assessment of the Clackamas River..... | 3-428 |
| 3-167: Summary of Key Problems in Johnson Creek..... | 3-472 |
| 3-168: Number of Stream Reaches in the Johnson Creek Subbasin..... | 3-474 |
| 3-169: Estimated Protection Value of Each Geographic Area for Johnson Creek Coho..... | 3-477 |
| 3-170: Estimated Restoration Value of Each Geographic Area for Johnson Creek Coho..... | 3-478 |
| 3-171: Estimated Protection Value of Each Geographic Area for Johnson Creek Steelhead..... | 3-479 |
| 3-172: Estimated Restoration Value Each of the Geographic Area for Johnson Creek Steelhead..... | 3-481 |
| 3-173: 303(d)-Listed Water Quality Parameters for the Lower Willamette River..... | 3-507 |
| 3-174: McKenzie Subbasin: Subbasin Attributes Affecting Cutthroat Trout Life Stages..... | 3-512 |
| 3-175: Qualitative Ratings of EDT attributes Related to Limiting Factors for Cutthroat Trout in the Lower McKenzie River Subbasin..... | 3-513 |
| 3-176: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Cutthroat Trout in the McKenzie River Subbasin..... | 3-514 |
| 3-177: McKenzie Subbasin: Subbasin Attributes Affecting Oregon Chub Life Stages..... | 3-516 |
| 3-178: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Oregon in the Lower McKenzie..... | 3-518 |
| 3-179: McKenzie Subbasin: Subbasin Attributes Affecting Bull Trout Life Stages..... | 3-519 |
| 3-180: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Bull Trout in the Lower McKenzie..... | 3-521 |
| 3-181: Qualitative Ratings of EDT Attributes Related to Limiting Factors for Bull Trout in the Lower McKenzie..... | 3-522 |
| 3-182: McKenzie Subbasin EDT Geographic Areas..... | 3-523 |
| 3-183: Capacity, Productivity, Abundance, and Diversity of McKenzie River Spring Chinook Salmon, Estimated as a Function of Habitat..... | 3-524 |
| 3-184: Estimated Changes in Population Parameters for McKenzie River Spring Chinook, by Geographic Area..... | 3-526 |
| 3-185: Summary of Key Problems in Tryon Creek..... | 3-533 |
| 3-186: Estimated Restoration Value of Each of Geographic Area for Tryon Creek Coho..... | 3-539 |
| 3-187: Estimated Restoration Value Each of Geographic Area for Tryon Creek Steelhead..... | 3-541 |
| 3-188: Metals Concentrations in Tryon Creek in 1999-20000..... | 3-551 |

| Chapter | Page |
|--|-------------|
| 3-189: Hypothesized Importance of the Limiting Factors to Focal Species in Oak Woodland..... | 3-558 |
| 3-190: Hypothesized or Documented Importance of the Limiting Factors to Focal Species in Upland Prairie..... | 3-558 |
| 3-191: Hypothesized or Documented Importance and Prevalence of the Limiting Factors to Focal Species in Wetland Prairie and Seasonal Marsh..... | 3-559 |
| 3-192: Hypothesized or Documented Importance and Prevalence of the Limiting Factors to Focal Species in Pond and Pond Riparian Habitat..... | 3-560 |
| 3-193: Hypothesized or Documented Importance and Prevalence of the Limiting Factors to Focal Species in Stream and Stream Riparian Habitat..... | 3-561 |
| 3-194: Hypothesized or Documented Importance and Prevalence of the Limiting Factors to Focal Species in Old-Growth Conifer Forest..... | 3-561 |
| 3-195: Management Unit Attributes..... | 3-572 |
| 3-196: Flow Regimes for Major Tributaries in the Willamette Basin..... | 3-577 |
| 3-197: Summary: Percent of ERC-identified Conservation and Restoration Opportunity Areas Included within TNC-identified Priority Conservation Areas..... | 3-589 |
| | |
| 4-1: Watershed Groups in the Willamette Basin..... | 4-8 |
| 4-2: Examples of Geographically Concentrated Conservation Efforts..... | 4-9 |
| 4-3: Recent BPA-Funded Projects in the Willamette Basin..... | 4-14 |
| 4-4: Institutional Limiting Factors in the Willamette Subbasin as Identified in the <i>Willamette Restoration Strategy</i> | 4-24 |
| | |
| 5-1: Biological and Habitat Objectives for Willamette Subbasin Terrestrial Focal Species* ... | 5-10 |
| 5-2: Examples of Objectives for Focal Habitat Types (or Their Approximate Equivalents) Identified in Other Assessments..... | 5-17 |
| 5-3: Strategies..... | 5-18 |
| 5-4: Example of Steps for Evaluating Floodplain Restoration Opportunities..... | 5-34 |
| 5-5: Selected Willamette Basin Monitoring and Research Projects And Programs..... | 5-35 |
| 5-6: Sample Strategic Framework for Monitoring and Evaluation Within the Willamette Basin..... | 5-40 |
| 5-7: Implementation Issues Related to the Key Willamette Basin Monitoring Strategies..... | 5-41 |
| 5-8: Selected Monitoring and Research Issues for the Willamette Basin’s Lowland Aquatic Systems..... | 5-44 |

