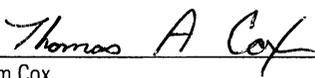


Mark Twain

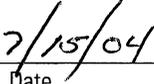
National Wildlife Refuge Complex

Comprehensive Conservation Plan Approval

Submitted by:



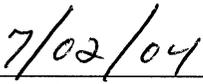
Tom Cox
Refuge Manager, Port Louisa NWR



Date



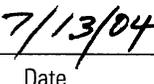
David Ellis
Refuge Manager, Great River NWR



Date



John Mabery
Refuge Manager, Two Rivers NWR



Date



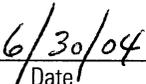
John Magera
Refuge Manager, Middle Mississippi NWR



Date



Richard Steinbach
Mark Twain NWR Complex Manager



Date

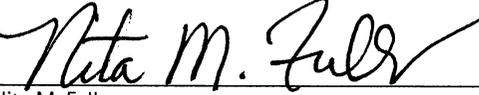
Concur:



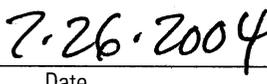
Jon Kauffeld
Refuge Supervisor, Area 2



Date



Nita M. Fuller
Regional Chief, National Wildlife Refuge System

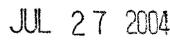


Date

Approve:



Robyn Thorson
Regional Director



Date

Mark Twain

National Wildlife Refuge Complex

Comprehensive Conservation Plan and Environmental Assessment

Chapter 1: Introduction and Background	1
Vision Statement	1
Manager's Note on the CCP	2
Refuge System Mission	3
National Wildlife Refuge System Goals	3
Mark Twain Refuge Complex Goals	4
Area of Ecological Concern	5
Need for Action/Planning Perspectives	6
Organizational Change in Stations within Mark Twain Complex	8
Legal, Policy and Administrative Guidelines	10
Legal Mandates (including FWCA, Refuge Improvement Act)	10
Relationship to Other Plans	12
Migratory Bird Conservation Initiatives	12
Upper Mississippi River/Tallgrass Prairie Ecosystem Team	13
Upper Mississippi River Conservation Committee	13
Army Corps of Engineers St. Louis District Master Plan	14
Army Corps of Engineers – Rock Island District Land Use Allocation Plan	14
Army Corps of Engineers Operational Management Plans (OMP)	15
Other Plans / Studies Relevant to This Document	15
Upper Mississippi River Summit	15
Report of the Interagency Floodplain Management Review Committee to the Administration Floodplain Management Task Force (The "Galloway Report")	16
The Floodplain Management Assessment of the Upper Mississippi and Lower Missouri Rivers and their tributaries (FPMA)	17
Upper Mississippi River System Habitat Needs Assessment – 2000	17
Special Land Use Designations	18
Wilderness Review	18
Other Special Land Designations	18
Cooperative Agreement with COE for General Plan (GP) Lands	18
Other Interagency Coordination	19
Spill Response	19
Channel Maintenance and Dredge Disposal	20
U.S. Department of Agriculture	21

Natural Resources Conservation Service	21
Farm Service Agency (FSA)	22
Chapter 2: Public Involvement and Identification of Refuge Planning Issues	23
Issues	25
Chapter 3: Refuge and Resources Description	26
History and Establishment of Mark Twain NWR	26
Pre-Refuge History	27
Corps of Engineers Activity on the UMR	27
The 1945 Cooperative Agreement	29
The 1954 Cooperative Agreement and General Plan	29
The 1961 General Plans and 1963 Cooperative Agreement	31
Mark Twain Refuge Established	32
General Plan (GP) Lands and the National Wildlife Refuge System	33
Description of Existing Units within Mark Twain NWR Complex	34
Port Louisa NWR	35
Big Timber Division	35
Louisa Division	36
Horseshoe Bend Division	37
Keithsburg Division	38
Great River NWR	39
Fox Island Division	39
Long Island Division	39
Delair Division	40
Clarence Cannon NWR	41
Two Rivers NWR	42
Batchtown Division	42
Calhoun Division	42
Gilbert Lake Division	43
Portage Islands Division	44
Middle Mississippi River NWR	44
Meissner Island Division	44
Harlow Island Division	45
Wilkinson Island Division	45
Service Fee Title Properties Acquired From USDA	45
Area of Ecological Concern Setting	46
Climate	46
Geomorphology of the Upper Mississippi River	47
Lateral Variation of Geomorphology	50
Socioeconomics	52
Current Status of Area of Ecological Concern Resources	54
Fish and Wildlife	54
Birds	54
Endangered Species	67
Habitat	72

