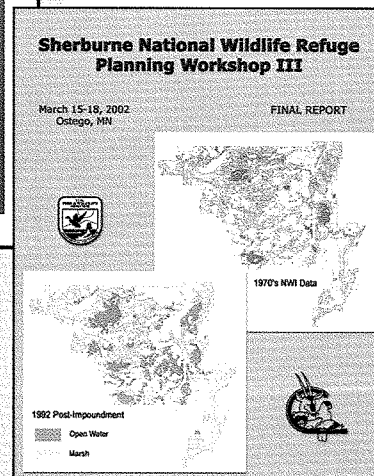
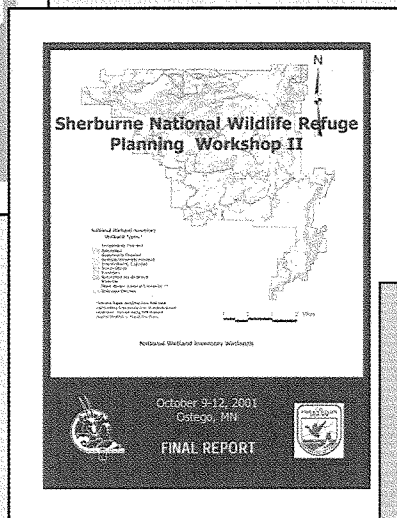
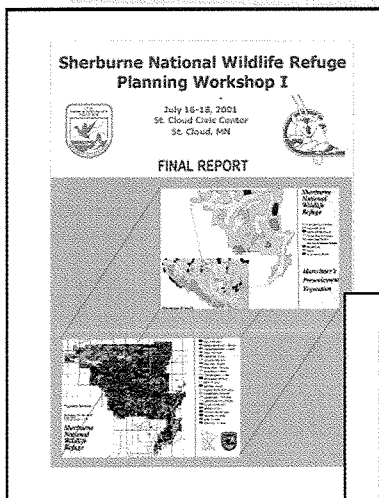


Sherburne National Wildlife Refuge Planning Workshop IV



10-13 September 2002
St. Cloud, MN

FINAL REPORT



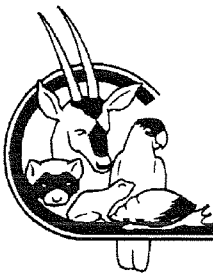
Sherburne National Wildlife Refuge Planning Workshop 4

September 10-13, 2002
St. Cloud, MN

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A Collaborative Workshop:

United States Fish & Wildlife Service
The Conservation Breeding Specialist Group (SSC/IUCN)



The CBSG Conservation Council

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October 2002

Sherburne National Wildlife Refuge Planning Workshop 4

September 10-13, 2002
St. Cloud, MN

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Sherburne National Wildlife Refuge Planning Workshop 4

**September 10-13, 2002
St. Cloud, MN**

FINAL REPORT

Section 1

Executive Summary

EXECUTIVE SUMMARY

A. Introduction and Workshop Process

Introduction to Comprehensive Conservation Planning

The Comprehensive Conservation Plan (CCP) of Sherburne National Wildlife Refuge is a required element of the National Wildlife Refuge Improvement Act of 1997 which states that all refuges will be managed in accordance with an approved CCP that when implemented will achieve the mission of the National Wildlife Refuge System (System) and the refuge purpose.

The National Wildlife Refuge Improvement Act of 1997 determined that the National Wildlife Refuge System was created to conserve fish, wildlife, and plants and their habitats and this conservation mission has been facilitated by providing Americans opportunities to participate in compatible wildlife-dependent recreation. For the purposes of the Act:

- (1) The term ‘compatible use’ means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.
- (2) The terms ‘wildlife-dependent recreation’ and ‘wildlife-dependent recreational use’ mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

The Mission of the System

“The Mission of the System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

Sherburne National Wildlife Refuge and its Purpose

Sherburne National Wildlife Refuge (NWR) encompasses about 30,600 acres in an area of Minnesota known as the Anoka Sandplain. The landscape is interspersed with upland habitats dominated by oak, varying from dense forest, oak savanna, to brush prairie openings. The St. Frances River winds through the Refuge and impoundments have been created to restore dozens (24) of historic wetland basins along the ditch system of the 1920s and ‘30s originally designed to drain them. These and several other undrained wetlands comprise a mosaic of wetland types on the Refuge ranging from sedge meadows to deep-water marshes.

The history of the refuge began in the early 1940s. Local conservationists and sportsmen became interested in restoring the wildlife values of the St. Francis River Basin. Many of these supporters were interested in creating more waterfowl hunting opportunities in the region. The

Workshop Goals

1. Review management Alternatives 2 and 4 for achieving refuge goals.
2. Fully develop management objectives for each alternative.

Workshop Process

The workshop was organized at the request of the Regional Office of the U.S. Fish and Wildlife Service, in collaboration with the Conservation Breeding Specialist Group (CBSG) of the Species Survival Commission of the World Conservation Union (SSC/IUCN). To assure credible, fair, and independent conduct of the workshop and of the workshop results, CBSG was requested to design the workshop process, provide facilitation for the workshop, and to assemble and edit the report. Editing of the draft report was done with the assistance of a subset of the workshop participants. Outside review by non-participants was not part of the process. No content changes were made by the editors and the participants checked that accurate presentations were made of the work they had done during the workshop.

The workshop was conducted September 10-13, 2002 at the St. Cloud Civic Center in St. Cloud, MN. The workshop extended over three and a half days. There were 21 participants, with most present the entire duration of the workshop providing for sustained interactions and the benefits of full attention to the goals and process of the workshop. These participants, from more than 70 issued invitations, included state and federal wildlife agency personnel, NGOs representatives, academics from local universities, Friends of Sherburne representatives and public citizens. Participants and invitees are listed in the report (see Sections 6 and 7). In addition, public notice of the meeting was published in local newspapers and a notice was also included in a Sherburne newsletter sent to over 4,500 citizens who live near the refuge.

The CBSG team designed a planning process to achieve the organizer's stated outcome for the workshop and the participants involved. The intent was that the unresolved issues from the earlier Sherburne workshops would be reviewed, revised if necessary and agreed upon and management alternatives and associated objectives would be developed and finalized. Information and analysis generated and agreed upon in this and the three earlier workshops will become the core material for development of the Sherburne National Wildlife Refuge CCP.

Before getting started with the first task of this workshop, each participant was asked to introduce themselves and to write out and then read aloud answers to four introductory questions. This process allows for expression of individual perspectives without being immediately influenced by previous responses. This process indicates potential areas of common ground and provides a first insight into the diversity of perceived issues present in the group. The process also provides a check on whether the workshop deliberations respond to the concerns and issues that are raised. Answers to these questions can be found in Section 6 of this report.

C. The Objectives

The conceptual objectives that were started in the third workshop were more fully developed over the course of the final workshop into the following table. Unless stated otherwise, all objectives below will be implemented within 15 years of approval of this plan.

