Tualatin River National Wildlife Refuge

Draft Comprehensive Conservation Plan and Environmental Assessment

Prepared by:
Tualatin River National Wildlife Refuge
19255 SW Pacific Highway
Sherwood, Oregon 97140

U.S. Fish and Wildlife Service
Pacific Northwest Planning Team
911 NE 11th Avenue
Portland, Oregon 97232

August 2012

Table of Contents

Chapter 1 Introduction and Background 1-1
1.1 Introduction 1-1
1.2 Importance of the Refuge 1-2
1.3 Proposed Action 1-3
1.4 Purpose of and Need for Action 1-4
1.5 Legal and Policy Guidance 1-5
1.5.1 U.S. Fish and Wildlife Service 1-5
1.5.2 National Wildlife Refuge System 1-5
1.5.3 Other Laws and Mandates 1-7
1.6 Refuge Establishment and Purposes 1-8
1.6.1 Legal Significance of the Refuge Purpose 1-8
1.6.2 Purpose and History of Refuge Establishment 1-8
1.6.3 Land Status and Ownership 1-9
1.7 Relationship to Other Planning Efforts 1-9
1.7.1 Regional Plans 1-9
1.7.2 State Plans 1-11
1.7.3 Additional Plans and Assessments 1-11
1.8 Special Designation Lands 1-11
1.8.1 Important Bird Areas 1-11
1.9 Planning Process and Issue Identification 1-12
1.9.1 Planning Process 1-12
1.9.2 Key Issues Addressed in the Comprehensive Conservation Plan 1-14
1.9.3 Issues Outside the Scope of the Comprehensive Conservation Plan 1-17
1.10 Refuge Vision and Goals 1-18
1.10.1 Expanded Vision Statement: An Image of the Future 1-18
1.10.2 Condensed Vision: Summarizing the Core Values of the Refuge 1-19
1.10.3 Refuge Goals 1-19
Chapter 2 Management Alternatives 2-1
2.1 Alternatives Development 2-1
2.2 Alternatives Considered but Eliminated from Detailed Study 2-1
2.3 Alternative Descriptions 2-3
2.3.1 Features Common to All Alternatives 2-3
2.3.2 Summaries of Alternatives 2-14
2.4 Goals, Objectives, and Strategies 2-22
Goal 1: Maintain, enhance, and restore bottomland riparian habitat consistent with the historical range of variability representative of the Willamette Valley ecosystem to support breeding and migratory landbirds and other native species. 2-23

Goal 2: Maintain, enhance, and restore mixed coniferous/deciduous forest habitat to a historical range of variability representative of the Willamette Valley ecosystem in order to support breeding and migratory landbirds and other native species. 2-25

Goal 3: Maintain, enhance, and restore oak savanna habitat to a historical range of variability representative of the Willamette Valley ecosystem in order to support breeding and migratory landbirds and other native species..... 2-28

Goal 4: Maintain, enhance, and restore native Willamette Valley wet prairie habitat, with an emphasis on management for rare and listed plant species. 2-30

Goal 5: Maintain, enhance, and restore a diversity of wetlands to support migratory landbirds, waterbirds, and shorebirds with special emphasis on wintering waterfowl. 2-32

Goal 6: Maintain, enhance, and, where feasible, restore streams and off-channel backwater slough habitats in order to benefit salmonids and other native aquatic species. 2-36

Goal 7: Cultivate and maintain croplands as an interim measure to control nonnative invasive species. 2-39

Goal 8: Collect scientific information (surveys, scientific assessments, and research) necessary to support adaptive management decisions that are associated with Goals 1-7. 2-43

Goal 9: Protect and manage the refuge's unique cultural resources for their cultural, scientific, and educational values, while consulting with appropriate Native American groups and preservation organizations and complying with historic preservation legislation. 2-46

Goal 10: Provide visitors, local residents, volunteers, and partners with opportunities to understand and appreciate fish and wildlife conservation as well as the purpose, ecology, and management of the refuge and the Refuge System. 2-47

Goal 11: Provide students and educators from the greater Portland area with compatible and high-quality opportunities to participate in environmental education. 2-52

Goal 12: Provide refuge visitors with diverse, compatible, and high-quality opportunities to participate in wildlife-dependent recreation and interpretation. 2-55

Goal 13: Build a broad-based natural resource conservation constituency with a focus on urban audiences to create a conservation ethic within urban communities; increase relevance of habitat conservation, wildlife heritage, and the Refuge System in the eyes of urban citizens; and instill a sense of empowerment for urban communities to work together to actively support conservation, in both local and global settings. 2-61