Figures

| | |
|---|-----|
| 1-1: Recommended Priority Conservation Themes for the Willamette Subbasin..... | 1-3 |
| | |
| 3-1: The Willamette and Other Basins Within the State of Oregon..... | 3-2 |
| 3-2: The Willamette Basin..... | 3-3 |
| 3-3: Generalized Geology and Geographic Features in the Willamette Basin..... | 3-6 |
| 3-4: Generalized Geologic Section East-West Across the Central Willamette Valley..... | 3-7 |

| Chapter | Page |
|--|-------------|
| 3-5: Precipitation in the Willamette Basin..... | 3-8 |
| 3-6: Land Cover in the Willamette Basin | 3-9 |
| 3-7: Locations of Ecoregions in the Willamette Basin | 3-11 |
| 3-8: Native American Languages and Tribes, 1840-1850..... | 3-13 |
| 3-9: Proportion of Land Ownership in the Willamette Basin..... | 3-16 |
| 3-10: Land Ownership in the Willamette Subbasin..... | 3-17 |
| 3-11: Comparison of Average Monthly Flows of an Eastside (McKenzie River) and Westside (Marys River) Tributary | 3-21 |
| 3-12: USGS Hydrologic Unit Coding of the Mohawk River | 3-22 |
| 3-13: 5 th -Field Hydrologic Units in the Willamette Basin..... | 3-23 |
| 3-14: Watershed Council Boundaries | 3-24 |
| 3-15: Generalized Hydrogeology of the Willamette Basin and Areas of Groundwater Supply Concern..... | 3-26 |
| 3-16: Nitrate Levels in Wells..... | 3-31 |
| 3-17: Permitted Discharges in the Willamette Basin..... | 3-35 |
| 3-18: Northwest Power and Conservation Council Ecoprovinces..... | 3-47 |
| 3-19: Willamette River Fish Species | 3-62 |
| 3-20: Expansion of the Biological Objectives Model within EDT..... | 3-78 |
| 3-21: Analytical Framework for Subbasin Assessment in the Willamette | 3-79 |
| 3-22: Time Series of Abundance for Upper Willamette Spring Chinook in the Clackamas River | 3-97 |
| 3-23: Time Series of Abundance of Spring Chinook at Leaburg Dam in the Mackenzie River..... | 3-99 |
| 3-24: Time Series of Abundance for Upper Willamette Spring Chinook North Santiam Redds per Mile..... | 3-106 |
| 3-25: Time Series of Abundance for Upper Willamette Winter Steelhead in the Calapooia .. | 3-117 |
| 3-26: Redd Surveys of Winter Steelhead in the Molalla River | 3-118 |
| 3-27: Redd Surveys of Winter Steelhead in the North Santiam | 3-120 |
| 3-28: Time Series of Abundance for Upper Willamette Winter Steelhead in the North Santiam, Minto Trap | 3-120 |
| 3-29: Redd Surveys of Winter Steelhead in the South Santiam Below Foster Dam | 3-122 |
| 3-30: Time Series of Abundance for Upper Willamette Winter Steelhead South Santiam, Foster Dam..... | 3-122 |
| 3-31: Willamette Subbasin Hatcheries..... | 3-149 |
| 3-32: Change Likely from Plan Trend 2050 Scenario | 3-244 |
| 3-33: Change in Terrestrial Species Populations under Alternative Future Scenarios..... | 3-245 |
| 3-34: Daily Average Flow in the Willamette River at Salem, Oregon..... | 3-399 |
| 3-35: Flow in the Clackamas River in the Upper Watershed (Big Bottom) and Lower Watershed (Estacada)..... | 3-423 |
| 3-36: Protection and Restoration Priorities for Each Geographic Area in the Clackamas River in Regard to Abundance of All Six Focal Populations | 3-424 |
| 3-37: Generalized Early Returning (Type S) Coho Life History..... | 3-429 |

| Chapter | Page |
|---|-------------|
| 3-38: Count of Adult Early Returning Coho at North Fork Dam | 3-430 |
| 3-39: EDT Estimates of Habitat Potential in the Lower Clackamas River for Coho Salmon | 3-431 |
| 3-40: Lower Clackamas River Coho Habitat Priorities | 3-432 |
| 3-41: Lower Clackamas River Coho Habitat Attribute Priorities..... | 3-433 |
| 3-42: Generalized Life History of Winter Steelhead in the Clackamas River..... | 3-434 |
| 3-43: Abundance of Winter Steelhead at North Fork Dam | 3-435 |
| 3-44: EDT Estimates of Habitat Potential in the Lower Clackamas River for Winter Steelhead..... | 3-436 |
| 3-45: Lower Clackamas River Winter Steelhead Habitat Priorities | 3-437 |
| 3-46: Lower Clackamas River Steelhead Habitat Attribute Priorities..... | 3-438 |
| 3-47: Generalized Life History of Clackamas River Tule Fall Chinook | 3-439 |
| 3-48: Estimated Abundance of Clackamas River Fall Chinook Below River Mill Dam | 3-439 |
| 3-49: EDT Estimates of Habitat Potential in the Lower Clackamas River For Fall Chinook..... | 3-440 |
| 3-50: Clackamas River Fall Chinook Habitat Priorities | 3-441 |
| 3-51: Clackamas River Fall Chinook Habitat Attribute Effects | 3-441 |
| 3-52: EDT Estimates of Habitat Potential in the Upper Clackamas River for Coho Salmon | 3-443 |
| 3-53: Upper Clackamas River Coho Habitat Priorities..... | 3-444 |
| 3-54: Upper Clackamas River Coho Habitat Attribute Effects | 3-445 |
| 3-55: EDT Estimates of Habitat Potential in the Upper Clackamas River for Winter Steelhead..... | 3-447 |
| 3-56: Upper Clackamas River Winter Steelhead Habitat Priorities..... | 3-448 |
| 3-57: Upper Clackamas River Steelhead Habitat Attribute Effects..... | 3-449 |
| 3-58: Generalized Spring Chinook Life History in the Clackamas River | 3-450 |
| 3-59: Estimated Return of Spring Chinook to the Clackamas River | 3-450 |
| 3-60: EDT Estimates of Habitat Potential in the Clackamas River for Spring Chinook | 3-451 |
| 3-61: Clackamas River Spring Chinook Habitat Priorities..... | 3-452 |
| 3-62: Clackamas River Spring Chinook Attribute Effects | 3-453 |
| 3-63: Protection and Restoration Rankings for the Portland (Lower Willamette) Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-455 |
| 3-64: Protection and Restoration Rankings for the Lower Clackamas Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-456 |
| 3-65: Protection and Restoration Rankings for the Deep Creek Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-457 |
| 3-66: Protection and Restoration Rankings for the Clear Creek Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-458 |
| 3-67: Protection and Restoration Rankings for the Eagle Creek Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-459 |