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
Goal 1: Uplands consist of a dynamic and diverse mosaic of <i>Anoka Sandplain</i> habitats native to this area, ranging from grasslands to oak savanna to forested areas, supporting Service priority species and others associated with these plant communities.				
1.1 Maintain existing grassland areas within 400 m of an impoundment and scattered throughout the oak savanna with none of these scattered areas being larger than 40 acres. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.	1.1 Initiate conversion of a minimum of XX2000 grassland acres to oak savanna matrix. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix	1.1 Maintain existing grassland areas within 400 m of an impoundment and scattered throughout the oak savanna with none of these scattered areas being larger than 40 acres. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.	1.1 Convert a minimum of 2000 grassland acres to oak savanna. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix	1.1 Within 15 years of CCP approval, provide a minimum of 3 grassland blocks of at least 200 acres each. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.
1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative	1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative	1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative	1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative	1.2 Provide a minimum of 1000 acres of oak savanna using current management, with the exception that grasslands will not be planted to trees. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative cover of diverse native grasses and

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
	1.9 Grazing: Assess the role of grazing in creating oak savannah			
	1.10 Hydrology: Assess the effects of elevated water table			
Goal 2: A diverse mosaic of riverine and wetland habitats meets the needs of Service priority riparian and other wetland dependent species.				
2.1 For the benefit of open water dependent species, provide open water in 1 to 3 pools annually, from mid-April to July, in those years that weather conditions allow. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.	2.1 Maintain current management capability of pool 2 (at a high level?) for the purposes of mitigating upstream drainage (flood control and sediment trap) and to provide a water source for wetland hydrology downgradient.	2.1 For the benefit of open water dependent species, provide open water in 1 to 3 pools annually, from mid-April to July, in those years that weather conditions allow. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.	2.1 Maintain current management capability of Pool 3 and the impoundment system from St. Francis Pool to Bergerson Pool.	2.1 For the benefit of open water dependent species, provide at least 6 pools annually, from mid-April to July, in those years that weather conditions allow. Each pool should have a minimum of 200 acres of open water. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.

<p>Alternative 1 Current Management</p>		<p>2.4 Lowland brush will not be actively managed but will be maintained or created in varying amounts as a result of management actions focused upon other objectives.</p>		<p>2.4 Habitat objectives under this alternative will be similar to those of Alternative 5 (2.1-2.10 inclusive), with acreage figures amended according to the outcome of the hydrologic study. (If specific acreage targets are needed in the CCP at this time, they should be generally smaller and denoted as a liberal range of acres in order to allow for an adaptive feedback loop between experimental trials and implementation.)</p> <p>2.5 Based on the outcome of hydrologic trials (Objectives 2.3 & 2.4), identify and implement management actions necessary to maintain progress toward achieving habitat expectations from Objective 2.4—or modify habitat expectations</p>
<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p>		<p>2.4 Lowland brush will not be actively managed but will be maintained or created in varying amounts as a result of management actions focused upon other objectives.</p>		<p>2.5 For the benefit of marsh nesting birds, cattail marsh will be maintained but will be managed so that it does not exceed 70% of the surface area of any given pool; 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>
<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p>		<p>2.4 Lowland brush will not be actively managed but will be maintained or created in varying amounts as a result of management actions focused upon other objectives.</p>		<p>2.5 For the benefit of marsh nesting birds, cattail marsh will be maintained but will be managed so that it does not exceed 70% of the surface area of any given pool; 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>
<p>Alternative 4 Migratory Waterbirds Emphasis</p>	<p>emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.</p>	<p>2.4 For the benefit of brush associated marsh birds, maintain a minimum of 1250 acres of lowland brush annually.</p> <p>(Insert Murray L.'s fall parameters)</p>		<p>2.5 For the benefit of marsh nesting birds, annually manage 2500-4000 acres of cattail marsh; less than 70% of cattail is desirable on any one basin. 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>
<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p>		<p>2.4 For the benefit of brush associated marsh birds, maintain a minimum of 2500 acres of lowland brush annually. 40-60% of the lowland brush acreage will have a VOR of 20-50 cm, and water depths from vegetation heights of 30-100 cm, and water depths from moist to 100 cm. In addition, 40-60% of the lowland brush acreage will have a VOR of 50-80 cm, brush heights between 70-150 cm, and water depths of moist-20 cm.</p>		<p>2.5 For the benefit of marsh nesting birds, annually manage 2500-4000 acres of cattail marsh; less than 70% of cattail is desirable on any one basin. 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>

<p>Alternative 1 Current Management</p>	<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p>
<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation,

<p>Alternative 1 Current Management</p>	<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p>
<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>the first year, (could also increase nutrients by introducing hay)</p> <ul style="list-style-type: none"> then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, finally, manage a slow drawdown beginning in April and continuing through June 15 of the third year). <p>Maintain wild rice beds of 700 acres in pools mostly to benefit rails, songbirds and waterfowl.</p>	<p>the first year, (could also increase nutrients by introducing hay)</p> <ul style="list-style-type: none"> then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, finally, manage a slow drawdown beginning in April and continuing through June 15 of the third year). <p>Maintain wild rice beds of 1500 acres in pools mostly to benefit rails, songbirds and waterfowl.</p>
<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>

<p>Alternative 1 Current Management</p> <p>3.3 Breeding bird point counts will continue to monitor abundance and distribution. Monitoring will comply with Region 3 monitoring protocol. Monitoring will occur two consecutive years followed by five years without monitoring.</p> <p>Needs to be reworked because it is a strategy</p>	<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p> <p>3.3 Develop a monitoring plan within xx years. Periodically determine the variety and abundance of wildlife species on the refuge. Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc). Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p> <p>3.3 Breeding bird point counts will continue to monitor abundance and distribution. Monitoring will comply with Region 3 monitoring protocol. Monitoring will occur two consecutive years followed by five years without monitoring.</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p> <p>3.3 Develop a monitoring plan within xx years. Periodically determine the variety and abundance of wildlife species on the refuge. Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc). Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p> <p>3.3 Within two years of approval of this plan, initiate a 10-year monitoring plan to assess population levels and breeding productivity of wetland, grassland, and oak savanna birds. The objective is to determine if the habitat is sufficient to sustain a source population of birds, define what constitutes source populations on the Refuge, and establish baseline information regarding breeding productivity. We will use the data we acquire through monitoring wildlife numbers as a “feedback” indicator of the appropriateness of our habitat objectives or our success at meeting habitat objectives (as stated in habitat goals). Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc).</p>
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Goal 4: A complex of natural areas, corridors, and watershed conservation practices in the surrounding landscape complements Refuge habitat and wildlife goals.				
<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>
<p>N/A (County Water Plans will suffice)</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>
<p>N/A (County Water Plans will suffice)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis on hydrology that influences the refuge) (Strategy 2: review and consider existing plans, DNR stewardship work and plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would include hydrology, wildlife, land protection) (Strategy 2: review and consider existing plans, DNR stewardship work and plans, Sand Dunes SF plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would include migratory bird habitat and hydrology) (Strategy 2: review and consider existing plans, DNR stewardship work and plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would be on migratory bird habitat)</p>

<p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a species-appropriate distance and continue to work with partners on a control program. (Strategy: Outreach to landowners with infestations)</p>		<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program. (Strategy: Outreach to landowners with infestations)</p>	<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program. (Strategy: Outreach to landowners with infestations)</p>	<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program. (Strategy: Outreach to landowners with infestations)</p>
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Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
<p>5.3. Maintain at least 50 percent of the refuge open to small game hunting.</p>	<p>considerations: -crowding -reasonable -satisfaction -safety</p> <p>5.3 Provide small game, which meets definition of quality hunt in FWS manual. (and results from Objective 5xx) hunt plan is step down plan and will ID zones and # of days.</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>
<p>5.4. Provide waterfowl hunting opportunities for both open water and river hunting.</p>	<p>5.4 Provide waterfowl hunting opportunities that meet definition of quality in FWS manual and outcome of Objective 5xx (note that old 5.4 Identified xx visits/day – this is a strategy)</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>	<p>5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).</p> <p>5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)</p>

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
5.9 N/A	5.9 N/A	5.9 N/A	5.9 N/A	5.9 Consider spring turkey hunt within 2 years of CCP completion.
5.10 Provide fishing opportunities on the St. Francis River at a minimum of 4 access points.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.
5.11 Construct a fishing pier on at least one location that can be used by anglers with disabilities	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10
	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
<p>5.15 Wildlife photography opportunities are allowed throughout the Refuge during the non-sanctuary period and year round on wildlife drive and trails.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers. NTE 15,000 visits without re-evaluation.</p>	<p>development of new trails in CCP (example of NW)</p> <p>**Construct 2 miles of trail in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>**Construct 2 miles of trail in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16 (A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16 (A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>