Wetland	72
Forest	73
Grassland	74
Soils	75
Water Quality	75
Sedimentation	76
Nutrients	77
Other Contaminants	78
Keithsburg Division	79
Cultural Resources – Archeology and History	80
Chapter 4: Management Direction	82
Refuge Management Considerations	82
Wetland Management	82
Forest Management	85
Cropland Management	87
Prescribed Fire Management	89
Invasive Species Management	90
Plants	91
Exotic Mussels	93
Exotic Fish	94
Other Invasive Species	95
Commercial Fishing	96
Trapping	97
Environmental Management Program (EMP)	97
Navigation Pool Water Level Management	98
Management of Lands Associated with Agriculture Department (USDA)	100
Conservation Easements	100
Private Land Assistance Through the Partners for Fish and Wildlife Program	101
Goals, Objectives and Strategies Discussion	102
Habitat Goals	102
Goal 1 Discussion: Wetlands and Aquatic Habitat	105
Goal 2 Discussion: Forest Habitat	116
Goal 3 Discussion: Other Terrestrial Habitats	125
Goal 4 Discussion: Sedimentation and Water Quality	135
Goal 5 Discussion: Floodplain Management	140
Goal 6 Discussion: Public Use and Education	147
Goal 7 Discussion: Monitoring	164
Chapter 5: Refuge Boundary Expansion	171
Land Acquisition Factors	171
Revenue Sharing	175
Chapter 6: Plan Implementation	176
Funding	176
Personnel Needs	183

Step-down Management Plans	183
Partnerships	183
Appendix A: Refuge Complex Maps	187
Appendix B: Species List	231
Appendix C: List of Abbreviations and Acronyms	261
Appendix D: Glossary	265
Appendix E: Cooperative Agreement	269
Appendix F: Compatibility Determinations	281
Appendix G: Mailing List	285
Appendix H: Environmental Assessment	291
Appendix I: Guiding Laws and Orders	391
Appendix J: Soil Associations	397
Appendix K: Bibliography	403
Appendix L: List of Preparers	415
Appendix M: Land Protection Plan	419
Appendix N: Summary and Disposition of Comments on Draft Comprehensive Conservation Plan	435

List of Tables and Figures

Table 1: Changes in Organizational Structure, Mark Twain NWR Complex	10
Table 2: Average Temperatures, Precipitation, Snowfall and Humidity in a Few AEC Counties, From North to South	47
Table 3: Waterfowl Species for Which the Upper Mississippi River Valley is Critical Migration Corridor	55
Table 4: INHS Aerial Canada Goose Counts, Mark Twain NWR Complex	56
Table 5: INHS Aerial Canada Goose Count, Mark Twain NWR Complex River Reach	56
Table 6: Peak Snow Goose Numbers Using the UMRS	59
Table 7: Prescribed Burn Units, Mark Twain NWR Complex	90
Table 8: Predicted Reliability of Pool Level Management in St. Louis District	99
Table 9: Mark Twain NWR Complex Habitats and Prevalent Wildlife Associations	104
Table 10: Connectivity and Sedimentation, Mark Twain NWR Complex	143
Table 11: Cover Types for CCP Habitat Management Strategies	166
Table 12: Mark Twain NWR Complex Funding Needs Summary as of September 2002	177
Table 13: Port Louisa NWR Funding Needs Summary / RONS Tier 1	177
Table 14: Port Louisa NWR Refuge Funding Needs Summary / RONS Tier 2	178
Table 15: Port Louisa NWR Funding Needs Summary / MMS Deferred Maintenance Projects	178
Table 16: Great River NWR Funding Needs Summary / RONS Tier 1	179
Table 17: Clarence Cannon NWR Funding Needs Survey / Maintenance Management System (MMS) and Deferred Maintenance Projects	179
Table 18: Two Rivers NWR Funding Needs Summary / RONS Tier 1	180
Table 19: Two Rivers NWR Refuge Funding Needs Summary / RONS Tier 2	181
Table 20: Two Rivers NWR Funding Needs Summary, Maintenance Management System and Deferred Maintenance Projects	181
Table 21: Middle Mississippi NWR Funding Needs Summary, Maintenance Management System and Deferred Maintenance Projects	182
Table 22: Mark Twain NWR Complex RONS Projects	182

Figures

Figure 1: Figure 1: Organization of Refuges Within Mark Twain NWR Complex	11
Figure 2: Figure 2: Mark Twain NWR Complex Staffing Chart	184