| Chapter | Page |
|--|-------------|
| 3-68: Protection and Restoration Rankings for the North Fork Eagle Creek Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-460 |
| 3-69: Protection and Restoration Rankings for the Lower Clackamas Tributaries Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-461 |
| 3-70: Protection and Restoration Rankings for the Middle Clackamas Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River..... | 3-462 |
| 3-71: Protection and Restoration Rankings for the Fish Creek Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-463 |
| 3-72: Protection and Restoration Rankings for Roaring River Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-464 |
| 3-73: Protection and Restoration Rankings for the Middle Clackamas Tributaries Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-465 |
| 3-74: Protection and Restoration Rankings for the Upper Clackamas Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-466 |
| 3-75: Protection and Restoration Rankings for the Collowash River Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-467 |
| 3-76: Protection and Restoration Rankings for the Hot Springs Fork Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River | 3-468 |
| 3-77: Protection and Restoration Rankings for the Upper Clackamas Tributaries Area and Restoration Effects of Survival Attributes on Six Populations from the Clackamas River..... | 3-469 |
| 3-78: Estimated Coho Abundance Potential as a Function of Habitat in the Current and Reference Conditions for the Johnson Creek Coho Population..... | 3-476 |
| 3-79: Estimated Steelhead Abundance Potential as a Function of Habitat in the Current and Reference Conditions for the Johnson Creek Steelhead Population..... | 3-476 |
| 3-80: Johnson Creek Coho Habitat Priorities | 3-477 |
| 3-81: Johnson Creek Steelhead Habitat Priorities | 3-479 |
| 3-82: Volume of Wood per 100 Meters of Channel Length..... | 3-482 |
| 3-83: Amount and Quality of Pool Habitat Throughout Johnson Creek | 3-483 |
| 3-84: Percentage of Each Subwatershed That Is Off-Channel Habitat (Right) and Total Amount of Off-Channel Habitat That Each Subwatershed Provides (Left)..... | 3-484 |
| 3-85: Percentage of Riffle Area in Johnson Creek Where Gravel Is Below 35 Percent | 3-484 |
| 3-86: Percentage of Riffle Area in Johnson Creek Where Fines Exceed 12 Percent | 3-485 |
| 3-87: Percentage of the Average Daily Flow at the Milport, Sycamore, and Regnor Gauges That Do Not Meet ODFW Flow Targets | 3-486 |
| 3-88: Temperatures along the Johnson Creek mainstem..... | 3-487 |
| 3-89: Culverts and Their Ratings for Passability in Johnson Creek | 3-487 |
| 3-90: DDT Concentrations in Johnson Creek..... | 3-488 |

| Chapter | Page |
|--|-------------|
| 3-91: Combined Restoration and Protection Potential for Coho and Steelhead in the Lower Willamette | 3-498 |
| 3-92: Median Flow over the Period of Record (1975-present) at the USGS Portland Gage (Blue Line)..... | 3-501 |
| 3-93: Changes in Median Daily Flow Before and After Dam Construction | 3-501 |
| 3-94: Changes in Maximum Flows Before and After Dam construction. | 3-502 |
| 3-95: Changes in the Amount of Mainstem, Secondary and Off-Channel Habitat in the Lower Willamette River through Portland, 1888 – 2001 | 3-505 |
| 3-96: Changes in the Proportion and Total Amount of Shallow and Deep Water Habitat in the Lower Willamette River through Portland | 3-506 |
| 3-97: Changes in Bank Types Along the North Segment of the Lower Willamette River | 3-506 |
| 3-99: Relative Importance of Geographic Areas for Protection and Restoration Measures for McKenzie River Spring Chinook..... | 3-527 |
| 3-100: Aquatic and Riparian Protection and Restoration Priorities by EDT Attribute Class for McKenzie River Spring Chinook | 3-529 |
| 3-101: Estimated Fish Abundance Potential as a Function of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Winter Steelhead Population | 3-536 |
| 3-102: Estimated Fish Productivity Potential as a Function Of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Winter Steelhead Population | 3-537 |
| 3-103. Estimated Species Diversity Potential as a Function of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Winter Steelhead Population | 3-537 |
| 3-104: Estimated Fish Abundance Potential as a Function of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Coho Population | 3-538 |
| 3-105: Estimated Fish Productivity Potential as a Function of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Coho Population | 3-538 |
| 3-106: Estimated Species Diversity Potential as a Function of Habitat in the Current and Reference Conditions for Tryon Creek Subbasin Coho Population | 3-539 |
| 3-107: Relative Importance of the EDT Analysis Geographic Areas for Protection and Restoration Measures for the Tryon Creek Coho Salmon | 3-540 |
| 3-108: Relative Importance of the EDT Analysis Geographic Areas for Protection and Restoration Measures for the Tryon Creek Steelhead | 3-541 |
| 3-109: EDT analysis of aquatic and riparian protection and restoration priorities by attribute class for the Tryon Creek coho salmon. | 3-542 |
| 3-110: EDT Analysis of Aquatic and Riparian Protection and Restoration Priorities by Attribute Class for the Tryon Creek Steelhead Population..... | 3-542 |
| 3-111: Culverts and Their Passability in Tryon Creek | 3-544 |
| 3-112: Volume of Wood per 100 Meters of Channel Length..... | 3-545 |
| 3-113: Amount and Quality of Pool Habitat Throughout Tryon Creek..... | 3-546 |
| 3-114: Amount of Off-Channel Habitat Through Tryon Creek..... | 3-547 |
| 3-115: Percent of Gravels in Tryon Creek Riffles | 3-548 |
| 3-116: Percentage of Riffle Area in Johnson Creek Where Fines Exceed 12 Percent | 3-549 |
| 3-117: Seven-Day Average Daily Maximum Temperatures in Tryon Creek 1998-2000 | 3-550 |