<p>Alternative 1 Current Management</p> <p>5.17 (C) Annually provide at least 10 programs, events, festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission.</p>	<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p> <p>5.17 (C) Annually provide at least 10 programs, events, festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on ecological processes and pre-settlement conditions.</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p> <p>festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be on off Refuge land conservation and the role of the Refuge in a larger landscape.</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p> <p>festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on ecological processes, pre-settlement conditions, and wetlands.</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p> <p>festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on wetlands and grassland birds.</p>
<p>5.18 (A) NA</p>	<p>5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of ecological processes and pre-settlement conditions.</p> <p>5.18 (B) Annually, 70 % of students participating in Refuge sponsored environmental education understand and appreciate the management theme of ecological processes and pre-settlement conditions.</p>	<p>5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of off Refuge land conservation and the role of the Refuge in a larger landscape. the refuge.</p> <p>5.18 (B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of off Refuge land conservation and the role of the Refuge in a larger landscape.</p>	<p>5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of ecological processes, pre-settlement conditions, and wetlands.</p> <p>5.18(B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of ecological processes, pre-settlement conditions, and wetlands.</p>	<p>5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of wetlands and grassland birds.</p> <p>5.18 (B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of wetlands and grassland birds.</p>

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
6.2 Provide technical assistance to all inquiring private landowners in the Sherburne management district within annual budget constraints.	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and other impacts to the presentment hydrograph)	6.2 Same as 5 with more landowner contacts. (Strategy: include exotic species in message).	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and grassland bird declines)	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and grassland bird declines)
Goal 7: The cultural resources and cultural history of the Refuge are valued and preserved, and connect Refuge staff, visitors, and the community to the area's past.				
7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)

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Section 2

Accomplishments of Sherburne Workshop Series

Accomplishments of the Sherburne Wildlife Refuge Planning Workshop Series

Over the course of Workshops 1-4, a consensus was reached by the multi-stakeholder group on the following items. These items will serve as the core material for development of the Sherburne National Wildlife Refuge CCP.

Refuge Purpose, Legislation, and Policy: Their Relationship to Management Direction

The purpose of a refuge is derived from the legislation under which the lands are acquired. Some refuges are established by legislation passed by Congress specifically for the refuge being established. However, most refuges are established under more general legislation already in existence. Sherburne National Wildlife Refuge was established in 1965 under the authority of the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d). That Act states that lands may be acquired "... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds."

The intention of the Migratory Bird Conservation Commission in establishing the Refuge was primarily to provide habitat for migratory waterfowl (as per a USFWS new release dated May 18, 1965).

Considering the wording of the establishing legislation, along with recent policy and legislation, the Refuge purpose is interpreted to include all migratory birds as identified in the Code of Federal Regulations (50 CFR 10.13).

The Refuge purpose describes the authorized use of the Refuge as "... an inviolate sanctuary, or for any other management purpose, for migratory birds." The term "inviolate sanctuary", as interpreted by the Service, means that the Refuge will be managed to promote the health and well-being of migratory birds and their habitats. Other activities may also be accommodated, provided they are compatible with the Refuge purpose (as per Service Compatibility Policy, Federal Register 65 (202): 62484-62496).

The above interpretation of the migratory bird purpose of the refuge was the first consideration in determining management actions in this Plan. However, development of this Plan also considered the full diversity of native species that make up and depend upon healthy ecosystems. This is in accordance with the National Wildlife Refuge System Improvement Act of 1997 and the Service Policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System; Notice (Federal Register 66 (10): 3810-3823).

Management Alternatives

Alternative 1: Current Management

Current management is focused on upland habitats to approximate 1850s conditions based on the Refuge Landscape Plan as a guiding document. Wetlands are actively managed to benefit migratory birds. The Landscape Plan also allows for a re-evaluation of the impoundments as the structures deteriorate. Interpretive and environmental education programs on and off refuge contrast natural and managed systems and pre-settlement and settlement cultural history. Opportunities for hunting, fishing, wildlife observation, and wildlife photography are provided at levels consistent with existing plans and guidance. Off-refuge restoration programs are focused on the objectives of the Partners for Wildlife Program.

Alternative 2: Pre-settlement (1800-1850) Ecological Processes

Refuge management will focus on approximating the ecological processes that promoted the native Anoka Sandplain communities present prior to European settlement, emphasizing hydrological and fire regimes. Vegetative communities and wildlife diversity would then be expected to resemble pre-settlement conditions. Hunting, fishing, wildlife viewing, and wildlife photography would continue consistent with compatibility requirements. Interpretive and environmental education programs would emphasize the role of ecological processes in creating natural pre-settlement habitats and cultural history. Off-refuge outreach, private lands, and partnership activity will emphasize natural processes, corridors, and restoration. Cultural resources of the refuge would be preserved. Recognizing present-day constraints, this alternative will require active management of ecological processes and will be a long-term effort, requiring careful attention to the adaptive management feedback loop between experimental trials and implementation of management strategies.

Alternative 3: Enhanced off-refuge coordination with current on-refuge management direction

This alternative recognizes that the refuge is part of a larger and rapidly changing landscape. The current management direction will be maintained on the refuge but new programs and staff will be focused on off-Refuge land conservation efforts. We would emphasize pursuit of a strong land conservation ethic through relationship-building with the local community, partners groups, and local governments. Outreach will be strategic: focusing on habitat restoration and protection with an emphasis on native vegetation. Restoration of native vegetation and wetlands on the refuge will be used as demonstration areas. Opportunities for hunting, fishing, wildlife observation, and wildlife photography will receive balanced emphasis to increase opportunities for all visitors to have personal experience with wildlife and native habitats. Interpretive and environmental education programs on and off the refuge will contrast managed landscapes with natural systems and pre-settlement with settlement cultural history. Cultural resources of the Refuge and the watershed will be valued, interpreted and preserved.

Alternative 4: "Migratory Waterbirds"

Refuge management will emphasize maintenance of a portion of the current water impoundment system for waterbird use during migration. Vegetative communities and hydrology on the remainder of the Refuge would approximate conditions typical of the Anoka Sandplain in the mid-1800s. Wildlife diversity will reflect the relative extent to which specific management actions (e.g., impoundments) are implemented. Choices of which lands are managed and how they are managed will impact that diversity. Interpretive and environmental education programs on and off-refuge would contrast natural and managed systems and pre-settlement and settlement cultural history. Hunting, fishing, wildlife viewing and wildlife photography would continue consistent with compatibility requirements. There would be strong

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Section 3

Management Alternatives

Management Alternatives

Within the context of comprehensive conservation planning, the Service defines alternatives as: “Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission, and resolving issues.” Participants reviewed alternatives 2 and 4, which were drafted during the Sherburne workshop 2 in October 2001 and revised during the Sherburne workshop 3 in March 2002. At the final workshop, each of two working groups was tasked with reviewing alternatives 2 and 4. For each aspect of the alternative, participants considered what is needed to achieve the long-term Refuge Vision and then scaled back to the 15-year scope of the CCP. They were also asked to be sure that each alternative is consistent across all goals. The reports from each group were presented in plenary and the alternatives edited accordingly.

Original Alternatives 2 and 4

Alternative 2: Pre-settlement Habitat Conditions (1800-1850)

Vegetative communities and hydrology on the refuge would approximate native Anoka Sandplain habitats. Wildlife diversity would mirror the diversity of the habitats. Hunting, fishing, wildlife viewing, and wildlife photography would continue under current management direction with consideration for some mid-1800 experiences. Interpretive and environmental education programs on and off refuge would emphasize natural pre-settlement conditions and cultural history and natural processes. There would be strong emphasis on off-refuge outreach, private lands, and partnership activity with emphasis on natural processes, corridors, and restoration. Cultural resources of the refuge would be preserved. There is recognition that this alternative’s habitat component will require a long-term restoration effort.