Chapter 3 Physical Environment 3-1

3.1 Climate 3-1

3.1.1 General Climate 3-1

3.1.2 Climate Change 3-3

3.2 Hydrology 3-9

3.2.1 Regional Hydrology 3-9

3.2.2 Refuge-specific Hydrology 3-12

3.3 Topography and Bathymetry 3-16

3.4 Geology and Geomorphology 3-16

3.4.1 Origins and Development 3-16

3.4.2 Recent Geologic Events 3-17

3.5 Soils 3-18

3.6 Fire 3-18

3.6.1 Historic Activity 3-18

3.6.2 Recent Activity 3-19

3.6.3 Current Conditions ... 3-20
3.7 Environmental Contaminants ... 3-20
3.8 Air Quality ... 3-21
3.9 Water Quality ... 3-23
3.9.1 Overview—Tualatin River and Basin ... 3-23
3.9.2 Refuge-specific Water Quality ... 3-24
3.10 Visual Quality ... 3-24
3.11 Surrounding Land Use ... 3-25
Chapter 4 Biological Environment ... 4-1
4.1 Overview ... 4-1
4.1.1 Historic Land Use and Conditions ... 4-1
4.1.2 Biological Integrity, Diversity, and Environmental Health ... 4-2
4.2 Selection of Priority Resources of Concern ... 4-2
4.2.1 Analysis of Priority Resources of Concern ... 4-2
4.3 Habitat Types ... 4-5
4.3.1 Bottomland Riparian Forest ... 4-5
4.3.2 Mixed Coniferous/Deciduous Forest ... 4-6
4.3.3 Oak Savanna ... 4-8
4.3.4 Wet Prairie ... 4-9
4.3.5 Herbaceous and Scrub-shrub Wetlands ... 4-11
4.3.6 Rivers, Streams, and Backwater Sloughs ... 4-13
4.3.7 Croplands ... 4-15
4.3.8 Ruderal Lands ... 4-16
4.4 Major Species Groups ... 4-17
4.4.1 Waterfowl ... 4-17
4.4.2 Songbirds ... 4-19
4.4.3 Shorebirds ... 4-19
4.4.4 Marsh Birds and Waders ... 4-19
4.4.5 Raptors ... 4-20
4.4.6 Mammals ... 4-20
4.4.7 Fish ... 4-21
4.4.8 Reptiles ... 4-22
4.4.9 Amphibians ... 4-22
4.5 Threatened, Endangered, and Sensitive Species ... 4-23
4.6 Invasive and Nuisance Species ... 4-24
4.7 Wildlife and Habitat Research, Inventory, and Monitoring ... 4-27
Chapter 5 Human Environment ... 5-1
5.1 Cultural Resources ... 5-1
5.1.1 Prehistoric and Ethnographic Resources ... 5-2

5.1.2 Historic Resources 5-4
5.2 Refuge Facilities 5-6
5.2.1 Boundary Fences and Markers 5-6
5.2.2 Entrance and Access Points 5-6
5.2.3 Administrative Facilities 5-8
5.2.4 Roads, Trails, and Parking Areas 5-8
5.2.5 Visitor Facilities 5-9
5.2.6 Easements and Agreements 5-10
5.2.7 Dikes, Irrigation, Water Control Structures, and Pump Houses 5-11
5.3 Public Use Overview 5-12
5.3.1 Public Use Program History 5-12
5.3.2 Open and Closed Areas 5-12
5.3.3 Annual Visitation 5-13
5.3.4 Entrance and User Fees 5-13
5.3.5 Accessibility of Recreation Sites and Programs to Disabled Persons 5-13
5.3.6 Volunteers 5-13
5.4 Wildlife-dependent Public Uses 5-14
5.4.1 Hunting 5-14
5.4.2 Fishing 5-14
5.4.3 Wildlife Observation and Photography 5-15
5.4.4 Environmental Education 5-16
5.4.5 Interpretation/Outreach 5-17
5.5 Nonwildlife-dependent Recreation 5-18
5.6 Illegal Uses and Law Enforcement 5-18
5.7 Area Outdoor Recreational Opportunities and Trends 5-19
5.7.1 Nearby Recreational Opportunities 5-19
5.7.2 Outdoor Recreation Trends and Demographics 5-19
5.8 Socioeconomic Environment 5-22
5.8.1 Population and Area Economy 5-22
Chapter 6 Environmental Consequences 6-1
6.1 Summary of Effects 6-1
6.2 Effects to the Physical Environment 6-7
6.2.1 Effects to Hydrology 6-7
6.2.2 Effects to Water Quality 6-7
6.2.3 Effects to Air Quality 6-8
6.2.4 Effects to Visual Quality 6-9
6.3 Effects to Habitats and Wildlife 6-9
6.3.1 General Effects 6-9
6.3.2 Effects to Bottomland Riparian Forest 6-12