| Chapter | Page |
|---|-------------|
| 3-118: Combined Restoration and Protection Potential for Coho and Steelhead in the Lower Willamette | 3-556 |
| 3-119: Spring Chinook Salmon Habitat Blocked By Major Willamette Dams..... | 3-577 |
| 4-2: Funding for Restoration Activities in the Willamette Basin, 2000 and 2001 | 4-17 |
| 5-1: Fish Abundance Relative to Targets Articulated by Oregon Department of Fish and Wildlife | 5-5 |
| 5-2: Fish Abundance Relative to Targets Articulated by Oregon Department of Fish and Wildlife | 5-6 |
| 5-3: Conservation Guidelines | 5-21 |
| 5-4: Institutional Limiting Factors Identified as Having Highest Constructive Potential | 5-28 |

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- Steve Mamoyac, Oregon Department of Fish and Wildlife
- Jeff Ziller, Oregon Department of Fish and Wildlife
- Todd Alsbury, Oregon Department of Fish and Wildlife
- Darlene Siegel, Oregon Department of Fish and Wildlife
- Holly Michael, Oregon Department of Fish and Wildlife
- Bob Altman, American Bird Conservancy
- Denise Kelsey and Jennifer Lloyd CRITFC

- Doug Creamer and Tim Shibahara, Portland General Electric
- Dave Roberts, Bureau of Land Management
- Bob Bergamini, U.S. Forest Service
- Tom Horning, U.S. Forest Service
- Neil Bjorklund, City of Eugene
- Mark Brown, Willamette River Navigator
- Travis Williams, Willamette River Keeper
- Steve Smith, U.S. Fish and Wildlife Service
- Betsy Torell, Mobrand Biometrics

David Primozich and Rick Bastasch, Willamette Restoration Initiative
May 28, 2004

Acronyms and Abbreviations

| | |
|------|---|
| BBS | Breeding Bird Survey |
| BFS | Basin fill sediment unit |
| BLM | U.S. Bureau of Land Management |
| BMP | best management practice |
| | |
| cfs | cubic feet per second |
| CRB | Columbia River Basalt unit |
| | |
| DEQ | Oregon Department of Environmental Quality |
| | |
| EDT | Ecosystem Diagnosis and Treatment |
| ESA | Endangered Specie Act |
| ESU | evolutionarily significant unit |
| EWEB | Eugene Water and Electric Board |
| | |
| FERC | Federal Energy Regulatory Commission |
| FR | Federal Register |
| FR | Federal Register |
| | |
| GWMA | Groundwater Management Area |
| | |
| HGMP | Hatchery and Genetic Management Plan |
| HIS | |
| | |
| IBIS | Interactive Biodiversity Information System |
| | |
| ISG | Independent Scientific Group |
| | |
| LUST | leaking underground storage tank |
| LYU | Low-yield bedrock unit |
| | |
| mg/L | milligrams per liter |
| | |
| NEPA | National Environmental Policy Act |
| NHI | Northwest Habitat Institute |
| NPCC | Northwest Power and Conservation Council |

| | |
|--------|---|
| ODFW | Oregon Department of Fish and Wildlife |
| OFC | Oregon Fish Commission |
| OSHD | Oregon State Health Department |
| OWEB | Oregon Watershed Enhancement Board |
| OWRD | Oregon Water Resources Department |
| PAHs | polycyclic aromatic hydrocarbons |
| PCA | Priority Conservation Area |
| PCBs | polychlorinated biphenyls |
| PFC | properly functioning conditions |
| PGE | Portland General Electric |
| PNWERC | Pacific Northwest Ecosystem Research Consortium |
| QHA | Qualitative Habitat Assessment |
| RKm | river kilometer |
| RM | river mile |
| RM&E | research, monitoring, and evaluation |
| SRE | Stream Reach Editor |
| SWCD | soil and water conservation district |
| TAG | Technical Advisory Group |
| TMDL | total maximum daily load |
| TNC | The Nature Conservancy |
| TRT | Technical Recovery Team |
| UGB | urban growth boundary |
| UIC | underground injection control |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VOC | volatile organic constituent |
| WPA | Works Progress Administration |
| WRI | Willamette Restoration Initiative |

1 Executive Summary

The Willamette Subbasin is a special place. It wholly contains the nation's 13th largest river (by volume) and the largest waterfall in the Northwest. It has one of the richest assemblages of fish and wildlife species in the Northwest: 31 fish, 18 amphibian, 154 bird, and 69 mammalian species are native to the basin. It accounts for 60 percent of all of Oregon's crop sales, while at the same time supporting the largest port and one of the most well-developed industrial and service infrastructures in the region. It is also home to approximately 40 percent of the people living in the Columbia Basin.