Alternative 4: Partial Presettlement Habitat Conditions with Managed Impoundments

Vegetative communities and hydrology on a portion of the refuge would approximate those communities typical of the Anoka Sandplain in the mid-1800s. Other areas will be maintained as impoundments with an emphasis on waterbird use during migration. Wildlife diversity will reflect the relative extent to which specific management actions (e.g., impoundments) are implemented. Choices of what lands are managed and how they are managed will impact that diversity. Interpretive and environmental education programs on and off-refuge would contrast natural and managed systems and pre-settlement and settlement cultural history. Visitor recreational activities are consistent with maintenance of sustainable populations of wildlife. There would be strong emphasis on off-refuge outreach, private lands, and partnership activity with emphasis on natural processes, corridors, and restoration. Cultural resources of the refuge would be preserved.

GROUP 2

Alternative 2 Suggested Revisions

Add qualifiers- recognized limitations this approach will involve long term management particularly hydrologic constraints also includes fire, invasive species:

“ present day constraints (eg. Hydrological fire, invasive sp. Climate change)”

Reformat title, “ecological integrity emphasis” “restoration of historic processes”

Rename: “**Restoration of Historic Ecological Processes**”

Change, ie., remove “with consideration for some mid-1800 experiences.” Remove this: “Hunting, fishing, wildlife viewing, and wildlife photography would continue under current management.”

Why is it important to return process?

What are the good things about moving back?

- Not fighting the land
- This alternative would promote historic hydrology and native Anoka Sandplain vegetation.
- Value in maintaining or restoring any habitat that is in short supply. This is a declining ecosystem a declining habitat
- It is the most efficient way to manage it because for example, fire is a natural process and applying to manage habitat than to grow trees and keep fire out.
- The refuge provides a remnant Anoka sandplain community in its current state. There is the opportunity to improve this remnant.
- The best source of ground water, for home and irrigation.
- Building and capitalizing on the land’s capability. Functioning ecosystems provide services to human being.
- Suite of species tied to Anoka sandplain community
- We don’t know enough to let a habitat disappear.
- There is value, because of the loss of intact ecological process almost everywhere, it has both aesthetic and scientific value to maintain intact these process, if only in an archival, or token way.

Geology: there are three ground water basins around the twin cities. One is totally gone, Anoka sandplain is the last one remaining.

This alternative would promote historic process, and hydrologic conditions, and native Anoka sandplain habitat for their scientific and aesthetic values. This is important in light of loss of Anoka Sandplain habitats.

What are the bad things

- Interpretive nightmare
- Don’t want to be the one who has to interpret it.

Alternative 4: “Migratory Waterbirds” (re-work title)

Refuge management will emphasize maintenance of a portion of the current water impoundment system for waterbird use during migration. Vegetative communities and hydrology on the remainder of the Refuge would approximate conditions typical of the Anoka Sandplain in the mid-1800's. Wildlife diversity will reflect the relative extent to which specific management actions (e.g., impoundments) are implemented. Choices of which lands are managed and how they are managed will impact that diversity. Interpretive and environmental education programs on and off-refuge would contrast natural and managed systems and pre-settlement and settlement cultural history. Hunting, fishing, wildlife viewing and wildlife photography would continue consistent with compatibility requirements. There would be strong emphasis on off-refuge outreach, private lands, and partnership activity with emphasis on natural processes, corridors, and restoration. Cultural resources of the refuge would be preserved.

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Section 4

Objectives

Objectives

According to 602 FW 1.6 and the Goals and Objectives Handbook, an objective is “a concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies”. Participants were asked to review and more fully develop the Objectives drafted for the Alternatives at the last workshop. The working groups were specifically tasked to apply the SMART criteria to each objective making them attainable, time-specific, and measurable.

The process began with participants dividing into two groups spreading the stakeholders between the groups to maintain equal representation of all viewpoints in each group. The last day, once all the objectives were developed, the participants re-split into 5 small groups and each was assigned a particular goal, according to their expertise, to review the objectives and apply the SMART criteria.

Working Group Reports

GROUP 1

Comments from Group 2 in plenary:

Group 1: Alternative 2 & 4, Goal 2: Riverine and Wetland Habitats

Alternative 2:

Think about maintaining Pool 2 at above historic levels (from Wetlands Workshop).

1. Will mitigate drainage upstream by maintaining at a high level (flood control).
2. Use Pool 2 as an experiment for future wetland manipulations downstream.

Can you do both functions? (Maintaining high water without excessive sedimentation).

Objective 2.4. Jim M. How do we know when we've accomplished the objective? Should mention the pre-settlement habitat as the end product.

Alternative 4:

Objective 2.1. Re-visit, bring back in

Objective 2.4. Eliminate the section on vegetation height, water depths (insert migratory habitat parameters if they exist).

Objective 2.8. Re-visit per Jan Eldridge.

On the east side is the river.

If you leave the 1.5 in, then the river is the east boundary.

How many times does it cross the river and houses are up the river

Come back to 1.5

Lloyd 1.5, Alt. 2, each of us as a different definition of constraints, we may have difficulties, goals, objective, strategy.

There is good chance in 15 years a lot will change on where we spend our money. Fuel reduction burns and could be that will be freed, something like that could change. Keep flexibility. Leave it floating, where it lands is where you let it be.

Group?

As long as there is freedom of staff, to decide where you are going to burn, you can go with oak savanna matrix value.

If you take it out, it probably won't have impact on the plan. You are going to actively convert 4000 acres and other areas will be protected. If you lump dry oak acres into 1.7, then you will not be restricted for the next 15 years, it probably is not going to be an issue.

Is it a big enough issue to public and neighbors that you have to market your plan.

It might be a mistake, to say you will manage dry oak forest, it removes options, it may be fuel reduction burns will be necessary and wanted.

What about 1.5 eliminated.

In this alternative we should be letting the land do what it does.

You could still have dry forest in Alt. 1.

We can get rid of 1.5.

Is there a feeling that an effort needs to be made to refocus the objectives for Alt. 2 so they are more process oriented?

We should table that until we present our results.

This is a new way of thinking about objectives.

Alternative 4

Remove Alt. 1.5

Goal 3 Wildlife

Alternative 2

Do we need this goal?

Wildlife goal ends up being the control goal.

Beaver control is a strategy under wetlands. My point the target really should be a strategy. The goals should be to address RCP, but these are now listed under Alternatives.

Tom Will: Believes this Goal is very important. Feels strongly about this. For a refuge whose stated purpose is to provide a refuge for migratory birds, seems to be inconsistent to the purpose. We need a goal. There are certain objectives that can be written specific to wildlife, particularly when you have an alternative like 2, it doesn't really necessarily address wildlife. Goal 3 is a check on the "let it happen" Are we providing for a certain percentage of the RCP species that are a part of this and can be addressed under this goal.

New 2.5 Based on the outcome of hydrologic trials (objective 2.3 & 2.4) identify and implement management actions necessary to maintain progress toward achieving habitat expectations from objective 2.4. OR Modify habitat expectations previously identified in 2.4.

Additional Thought:

Add a new sentence to the end of Alternative 2 Description: Recognizing present-day constraints, this alternative will require active management of ecological processes and will be a long-term effort requiring careful attention to the Adaptive Management feedback loop between experiment trials and implementation of management strategies.

GROUP 1

Notes for Goal 4:

4.2 -

Strategies display what would be emphasized. (e.g. hydrology in alt 2)

4.4 -

Alt 2, why is emphasis put on grassland rather than oak savanna?

Replace with appropriate natural communities?