6.3.3 Effects to Mixed Coniferous/Deciduous Forest ... 6-13
6.3.4 Effects to Oak Savanna ... 6-13
6.3.5 Effects to Wet Prairie ... 6-14
6.3.6 Effects to Herbaceous and Scrub-shrub Wetlands ... 6-14
6.3.7 Effects to Streams, Rivers, and Backwater Sloughs ... 6-15
6.3.8 Effects to Croplands ... 6-16
6.3.9 Effects to Ruderal Lands ... 6-17
6.3.10 Effects to Waterfowl ... 6-17
6.3.11 Effects to Songbirds ... 6-18
6.3.12 Effects to Shorebirds ... 6-19
6.3.13 Effects to Marshbirds and Waders ... 6-20
6.3.14 Effects to Raptors ... 6-20
6.3.15 Effects to Mammals ... 6-21
6.3.16 Effects to Native Fish ... 6-21
6.3.17 Effects to Reptiles ... 6-22
6.3.18 Effects to Amphibians ... 6-23
6.3.19 Effects to Federally and State-listed Species ... 6-23
6.4 Effects to Cultural and Historical Resources ... 6-25
6.4.1 Overall Effects to Cultural Resources ... 6-26
6.5 Social Effects ... 6-26
6.5.1 General Effects ... 6-26
6.5.2 Opportunities for Quality Wildlife Observation and Photography ... 6-27
6.5.3 Opportunities for Quality Environmental Education ... 6-28
6.5.4 Opportunities for Quality Interpretation ... 6-29
6.5.5 Opportunities for Quality Hunting ... 6-29
6.5.6 Opportunities for Quality Fishing ... 6-29
6.5.7 Opportunities for Nonwildlife-dependent Recreation ... 6-29
6.5.8 Projected User Numbers in 15 Years ... 6-29
6.5.9 Amount of Illegal Use ... 6-32
6.5.10 Environmental Justice ... 6-32
6.5.11 Overall Social Effects ... 6-32
6.6 Economic Effects ... 6-32
6.6.1 Approach to Estimating Economic Effects ... 6-32
6.6.2 Economic Impacts from Recreational Activities ... 6-34
6.6.3 Alternative 1 (Baseline): Recreational Activities ... 6-35
6.6.4 Alternative 2: Recreational Activities ... 6-37
6.6.5 Alternative 3: Recreational Activities ... 6-39
6.6.6 Summary of Recreational Visitation Impacts ... 6-41
6.6.7 Economic Effects from Refuge Budget ... 6-42

6.6.8 Summary of Economic Impacts by Alternative 6-44
6.7 Other Effects 6-45
6.7.1 Potential Impacts on Adjacent Lands and Associated Natural Resources 6-45
6.7.2 Potential Impacts to Nearby Residents 6-46
6.8 Cumulative Effects 6-46
6.8.1 Effects from Reasonably Foreseeable Future Refuge Activities 6-47
6.8.2 Potential Effects from Climate Change 6-47
6.8.3 Other Reasonably Foreseeable Events and Activities 6-50

Figures

Figure 1-1. Overview of CCP planning process. 1-12
Figure 3-1. Average and peak river levels measured in feet above mean sea level (MSL) at Farmington gauge approximately 8 miles upstream from the westernmost parcel in the Sherwood Units. 3-3
Figure 3-2. Global surface temperature (NASA 2012). 3-4
Figure 3-3. Water year temperature 1925-2010. USHCN Station: Forest Grove, Oregon (352997). 3-6
Figure 3-4. Water year total precipitation 1925-2010. USHCN Station: Forest Grove, Oregon. 3-8
Figure 3-5. Summer (Jun-Aug) total precipitation, 1925-2010. USHCN Station: Forest Grove, Oregon (352997). 3-8
Figure 3-6. Average daily discharge rate (cfs) measured on the Tualatin River at the West Linn gauging station. 3-11
Figure 4-1. Average and maximum number of waterfowl counted on refuge lands during regular weekly surveys from 2004-2011. 4-18
Figure 5-1. Public use facilities and regulations. 5-7