Although the natural setting of the Willamette Subbasin draws people here, we must care for it to keep it. The abundance, diversity, and distribution of many native fish and wildlife species in the Willamette Subbasin have decreased significantly from historical estimates. About one-third of the species in the basin are now listed as threatened, endangered, or species of concern by state and federal fish and wildlife management agencies. Furthermore, the basin has lost at least 10 breeding species of wildlife since about 1850. Although there have been cycles of abundance, particularly among salmon and steelhead, overall trends for focal species in this *Willamette Subbasin Plan* are showing decline (PNERC, 2002; WLC TRT, 2003).

The bottom line of the *Willamette Subbasin Plan* is that the ecology of the Willamette Subbasin needs to become more complex. This is not a surprising conclusion, and this plan serves as an encyclopedia of current knowledge about fish and wildlife conditions augmented by a set of strategies, scientifically derived and evaluated, that are intended to make things better.

1.1 Need for Habitat

For 11 months, we have conducted thorough technical assessments that tell us we need more ecological complexity in the Willamette Subbasin because it is complexity that creates and maintains the habitats that produce plants, fish, and animals. Working backwards through this formula, to get more plants, fish, and animals to offset losses over the last half century, we need to get more habitat.

Much of the native habitat upon which the focal species of this plan depend is no longer available, no longer accessible, or heavily degraded. About 80 percent of bottomland forest, 97 percent of natural grassland, and nearly 100 percent of oak-savanna habitats that occurred historically in the basin have been lost (PNERC, 2002). Off-channel habitats such as alcoves and side channels have been reduced by 35 percent and 55 percent, respectively, on the mainstem Willamette River. Much of these habitat changes have occurred because major ecosystem functions and processes such as flow regimes, channel formation, and habitat connectivity have been disrupted (PNERC, 2002).

The primary—though not only—causes of disruption are as follows:

- Major dams
- Channel simplification
- Conversion of lands for urban, agricultural, and silvicultural purposes

A key to getting more habitat is enhancing the role of the natural processes that have been compromised over the last 150 years of settlement. This means we need to rely less on technical “fixes” and more on the inexact art of working with fire, floods, and a web of interconnected channels to encourage these natural processes.

1.2 Focus on Conservation

Although the basin’s ecology has undergone significant degradation, there is still a base of native species (in fact, no aquatic species has yet been extirpated from the Willamette Basin) and a range of existing habitat and potential habitats to build from and manage. The public lands in the basin, including nearly 40,000 acres of natural areas and refuges, can form an important conservation anchor.

For the past several decades, conservation efforts have tended to concentrate on forested uplands. However, lowlands represent an area in special need of conservation focus because most of the change and ecological disruption have occurred in these areas and this is where most of the population live and make a living. Simpler ways are needed for landowners to participate in conservation programs.

A key to lowland conservation efforts is managing the major dams, especially in the Cascade tributaries. While dams are effective and prized water-control devices, they also represent a major ecological disruption. They drastically change flow and temperature regimes (including channel-forming flows) and cut off access of salmon to highly productive habitat. For example, 71 percent of spring Chinook production in the Santiam system used to occur above Detroit Dam. Now there is no Chinook production above the dam. Because dams are essentially machines, they can and should be controlled in a way to better balance benefits and tradeoffs.

Although we may think of major ecological mitigation efforts such as modified dam operations as primarily fish-focused, our assessment shows that what is good for fish is nearly always good for wildlife as well. There is a built-in conservation efficiency, particularly in areas where habitats overlap, such as riparian areas and floodplains. Furthermore, restoring ecological function in an area affects the human residents as well. Recent research suggests that healthy riparian areas and floodplain zones can clean and cool water to help meet growing water demands while decreasing downstream flooding and increasing fish and wildlife habitat.

1.3 Plan Objectives

The problems facing fish and wildlife are as interwoven as the disrupted natural processes from which they flow. These processes make the Willamette Basin a chain of interconnected habitats. There is no single cause for disruption; rather, multiple causes act in concert to disrupt these processes. Therefore, this *Willamette Subbasin Plan* does not attempt to isolate, elevate, or pre-select a single, most important strategy or sequence of ranked strategies. There are no simple priorities.

However, there are simple objectives. This plan’s overall objective is to increase fish and wildlife population trajectories. To accomplish this, we need to do many things

simultaneously for a long time. The plan identifies more than 35 strategies needed to meet its identified objectives. This means that all concerned parties need to be on the same page in terms of conservation outcomes, commitment of resources to efficiently produce those outcomes, and tracking whether these efforts are working. This strategy calls for vastly improved coordination, program integration, targeted budgeting, and public communication. The current institutional setup does not currently facilitate these activities.