Revisit this especially under alt. 2 and alt. 4

Consider planning efforts by other agencies?

Don't contradict other agencies.

Work within context of regional planning efforts (DNR, County) maybe add this to original goal wording

Other efforts are acknowledged in the CCP text

4.6 -

Developers are going to do what's least expensive, work with zoning commission.

Watershed Management Plan would positively affect developers

Start annually when?

Refuge wouldn't wait on a watershed management plan

4.7 -

Landowners where?

Strategy that might come out of the watershed management plan.

"targeted at areas identified in the watershed plan"

- Add invasive species outside of the refuge, at least a strategy but possibly a goal.

- FWS can be more efficient working with others

- make more of an effort to work with Sand Dune state forest as partner particularly in alternative 3 and alternative 5

Biological Objectives

The conceptual objectives that were started in the third workshop were more fully developed over the course of the final workshop into the following table. Unless stated otherwise, all objectives below will be implemented within 15 years of approval of this plan.

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
<p>Goal 1: Uplands consist of a dynamic and diverse mosaic of Anoka Sandplain habitats native to this area, ranging from grasslands to oak savanna to forested areas, supporting Service priority species and others associated with these plant communities.</p>				
<p>1.1 Maintain existing grassland areas within 400 m of an impoundment and scattered throughout the oak savanna with none of these scattered areas being larger than 40 acres. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.</p>	<p>1.1 Initiate conversion of a minimum of XX2000 grassland acres to oak savanna matrix. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix</p>	<p>1.1 Maintain existing grassland areas within 400 m of an impoundment and scattered throughout the oak savanna with none of these scattered areas being larger than 40 acres. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.</p>	<p>1.1 Convert a minimum of 2000 grassland acres to oak savanna. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix</p>	<p>1.1 Within 15 years of CCP approval, provide a minimum of 3 grassland blocks of at least 200 acres each. Grasslands are characterized by <10% canopy closure, <5% shrub cover, and a diverse native grass and forb species mix.</p>
<p>1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative</p>	<p>1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative</p>	<p>1.2 Provide a minimum of 1000 acres of oak savanna using current management. Grasslands greater than 40 acres may be planted to trees, leaving at least a 40 acre grassland opening. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative</p>	<p>1.2 Provide a minimum of 1000 acres of oak savanna using current management, with the exception that grasslands will not be planted to trees. Oak savannas are characterized by 10-50% canopy closure, 5-35% relative cover of shrubs, and at least 25% relative cover of diverse native grasses and</p>	

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
	1.9 Grazing: Assess the role of grazing in creating oak savannah 1.10 Hydrology: Assess the effects of elevated water table			
Goal 2: A diverse mosaic of riverine and wetland habitats meets the needs of Service priority riparian and other wetland dependent species.				
2.1 For the benefit of open water dependent species, provide open water in 1 to 3 pools annually, from mid-April to July, in those years that weather conditions allow. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.	2.1 Maintain current management capability of pool 2 (at a high level?) for the purposes of mitigating upstream drainage (flood control and sediment trap) and to provide a water source for wetland hydrology downgradient.	2.1 For the benefit of open water dependent species, provide open water in 1 to 3 pools annually, from mid-April to July, in those years that weather conditions allow. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.	2.1 Maintain current management capability of Pool 3 and the impoundment system from St. Francis Pool to Bergerson Pool.	2.1 For the benefit of open water dependent species, provide at least 6 pools annually, from mid-April to July, in those years that weather conditions allow. Each pool should have a minimum of 200 acres of open water. Open water is defined as < 20 cm VOR flooded to depths ranging from 50-200 cm, and must include at least 50% submersed aquatic vegetation. An edge of emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.

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<p>2.4 Lowland brush will not be actively managed but will be maintained or created in varying amounts as a result of management actions focused upon other objectives.</p>	<p>2.4 Habitat objectives under this alternative will be similar to those of Alternative 5 (2.1-2.10 inclusive), with acreage figures amended according to the outcome of the hydrologic study. (If specific acreage targets are needed in the CCP at this time, they should be generally smaller and denoted as a liberal range of acres in order to allow for an adaptive feedback loop between experimental trials and implementation.)</p>	<p>2.4 Lowland brush will not be actively managed but will be maintained or created in varying amounts as a result of management actions focused upon other objectives.</p>	<p>emergent native vegetation on at least 50% of the perimeter is desirable to provide food and cover for a variety of species.</p> <p>2.4 For the benefit of brush associated marsh birds, maintain a minimum of 1250 acres of lowland brush annually.</p> <p>(Insert Murray L.'s fall parameters)</p>	<p>2.4 For the benefit of brush associated marsh birds, maintain a minimum of 2500 acres of lowland brush annually. 40-60% of the lowland brush acreage will have a VOR of 20-50 cm, and water depths from 30-100 cm, and water depths from moist to 100 cm. In addition, 40-60% of the lowland brush acreage will have a VOR of 50-80 cm, brush heights between 70-150 cm, and water depths of moist-20 cm.</p>
<p>2.5 For the benefit of marsh nesting birds, cattail marsh will be maintained but will be managed so that it does not exceed 70% of the surface area of any given pool; 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>	<p>2.5 Based on the outcome of hydrologic trials (Objectives 2.3 & 2.4), identify and implement management actions necessary to maintain progress toward achieving habitat expectations from Objective 2.4—or modify habitat expectations</p>	<p>2.5 For the benefit of marsh nesting birds, cattail marsh will be maintained but will be managed so that it does not exceed 70% of the surface area of any given pool; 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>	<p>2.5 For the benefit of marsh nesting birds, annually manage 2500-4000 acres of cattail marsh; less than 70% of cattail is desirable on any one basin. 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>	<p>2.5 For the benefit of marsh nesting birds, annually manage 2500-4000 acres of cattail marsh; less than 70% of cattail is desirable on any one basin. 20-40% of the cattail acreage will have a VOR of 50-80 cm.</p>

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<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, 	<p>2.8 For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20% cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30. During the drawdown, the substrate should contain Chironomidae densities of more than 200 larvae per square meter.</p> <p>To make invertebrates available to shorebirds in the fall:</p> <ul style="list-style-type: none"> • manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year, (could also increase nutrients by introducing hay) • then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation,

<p>Alternative 1 Current Management</p>	<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p>
<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>the first year, (could also increase nutrients by introducing hay)</p> <ul style="list-style-type: none"> then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, finally, manage a slow drawdown beginning in April and continuing through June 15 of the third year). <p>Maintain wild rice beds of 700 acres in pools mostly to benefit rails, songbirds and waterfowl.</p> <p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>	<p>the first year, (could also increase nutrients by introducing hay)</p> <ul style="list-style-type: none"> then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation, finally, manage a slow drawdown beginning in April and continuing through June 15 of the third year). <p>Maintain wild rice beds of 1500 acres in pools mostly to benefit rails, songbirds and waterfowl.</p> <p>2.10 For the benefit of fall migrant waterfowl, during mid-July to mid-September, provide 50-150 acres of sparsely (<20% cover) distributed short (<20 cm) native vegetation flooded to depths ranging from moist to 12 cm</p>