Tables

Table 1-1. Summary of CCP Planning Process for Tualatin River National Wildlife Refuge 1-13
Table 2-1. Summary of Alternatives for Comparison 2-18
Table 3-1. Monthly High, Low, and Average Temperatures; Monthly Rainfall April 2008-March 2009 3-2
Table 3-2. Seasonal Temperature Trends, 1981-2010 (Monthly Records) 3-6
Table 3-3. Approximate Reaches of the Tualatin River As it Flows from the Coast Range Mountains (rivermile 80) to its Confluence with the Willamette River (rivermile 0) 3-10
Table 3-4. Summary of Water Rights for the Refuge 3-13
Table 3-5. Letter Grades* of Selected Air Quality Measures Based on Tons Emission per Square Mile 3-22
Table 4-1. Focal Species and Other Benefitting Species for Each Priority Habitat Type 4-4
Table 4-2. Common and Scientific Names of Target Nonnative Invasive Species on Refuge 4-24
Table 4-3. Regular Surveys Conducted on Refuge Lands and Their Usual Timetables 4-27
Table 5-1. Prehistoric Resources within Refuge Boundaries 5-4
Table 5-2. Historic Resources within Refuge Boundaries 5-5
Table 5-3. Tualatin River National Wildlife Refuge Summary of Area Economy, 2009 5-22
Table 6-1. Summary of Effects to Habitats, Major Wildlife Groups, and Public Use 6-2
Table 6-2. Current and Proposed Habitat Acreages 6-11
Table 6-3. Annual Refuge Visits, Projected in 15 Years, by Activity 6-30
Table 6-4. Alternative 1: Fiscal Year 2010 Visitation at the Refuge 6-35
Table 6-5. Alternative 1: Visitor Recreation Expenditure (2010 dollars in thousands) 6-36
Table 6-6. Alternative 1: Local Economic Effects Associated with Recreation Visits (2010 dollars in thousands) 6-36
Table 6-7. Alternative 2: Annual Refuge Visitation 6-37
Table 6-8. Alternative 2: Visitor Recreation Expenditures (2010 dollars in thousands) 6-38
Table 6-9. Alternative 2: Local Economic Effects Associated with Recreation Visits (2010 dollars in thousands) 6-39
Table 6-10. Alternative 3: Refuge Visitation 6-40
Table 6-11. Alternative 3: Visitor Recreation Expenditures (2010 dollars in thousands) 6-40

Table 6-12. Alternative 3: Local Economic Effects Associated with Recreation Visits (2010 dollars in thousands) 6-41
Table 6-13. Annual Economic Effects Associated with Recreation Visits (2010 dollars in thousands) 6-42
Table 6-14. Change in Average Annual Recreation Visitors and Expenditures Compared to the Baseline (Alternative 1) (2010 dollars in thousands) 6-42
Table 6-15. Refuge Average Annual Expenditures (2010 dollars in thousands)..... 6-43
Table 6-16. Local Annual Economic Effects Associated with Average Annual Refuge Budget (2010 dollars in thousands)..... 6-43
Table 6-17. Change in Annual Expenditures Compared to the Baseline (Alternative 1) (2010 dollars in thousands) 6-43
Table 6-18. Summary of Annual Economic Impacts for Alternative 1 (2010 dollars in thousands)..... 6-44
Table 6-19. Summary of Annual Economic Impacts for Alternative 2 (2010 dollars in thousands)..... 6-44
Table 6-20. Summary of Annual Economic Impacts for Alternative 3 (2010 dollars in thousands)..... 6-45

Appendices

Appendix A. Appropriate Use Findings..... A-1
Appendix B. Compatibility Determinations B-1
Appendix C. Implementation.....C-1
Appendix D. Wilderness Review..... D-1
Appendix E. Biological Resources of Concern E-1
Appendix F. Statement of Compliance F-1
Appendix G. Integrated Pest Management Program..... G-1
Appendix H. Glossary of Terms, Phrases, Abbreviations, and Acronyms H-1
Appendix I. Contributors to the Comprehensive Conservation Plan.....I-1
Appendix J. Acquisition History J-1
Appendix K. Public Involvement..... K-1
Appendix L. Hydrological Modeling L-1
Appendix M. References M-1
Appendix N. List of Refuge Species..... N-1
Appendix O. Wildland Fire Management Plan O-1
Appendix P. Maps P-1