Although there are no simple priorities, there are clear conservation themes that will deliver important benefits to Willamette Subbasin fish and wildlife in the next 10 to 15 years. These themes can be viewed as “funds” or “accounts” in a Willamette Basin conservation investment portfolio. This plan recommends balanced investments to ensure protection of life, property, and economy, as shown in Figure 1-1 and described more fully in the Management Plan (see Section 5.2).

- *Deal with the dams—change flow regimes and establish fish passage.*
- *Fix culverts and diversions to allow fish passage.*
- *Focus on valley and foothills wildlife.*
- *Restore lowland riparian areas.*
- *Restore low-cost, high-return areas of the Willamette River floodplain.*
- *Let the river cool itself by seeping through streamside gravels, alcoves, and islands.*
- *Ensure that all priority themes above are taken up and supported in an organized way at the local level.*

Figure 1-1: Recommended Priority Conservation Themes for the Willamette Subbasin

The recommendation to ensure that all priority themes are taken up and supported in an organized way at the local level cannot be overemphasized. This plan cannot succeed unless local interests take ownership of it, agree with the identification of system-level needs, and identify how local contributions can help meet those needs. This plan is intended to provide useful and credentialed information—as well as new tools—for use by conservation practitioners. It is also intended to encourage local use of common analytical frameworks such as the Ecosystem Diagnostic Treatment (EDT) Method and the “terrestrial habitat utility” developed for this plan (see Management Plan, Section 5.6.1.2) to identify conservation opportunities.

The Willamette Basin has an active base of local and regional governments, watershed councils, soil and water conservation districts, nonprofit conservation organizations, and local, state, and federal agency staff who are well equipped to identify how local action can harmonize with basinwide needs.

The strategies identified in this plan are sound and needed—and likely to remain a list unless and until they are hooked up to well-considered local efforts. The plan is not a conservation cookbook. It requires actual work to implement it. Simply leaving the plan as a well-documented and, we hope, compelling identification of things to do is not sufficient for a place as special as the Willamette Subbasin. Therefore, the plan also includes some recommended approaches for implementation to move it from the identification of basinwide

needs into local action (see Management Plan, Section 5.6). We are particularly hopeful that the EDT products and the new terrestrial utility will simplify this process.

1.4 Additional Information Needs

The Willamette Subbasin may be one of the more-studied places on Earth, especially in the last decade. There have been intensive water quality studies, a ground-breaking “alternatives future” habitat study, and detailed studies of at-risk wildlife and fish (particularly salmon and steelhead). The combined information and its widespread availability are a boon to conservation efforts. Yet still more needs to be known. For example, the data and tools to directly link the biological performance of focal species in the Willamette Basin with specific habitat modifications are inadequately developed. The state of the science and of the data are simply insufficient at a basinwide scale to say with confidence what the return will be for proposed habitat actions.

Many other areas need additional information as well, including better species surveys, an improved understanding of site-specific behavior of flood flows and streamside gravel (hyporheic) flows, and improved use of environmental indicators to track progress (or lack thereof). The *Willamette Subbasin Plan's* Research, Monitoring and Evaluation section (Section 5.7) lays out a design for a comprehensive program of ordered information gathering, sharing, and analysis.

1.5 Looking Ahead

This *Willamette Subbasin Plan* structures and deepens our collective understanding of basinwide needs. We hope it can lead to a new Willamette Subbasin where science-based identification of ecosystem needs and clearly articulated strategies lay an enduring foundation for effective local conservation actions.

David Primozych and Rick Bastasch
WRI
May 2004

2 Introduction

2.1 Description of Planning Entity

In April 2003, the Northwest Power and Conservation Council (NPCC) designated the Willamette Restoration Initiative (WRI) as the lead entity for developing the *Willamette Subbasin Plan*. (In this document, the terms Willamette Subbasin and Willamette Basin are used interchangeably.) NPCC entered into a contract with WRI to produce the draft plan in June 2003.

WRI has a 26-member Board of Directors drawn from all walks of life across the full extent of the basin. WRI was established to develop and implement a long-range conservation plan for the Willamette River and its watershed. Completed in 2001, this conservation plan, called the *Willamette Restoration Strategy*, is the “Willamette chapter” of the Oregon Plan for Salmon and Watersheds. The *Willamette Restoration Strategy* identifies 27 critical actions needed to preserve and improve watershed health in the areas of water quality, water supply, habitat and hydrology, and institutions. Two of the actions call for more detailed identification of fish and wildlife conservation priorities and more integrated environmental planning. The development of the *Willamette Subbasin Plan* represents substantial progress for WRI in both these areas. More information on WRI and the *Strategy* can be found at: www.oregonwri.org.

2.2 List of Participants

The primary participants in the development of the Willamette Subbasin Plan include WRI staff and the members of work groups who contributed to different plan components. WRI’s Subbasin Plan Coordinator was David Primozech, who was assisted by WRI Executive Director Rick Bastasch. WRI was helped greatly by the work group members shown in Table 2-1 (the purpose of the work groups is described in Section 2.3). WRI also consulted widely with professionals in the environmental community.

2.3 Stakeholder Involvement Process

WRI’s stakeholder involvement process began far in advance of WRI’s designation as lead entity. In the fall of 2002, WRI initiated a series of meetings to scope expectations and possible partnerships for the subbasin planning process. These meetings included representatives from the cities of Portland and Albany; the Lower Columbia River Estuary Partnership; the Oregon Watershed Enhancement Board (OWEB); the Northwest Power and Conservation Council; the National Marine Fisheries Service in the National Oceanic and Atmospheric Administration (NOAA Fisheries); the U.S. Fish and Wildlife Service (USFWS); Clean Water Services of Washington County; Clackamas Water Environment Services; the U.S. Bureau of Land Management (BLM); and watershed councils.