<p>Alternative 1 Current Management</p>	<p>3.3 Breeding bird point counts will continue to monitor abundance and distribution. Monitoring will comply with Region 3 monitoring protocol. Monitoring will occur two consecutive years followed by five years without monitoring.</p> <p>Needs to be reworked because it is a strategy</p>	<p>3.3 Develop a monitoring plan within xx years. Periodically determine the variety and abundance of wildlife species on the refuge. Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc). Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.</p>	<p>Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction</p>	<p>Alternative 4 Migratory Waterbirds Emphasis</p>	<p>Alternative 5 Focused Management for Priority Wetland and Grassland Birds</p>
<p>Alternative 2 Pre-settlement (1800-1850) Ecological Processes</p>	<p>3.3 Breeding bird point counts will continue to monitor abundance and distribution. Monitoring will comply with Region 3 monitoring protocol. Monitoring will occur two consecutive years followed by five years without monitoring.</p> <p>Needs to be reworked because it is a strategy</p>	<p>3.3 Develop a monitoring plan within xx years. Periodically determine the variety and abundance of wildlife species on the refuge. Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc). Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.</p>	<p>3.3 Breeding bird point counts will continue to monitor abundance and distribution. Monitoring will comply with Region 3 monitoring protocol. Monitoring will occur two consecutive years followed by five years without monitoring.</p>	<p>3.3 Develop a monitoring plan within xx years. Periodically determine the variety and abundance of wildlife species on the refuge. Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc). Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.</p>	<p>3.3 Within two years of approval of this plan, initiate a 10-year monitoring plan to assess population levels and breeding productivity of wetland, grassland, and oak savanna birds. The objective is to determine if the habitat is sufficient to sustain a source population of birds, define what constitutes source populations on the Refuge, and establish baseline information regarding breeding productivity. We will use the data we acquire through monitoring wildlife numbers as a “feedback” indicator of the appropriateness of our habitat objectives or our success at meeting habitat objectives (as stated in habitat goals). Management changes will revolve around established “thresholds” based on long-term averages from a variety of sources (regional, refuge based, literature, BBS, etc).</p>

Goal 4: A complex of natural areas, corridors, and watershed conservation practices in the surrounding landscape complements Refuge habitat and wildlife goals.

<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas and obtain fundamental hydrologic data for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge. Also identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas and obtain fundamental hydrologic data for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge. Also identify potential corridors to facilitate wildlife movement between these areas.</p>	<p>4.1 Within 2 years of plan approval, map natural and managed areas within a 15 mile buffer of the refuge boundary and identify potential corridors to facilitate wildlife movement between these areas.</p>
<p>N/A (County Water Plans will suffice)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis on hydrology that influences the refuge) (Strategy 2: review and consider existing plans, DNR stewardship work and plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would include hydrology, wildlife, land protection) (Strategy 2: review and consider existing plans, DNR stewardship work and plans, Sand Dunes SF plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would include migratory bird habitat and hydrology) (Strategy 2: review and consider existing plans, DNR stewardship work and plans)</p>	<p>4.2 Within 5 years of CCP approval, facilitate to completion, a Watershed Mgmt. Plan for the entire St. Francis watershed, the Snake River watershed (between the refuge and Elk River), and sub-watersheds adjacent to the refuge in partnership with local governments and landowners. (Strategy: FWS staff emphasis would be on migratory bird habitat)</p>

<p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a species-appropriate distance and continue to work with partners on a control program.</p> <p>(Strategy: Outreach to landowners with infestations)</p>	<p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program.</p> <p>(Strategy: Outreach to landowners with infestations)</p>	<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program.</p> <p>(Strategy: Outreach to landowners with infestations)</p>	<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program.</p> <p>(Strategy: Outreach to landowners with infestations)</p>	<p>(Strategy: Work w/ local planning & zoning boards)</p> <p>4.7 To protect refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners on a control program.</p> <p>(Strategy: Outreach to landowners with infestations)</p>
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	satisfaction considerations: -crowding -reasonable -satisfaction -safety			
5.3. Maintain at least 50 percent of the refuge open to small game hunting.	5.3 Provide small game, which meets definition of quality hunt in FWS manual. (and results from Objective 5xx) hunt plan is step down plan and will ID zones and # of days.	5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).	5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).	5.3 Provide small game hunting opportunities on XX acres in designated areas in Figure X. (Areas need to be designated because of conflicts with migratory birds. Small game to be defined by state regulations).
5.4. Provide waterfowl hunting opportunities for both open water and river hunting.	5.4 Provide waterfowl hunting opportunities that meet definition of quality in FWS manual and outcome of Objective 5xx (note that old 5.4 Identified xx visits/day – this is a strategy)	5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)	5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)	5.4. Provide for no more than XX visits/day to ensure quality waterfowl hunting. (Note that we are providing opportunity to meet RIA-Big 6 & youth hunting. Support youth waterfowling day. (note that old 5.4 Identified xx visits/day – this is a strategy)

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5.9 N/A	5.9 N/A	5.9 N/A	5.9 N/A	5.9 Consider spring turkey hunt within 2 years of CCP completion.
5.10 Provide fishing opportunities on the St. Francis River at a minimum of 4 access points.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.	5.10 Provide fishing opportunities that meet definition of quality in FWS manual and outcome of objective 5.xx on St Francis River at a min. of 4 access points. Assessed every 5 years.
5.11 Construct a fishing pier on at least one location that can be used by anglers with disabilities	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10	5.11 Delete here because fishing pier is strategy under 5.10
	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)	5.12 80% of visitors understand Refuge mission, purpose, and management actions as assessed via using a survey of visitors once every 5 years (survey instrument may be in objective and strategy. Survey is measurement tool, not strategy to achieve it. Strategies would be opportunities that provide understanding)

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<p>5.15 Wildlife photography opportunities are allowed throughout the Refuge during the non-sanctuary period and year round on wildlife drive and trails.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers. NTE 15,000 visits without re-evaluation.</p>	<p>development of new trails in CCP (example of NW)</p> <p>**Construct 2 miles of trail in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16(A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>**Construct 2 miles of trail in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16 (A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>	<p>in association with a new environmental center.</p> <p>* Need to address development of new trails in CCP (example of NW)</p> <p>5.15 Provide wildlife (includes landscape, natural things) photography opportunities that meet quality as defined by outcome of objective 5.14. Strategies to consider: Tour route, special blinds, stationary or mobile, special season, design areas, permits.</p> <p>5.16 (A) Allow at least 50 percent of refuge lands open for winter wildlife-oriented recreation.</p> <p>5.16 (B) Provide a total of 6 to 8 platforms, observation blinds and/or towers to facilitate quality wildlife viewing, photography,</p>

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5.17 (C) Annually provide at least 10 programs, events, festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission.	5.17 (C) Annually provide at least 10 programs, events, festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on ecological processes and pre-settlement conditions.	festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be on off Refuge land conservation and the role of the Refuge in a larger landscape.	festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on ecological processes, pre-settlement conditions, and wetlands.	festivals and/or tours annually to enhance visitor understanding of the refuge and it's mission. Emphasis will be placed on wetlands and grassland birds.
5.18 (A) NA	5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of ecological processes and pre-settlement conditions.	5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of off Refuge land conservation and the role of the Refuge in a larger landscape. the refuge.	5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of ecological processes, pre-settlement conditions, and wetlands.	5.18 (A) As evaluated once every 5 years, 70% of visitors will understand and appreciate the interpretive theme of wetlands and grassland birds.
	5.18 (B) Annually, 70 % of students participating in Refuge sponsored environmental education understand and appreciate the management theme of ecological processes and pre-settlement conditions.	5.18 (B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of off Refuge land conservation and the role of the Refuge in a larger landscape.	5.18(B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of ecological processes, pre-settlement conditions, and wetlands.	5.18 (B) Annually, 70% of students participating in Refuge sponsored environmental education understand and appreciate the management theme of wetlands and grassland birds.

Alternative 1 Current Management	Alternative 2 Pre-settlement (1800-1850) Ecological Processes	Alternative 3 Enhanced off-refuge coordination with current on-refuge management direction	Alternative 4 Migratory Waterbirds Emphasis	Alternative 5 Focused Management for Priority Wetland and Grassland Birds
6.2 Provide technical assistance to all inquiring private landowners in the Sherburne management district within annual budget constraints.	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and other impacts to the presentment hydrograph)	6.2 Same as 5 with more landowner contacts. (Strategy: include exotic species in message).	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and grassland bird declines)	6.2 Annually, make XX contacts with private landowners in the St. Francis River Watershed to provide technical restoration assistance. (Message would focus on wetland loss and grassland bird declines)
Goal 7: The cultural resources and cultural history of the Refuge are valued and preserved, and connect Refuge staff, visitors, and the community to the area's past.				
7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)	7.1 By XXXX, complete a cultural resources management plan, which incorporates all existing surveys and investigations and identifies future needs. 7.2 Cultural Resource Protection (use language already provided by Regional Historian for other CCP's)

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Section 5

Plenary Session Notes

Plenary Session Notes

Tuesday, 10 September 2002

Discussions of Alternatives

Charlie: need to develop a full range of alternatives. One way to find out if you have good alternatives is to try to develop objectives and see if they are different across alternatives. We left the last workshop unclear about Alternatives 2 and 4.

Alternative 2 is a process alternative; Alternative 4 is a species-based alternative.

After discussion, we determined that there is enough difference across all the alternatives to keep all 5.

Can we merge alternatives 2 and 4?

To give a decision-maker something to go on to decide between 2 and 4, need to explain distinct differences in acreages. We could merge 2 and 4, and then consider process when managing for Alternative 4.

Can you even get back to pre-settlement conditions? Won't it turn out like Alternative 4 anyway?

If we merge 2 and 4, do we still need 5? Or need to alter 5?

Upland issues distinguish Alternative 5 from 2 and 4. This isn't a part of 2 and 4.

What is lost in combining 2 and 4? Do we lose breeding?

Overall, is there a benefit to combining 2 and 4?

Emphasis in 4 on migrating waterbirds would limit 2 if combined with 4. So you'd have to expand 4 to meet 2. Maybe it would be too hard to figure out the wetland aspect. You would change 4 to be more like 2.

We're not hearing a benefit to merging yet.

Alternative 4 started as a compromise between 2 and 5. At that time, alternative 2 seemed the most radical. And now seems the most improbable to actually get to pre-settlement conditions. Alternative 4 was a middle ground.

The requirement when writing the CCP is to write one for each of the 5 alternatives. If the objectives for two alternatives are going to be basically the same, it would be less work for the CCP writers to combine them.

Alternative 2 may be more philosophical, because we really want to go back to the original functioning ecosystem. The water table would be lower in alternative 2. Pre-settlement public use is hard to re-create. Public use for alternative 2 would be similar to alternative 4.

Let's go on, and develop objectives for all 5 objectives, and if after this workshop if the objectives turn out the same for 2 and 4, we can look at merging them.

Discussion of wording and interpretation for Alternatives 2 and 4

GROUP 1

Alternative 2 focus on ecological processes, especially hydrology.

Why did you focus on hydrology? It is more of a driving force than fire, herbivory, etc. Revisit "especially hydrology"

The biggest change is to put process first.

Shifting the focus to process, takes away from the dates for target habitats. Talk about dates and targets in title and first sentence.

Wednesday, September 11, 2002

Unresolved Issues

1. How to define historic, and when in text?

Alternative 2 deals with restoring historical processes; do we need to mention a target such as mid-1800s?

Change the wording to say that we would use the mid-1800s timeframe as a guide.

The ecological processes that made the mid-1800s conditions, worked over thousands of years, so we cannot reach that in 15 years.

Maybe re-word to: The ecological processes that promoted the Anoka Sandplain communities present to pre-European settlement.

What term do we use to describe the time period: mid-1800s? pre-European settlement? 1800-1850? We don't have a time period mentioned in goal one, but we need one in Alternative 2.

Use the term: present pre-European settlement.

Consensus reached.

4. Is the purpose of Alternative 4 to emphasize managing impoundments for waterbirds in migration?

It helps this alternative to have managing impoundments for migrating waterbirds as a priority because then in the objectives we can deal with each impoundment with this in mind.

Are we focusing on impoundments or waterbirds, which should we mention first?

Mention waterbirds first.

Most people are ok with this change in wording because it states up front that the focus of this alternative is waterbirds in migration.

Waterbird use during migration can be a criterion for what to do with each impoundment on the refuge.

Do we manage impoundments for migrating waterbirds, or to restore mid-1800s conditions? We need to have a priority, because these two things could compete and you would manage these two choices differently in some places depending on the priority.

We need to define "a portion" of impoundments.

We can't define it in too much detail because that should be in the objectives. An alternative should be more broad and conceptual.

So keep "a portion" in the wording of the alternative, and define "a portion" in the objectives.

Do we manage the uplands for migrating waterbirds over mid-1800s conditions?

Emphasis is maintaining a portion of impoundments for waterbird use in migration. Then it's clear that uplands are dealt with secondly.

Mention impoundments first, not waterbirds, so that how uplands are dealt with isn't questioned.

Consensus reached

Alternative 2 re-wording

There's a question about public use activities providing for some mid-1800 experiences.

Does it make sense to go to historic public use activities when the emphasis in this alternative is ecological processes. Should we just keep public use under current management?

Take the sentence out and deal with public use in the objectives.

Add to the last sentence: recognizing present-day constraints.

Consensus reached.

What constraints are there for the impoundments in 15 years under Alternative 2? Do we need to eliminate this like we did 1.5 above?

How do we want to define constraints in final sentence of Alternative 2? If it is not doable in 15 years? Off refuge issues that we don't see now that could happen in 15 years?

GROUP 1

Goal 2, Alternative 2.

2.1 Should change to: Maintain pool 2 as a managed impoundment. Keep pool 2 online. Pool 2 is providing 2 functions: to mitigate flooding upstream, and to maintain historic water levels. Pool 2 is a reservoir. Maintain this pool so we can change the other ones and observe the outcome. Reword to:

Maintain current management capability of pool 2 for the purposes of mitigating drainage upstream at a high level (flood control and sediment trap) and to potentially be able to utilize the pool as a water source for wetland hydrology down gradient.

This objective still needs a little work.

2.2 Hydrologic studies. Use processes to see what we come up with.

2.3 Provide a study of what conditions were historically.

2.4 If impoundment management leads to invasive species, we would have to deal with that, namely re-flood.

2.5 Sedge Meadow research

Are these objectives SMART?

Since our focus is process, not outcome, it is harder to make SMART objectives.

We need to define what the outcome will be to get to SMART objectives.

Goal 2, Alternative 4

2.4 does managing for waterbirds in migration need to discourage migratory birds nesting?

We should not have an objective for nesting in Alternative 4, since the focus is birds in migration.

Eliminate the part that deals with breeding/nesting.

2.5 need details that will benefit migrating birds.

*Since this Alternative has 2 aspects-waterbirds and pre-settlement conditions, we need to capture both those in the objectives. Don't think of these objectives only in terms of waterbirds.

2.8 across all the alternatives, this objective will not attract shore birds, it needs to be revisited.

2.10 the spring aspect will work, but need to re-work the fall.

Before the objectives for Alternative 2 can be revised, we need to figure out the process part of Goal 1 under Alternative 2.

Discussion on the Inclusion of Goal 3

On day three of the workshop, while writing objectives for Goal 3, a discussion arose over the necessity of the inclusion of Goal 3. Goals 1 and 2 are habitat goals, yet at the last workshop a caveat about wildlife was added to each of them. Therefore, the main questions at this workshop were: "Is Goal 3, the wildlife goal, to redundant to Goals 1 and 2?" and "since this is a wildlife goal, will it be too hard to write objectives for it, since they will mainly be population objectives?" After much discussion (see below), it was decided that Goal 3 will be kept, however the word 'balanced' will be dropped from it because no one had a definition for the word 'balanced'.

Thursday, September 12, 2002

Goal 4 across all Alternatives

Objective 4.7, Alternative 3: landowners will stop using chemical lawn treatments.