Table 2-1: Participants in the Development of the *Willamette Subbasin Plan*

| | |
|----------------------------------|--|
| Plan Oversight Group | |
| Sara Vickerman | Defenders of Wildlife |
| John Miller | Wildwood-Mahonia |
| Steve Gordon, | Lane Council of Governments |
| Martin Hudson | U.S. Army Corps of Engineers |
| Chris Wheaton & Greg Sieglitz | Oregon Department of Fish and Wildlife |
| Karl Weist & Bill Blosser | Northwest Power and Conservation Council |
| Rob Walton & Patty Dornbusch | NOAA Fisheries |
| Steve Smith | U.S. Fish and Wildlife Service |
| Ken Bierly | Oregon Watershed Enhancement Board |
| Julia Dougan & Mark Brown | Bureau of Land Management |
| Technical Advisory Group | |
| Stan Gregory | Oregon State University Department of Fisheries and Wildlife |
| Paul McElhaney & Patty Dornbusch | NOAA Fisheries |
| Chuck Willis | U.S. Army Corps of Engineers |
| Dave Ward and Greg Sieglitz | Oregon Department of Fish and Wildlife |
| Doug Young | U.S. Fish and Wildlife Service |
| Gordon Grant | U.S. Forest Service, Pacific Northwest Research Station |
| Jim Middaugh | City of Portland |
| Kathryn Boyer | Natural Resources Conservation Service |
| Cathy MacDonald | Nature Conservancy |
| Wildlife Team | |
| Greg Sieglitz | Oregon Department of Fish and Wildlife |
| Cathy MacDonald | Nature Conservancy |
| Holly Michael | Oregon Department of Fish and Wildlife |
| Paul Adamus | Adamus Resource Assessment, Inc. |
| Bob Altman | American Bird Conservancy |
| Jimmy Kagan | Oregon Natural Heritage Initiative |
| Technical Consultants | |
| John Runyon | Biosystems, Inc. |
| Chip McConnaha | Mobrand Biometrics, Inc. |
| Paul Hoobyar | Watershed Initiatives |
| Michael Carlson | Clackamas River Basin Council |
| Karen Streeter | Clackamas County Water Environment Services |
| Cedric Cooney | Oregon Department of Fish and Wildlife |
| Tom O'Neil | Northwest Habitat Institute |
| Paul Adamus | Adamus Resource Assessment |

Once WRI was designated as the lead entity for development of the plan, it established three stakeholder work groups to inform the planning process (members of the work groups are listed in Section 2.2):

- Technical Advisory Group (TAG)
 - Primary responsibility: Advise WRI on the assessment and the research, evaluation, and monitoring strategy
 - Tasks: Identify focal species and priority habitats, advise on methods for modeling species’ needs and responses, identify key data and information sources, review objectives, and identify limiting factors
- Wildlife Team
 - Primary responsibility: Advise WRI and TAG on specifics of the wildlife assessment, including the selection of focal species and the identification and incorporation of new, highly detailed data with the SITES and IBIS models; identify wildlife limiting factors
- Plan Oversight Group
 - Primary responsibility: Advise WRI on the management plan (see Chapter 5) and inventory (see Chapter 4)
 - Tasks: Articulate the vision, major goals, strategies, and objectives of the management plan and advise on key areas of emphasis; recommend principle means of ensuring that the plan becomes a conservation framework used not just by the NPCC, but by other agencies and organizations as well

As described in the *Willamette Subbasin Plan* work plan (Northwest Power Planning Council, 2003), the primary means of communicating with stakeholders was through representative bodies—that is, collectives of interests that convene regularly under the auspices of various organizations. WRI shared information about subbasin planning and sought input on plan products by communicating directly with the entities Table 2-2.

Table 2-2: Stakeholder Groups Consulted Regarding Subbasin Planning

| Body | Description |
|---|--|
| Willamette Urban Watershed Network | Members representing urban interests throughout the Willamette Basin who meet quarterly to share information on approaches and needs relating to urban aspects of watershed and species management |
| Willamette Provincial Interagency Executive Committee | Executives from federal natural resource agencies who meet every other month to cooperate in implementation of the Northwest Forest Plan |
| State of Oregon Northwest Region Managers Team | Administrators of state natural resource agencies who meet quarterly to discuss implementation of environmental programs, coordination opportunities, and agency needs |

Table 2-2: Stakeholder Groups Consulted Regarding Subbasin Planning

| Body | Description |
|---|---|
| Willamette Basin Watershed Council Coordinators | Coordinators of basin councils within the Willamette Basin |
| WRI Board of Directors | 26 citizens overseeing implementation of the <i>Willamette Restoration Strategy</i> |

WRI also worked closely with local stakeholders in the development of products of Ecosystem Diagnosis and Treatment (EDT), a habitat modeling tool developed by Mbrand Biometrics, Inc., that rates habitat conditions relative to the needs of a focal species, such as Chinook salmon. With its partners, WRI hosted meetings of local experts in the lower Willamette, McKenzie, and Clackamas watersheds to critique and refine reach breaks, parameter ratings, and other EDT inputs and outputs. These experts—who were convened with the help of the City of Portland, Clackamas Water Environment Services, Clackamas River Basin Council, and the McKenzie River Watershed Council—included local and district representatives from the Oregon Department of Fish and Wildlife (ODFW), the U.S. Forest Service, and utilities. Substantial assistance was also provided by many staff at ODFW’s headquarters and field offices and the City of Portland.