This objective may not be as reasonable.

Need to add more detail about where these landowners reside.

This should be a strategy under all alternatives, but need to deal with it when we discuss the watershed plan. The watershed plan can set the priorities to where landowners will be targeted to stop using chemical lawn treatment.

We'll keep it under objectives, but note that the specifics will be determined under the watershed plan. However, the Refuge will not wait for the watershed plan.

Objective 4.4, Alternative 2: Why are we creating grassland instead of oak savanna? Will we cut forest to make grassland?

We will revisit this and find alternative wording for habitats.

**Should keep in mind what other public agencies are doing in the area to keep habitats consistent. Work within the context of regional planning efforts: MNDNR, etc. Landscape plans are being developed presently.*

Where do say this?

As a strategy under the watershed management plan, and in the text of the CCP.

Need an objective for exotic species outside the refuge.

Group 1 will revisit this.

Goal 3 across all Alternatives

Objective 3.2, Alternative 2: wording problem with "accommodate". Do we mean 1 individual, a minimum viable population?

Accommodate means "occurs". Which means they only have to be there once.

How do we make this achievable? What does the refuge do?

This could be under alternative 1 because 60% probably occur now. It is very attainable.

This objective is not be very SMART.

We will revisit this tomorrow.

Objective 3.3, Alternative 2: Each species [or species group] will require a different amount of effort.

Objective 3.6, Alternative 2: Is Karner Blue an extirpated species?

Re-check Karner Blue to make sure.

**Copy objectives 2.8 and 2.10 from Alternative 5 under Goal 3 Alternative 4 also. Since Goal 3 is a wildlife goal, it should have these objectives for waterbirds. Is this objective reached by just having the habitats there, or the species present also?*

Do you need a population objective for each species on the RCP? Or focus on the ones that Sherburne can do something for uniquely. e.g. target red-headed woodpecker since Sherburne has the right habitats for it.

Friday, September 13, 2002

Tom Will wrote with a statement about adaptive to add on to the end of alternative 2. It was brought up that we should address feedback in all the alternatives.

Do we add it to the wording of the alternatives, or the objectives?

We could put it under the monitoring objectives.

We could add it in the introduction to the alternative chapter in the CCP, since adaptive management applies to all we do.

Consensus was reached on the following 3 things:

1. Add a paragraph about adaptive management in the introduction to the alternative chapter in the CCP.
2. Include group 2 wording under the monitoring objectives for alternatives 2,4,5
3. Include some version of Tom Will's phrase in the description of alternative 2, with the understanding that if those that write the CCP find it redundant, they can edit it.

Alternative 3 Title wording change:

Enhanced off-refuge coordination with current on-refuge management direction

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Section 6

**Participants List, Information and
Answers to Introductory questions**

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Participant Introductions

QUESTION 1: *Please provide your contact information. Did you participate in Sherburne Workshop 1, 2, or 3?*

1. Jan Eldridge, USFWS Planner, at all Sherburne workshops.
2. Jason Rohweder, USGS, at workshops 1 and 3.
3. Kevin Kenow, USGS, at all Sherburne workshops.
4. Gary Muelenhardt, USFWS Planner, at all Sherburne workshops.
5. Dave Warburton, Twin Cities Ecological Services Field Office, at workshops 1-3, and wetlands workshop.
6. Paul Soler, Sherburne NWR, at workshops 1-3.
7. Jeanne Holler, Sherburne NWR, at all Sherburne workshops.
8. Tom Will, USFWS Migratory Bird Biologist, at workshops 1-3.
9. Nancy Haugen, Sherburne NWR
10. Marv Ziner, "Friends of Sherburne", at all Sherburne workshops.
11. Brad Ehlers, Sherburne NWR, at all Sherburne Workshops.

QUESTION 2: *What is your personal goal for this workshop?*

1. To finish the CCP Objectives.
2. To assist the CCP staff by providing my GIS expertise and tools.
3. Provide GIS support for the CCP process, and complete development of the objectives.
4. To have a complete set of objectives for the CCP.
5. Continue to learn about Sherburne NWR management objectives, in order to assist evaluating water quality issues.
6. Generate a workable, beneficial CCP for the Refuge.
7. Blank.
8. To bring CCP to completion. To produce a model document, and above all to guarantee wildlife on the refuge for future generations, to learn.
9. Finish the CCP.
10. Finish the CCP.
11. Get done.

QUESTION 3: *What, in your view, is the most valuable outcome of the Sherburne National Wildlife Refuge planning process?*

1. To create an open, participatory process of continuing learning, to create a process where cumulative knowledge contributes to the outcomes, to use the contribution of many experts in setting the direction for future management.
2. Developing a plan that best suits a variety of disparate refuge uses.
3. The bringing together of resources to compile a thorough, comprehensive plan for Sherburne such that it considers varied points of view and carries the wealth of information that has been compiled.
4. A CCP that has buy-in from a wide variety of refuge users, staff, and local communities.

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Section 7

Invitation List

Invitation List

U. S. Fish and Wildlife Service (USFWS)

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Bob Adamcik

Liz Bellantoni

Steve Farrell

Regional Office, Region 3

Nita Fuller

Don Hultman

Tom Worthington

Tom Larson

Jim Mattsson

Barbara Pardo

Tom Will

John Dobrovolny

John Schomaker

Jan Eldridge

Gary Muehlenhardt

Tom Magnuson

Rick Schuldt

Sherburne National Wildlife Refuge

Charles Blair

Jeanne Holler

Brad Ehlers

Gary Swanson

Nancy Haugen

Paul Soler

Minnesota Waterfowl Association

Mark McNamara

Dean Flicker

Ecological Services

Dave Warburton

Nick Rowse

Ashland Fishery Resource Office

Mark Dryer

Frank Stone

Marv Ziner
Catherine Zimmer
Shirley Jones
Bill Faber

Non-Governmental Organizations (NGOs)

The Nature Conservancy

Jennifer Brown
Garth Fuller

Audubon Society

Betsy Daub
Brian Jungels
John Peck

Educational Institutions

University of MN, St. Paul

Kim Chapman
Mark Davis

World Conservation Union (IUCN)

Conservation Breeding Specialist Group (Facilitators)

Ulie S. Seal
Onnie Byers
Moriya McGovern

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Appendix I.

**Hydrology Statement for Alternative 2
from the Wetland Technical Group Meeting**

Hydrology Statement for Alternative 2

(from Wetland Technical Group Meeting held 18-19 July 2002)

There is general recognition that the processes that used to drive and maintain system historically are now altered and as a result, our ability to restore historic processes and vegetative communities everywhere on Refuge maybe limited. Initially we would develop a historic hydrograph hypothesis for the river and a similar flow description for the wetland systems. These would be used to identify sites on the refuge where the hydrologic regime potentially can be restored either by maintaining intact processes or mimicking them with management. This would lead to restoration trials in likely spots and with concurrent monitoring to test the success of these restoration strategies. The guiding principle of this effort is that we want to begin management for historic processes and habitats under a framework of adaptive management so as to prevent undesired or irreversible results.

Following the collection of existing information by refuge staff, we would enlist the help of ecologically-based soil scientist, hydrologist, groundwater specialist, and river geomorphologist to develop the initial hypotheses and guide the implementation of monitoring over time. The goal of this effort is to determine the potential of the current landscape to support the hypothesized historic processes with regard to the inputs and movement of nutrients, sediment, and water (in other words, the driving abiotic factors).

Manipulations of the existing systems, by altering outflow of pool 2 on both the river and the refuge system, would be designed to test the preliminary hypotheses. In the short term, Pool 2 can moderate changes to the river hydrograph caused by upstream watershed changes. In the long term, refuge staff will identify places or activities off the refuge where changes can be made to shift the hydrograph of the river to more natural conditions.