WRI also hosted several *Willamette Subbasin Plan* meetings specifically for staff of ODFW and USFWS. In addition, in April 2004, WRI convened more than 60 Willamette Basin experts for a facilitated review of draft subbasin plan products and the identification of most important strategies for addressing key environmental factors.

WRI developed its own *Willamette Subbasin Plan* Web site (<http://www.oregonwri.org/willamette-synthesis>) to share approaches and plan products and solicit feedback on them.

2.4 Overall Approach to the Planning Activity

The prime objective of WRI’s *Willamette Subbasin Plan* process was to establish a compelling, enduring, and locally appropriate conservation framework for use not only by NPCC, but by a wide range of conservation organizations.

Another aim of WRI’s planning strategy was to address all areas of this river basin—the size of Maryland—while recognizing key locations of high importance and the fact that certain areas had already undergone detailed analysis. In other words, because NPCC’s schedule and budget did not allow for concentrated analysis in all locations, WRI needed to target detailed analysis in key locations (for example, EDT assessments in the Clackamas and McKenzie watersheds). At the same time, WRI was committed to presenting in this document a sound characterization of conditions and needs in areas that had not yet received concentrated analysis. In other words, WRI wanted to avoid bestowing an advantage on areas simply because they have been studied the most.

So as not to fall into the trap of relying too heavily on data from already well-studied areas, WRI conducted several surveys to bring to light important limiting factors, conservation

needs, and existing programs throughout the Willamette Basin, including in areas that have not been studied extensively. These surveys included the following:

- An inventory of federal, state, and regional conservation plans and programs in the Willamette Basin
- A survey of the conservation needs of watershed council coordinators
- A survey of conservation programs of local governments and groups
- A survey of ODFW biologists regarding multi-species limiting factors
- A survey of technical experts regarding research, monitoring, and evaluation needs

Given the sheer size of the basin, both geographically and in terms of its human population (about 2.5 million), it was necessary for WRI to conduct outreach to stakeholders primarily through existing organizations and networks, rather than having local dialogues that would have anchored the *Willamette Subbasin Plan* in the minds of local citizens as a useful and respectful framework for conservation actions (see Section 2.5). (Unfortunately, these types of dialogues were largely precluded by budget and time constraints.)

The result was a planning process that did the following:

- **Created a synergy of interests and investment** in the *Willamette Subbasin Plan*. WRI was privileged to work with a number of partners who—through their own, substantive expenditures—increased the NPCC Willamette budget by 75 percent. (This does not include the many in-kind contributions of all the partners.)
- **Put a premium on the cooperation** of Willamette Basin partners. In the nine-month period allotted for this major planning effort, WRI made it a commitment to develop close working partnerships with about 30 conservation agencies, organizations, and efforts.¹
- **Placed a priority on laying a solid, lasting analytical framework.** WRI elected to take the time and allocate its limited budget to ensure that EDT, Qualitative Habitat Assessment (QHA), and wildlife modeling processes used the latest and most detailed information, and that local experts were given the time to refine and comment on both the modeling processes and the data used in the models. This meant that fewer resources were made available for speculative modeling runs for multiple alternative conservation scenarios. In other words, WRI chose not to rush through developing modeling inputs that would be poorly understood by and of little value to local experts, simply to crank out modeling results.
- **Addressed all areas of the basin,** while incorporating detailed analysis for specific locales, where available.

¹ These include Defenders of Wildlife, Wildwood-Mahonia, Lane Council of Governments, the U.S. Army Corps of Engineers, the Oregon Department of Fish and Wildlife, NPCC, NOAA Fisheries, the U.S. Fish and Wildlife Service, OWEB, BLM, the City of Portland, NRCS, the Nature Conservancy, the American Bird Conservancy, the Oregon Natural Heritage Initiative, the Clackamas River Basin Council, Clackamas County Water Environment Services, McKenzie River WSC, the Northwest Habitat Institute, Oregon State University's Department of Fisheries and Wildlife, USFS-PNW, WUWN, PIEC, NW Oregon Managers, Core Team, the Willamette Basin Conservation Project, the WRI Board of Directors, and the Grande Ronde Tribes.

- **Included the most detailed spatial and narrative descriptions of conservation priorities** yet produced in the Willamette Basin.

2.5 Process and Schedule for Revising/Updating the Plan

WRI is working with its Willamette Basin partners and stakeholders to develop a process, schedule, and budget for updating the *Willamette Subbasin Plan*. However, as previously communicated to NPCC and its Oregon Level II Group, which coordinates subbasin planning within the state, WRI will not be able to facilitate or participate in revision and updates of the plan without additional funding.

Nevertheless, as discussed with NPCC as this subbasin was developed, there is a critical need to provide for updates in the near future to incorporate expected results of the following:

- The Willamette Basin Project Biological Opinion
- The State of Oregon Conservation Plan
- State of Oregon native fish conservation policy implementation
- The Oregon Watershed Enhancement Board watershed restoration prioritization
- NOAA Fisheries' Willamette-Lower Columbia salmon recovery plan
- Oregon Department of Fish and Wildlife anadromous fish conservation curves
- The U.S. Army Corps of Engineers' Floodplain Restoration Feasibility Study
- Total maximum daily load (TMDL) implementation plans and schedules by designated management entities