Structured Decision Making Process
For
Benton Lake National Wildlife Refuge

October 1-5, 2012
Great Falls, Montana

U.S. Fish and Wildlife Service
Montana Fish, Wildlife and Parks

Overview

The U.S. Fish and Wildlife Service (USFWS) and Montana Fish, Wildlife and Parks (MFWP) agreed to participate in a week-long Structured Decision-Making (SDM) workshop. The purpose of this workshop was to develop recommendations on how best to move forward with the management of Benton Lake refuge. The results of this workshop are summarized in this report and will be incorporated by the U.S. Fish and Wildlife Service into the final Comprehensive Conservation Plan (CCP) for the Benton Lake National Wildlife Refuge Complex. The final plan will be presented to the Regional Director for the Mountain-Prairie Region who will make the decision on whether or not to approve the CCP.

Public Meeting
October 1, 3-7pm

A public meeting was held to review the Comprehensive Conservation Planning (CCP) process for the Benton Lake Refuge Complex and explain how Structured Decision Making (SDM) fits within the overall planning process. Presentations by Service staff and the SDM facilitator reviewed the CCP process, provided a summary of public comments received to date, identified the decision-maker as the USFWS Regional Director, and explained the SDM process. Following the presentation portion of the meeting, the public was asked to provide input and recommendations for alternatives that meet refuge selenium and habitat objectives, and provide opportunities for wildlife-dependent public use. The following comments were received.

Sun River Watershed Group: Every action has a reaction that could affect other entities. Anything alternative other than B1 could have negative effects on other things, such as water bodies and natural resources. Suggest continuing to use water from Muddy Creek and employing tools such as a siphon to take water out of Muddy Creek. A siphon would provide cleaner water, reduce pumping cost, and help reduce erosion.

Putting the open canal into a pipeline would address some of the areas selenium is coming from. Suggest a pipeline from the flats of the Fairfield Bench to the pump site, and then convert canal to pipeline all the way to Benton Lake Refuge would provide clean water for the refuge and benefit Muddy Creek. Work with landowners and a few other agencies to reduce saline seeps north of Power and reduce nutrient concentrations in Muddy Creek.

Landowner: Lots of ducks and geese migrate across his land which is adjacent to the refuge. The speaker has been a falconer for a long time and is concerned about helping the wildlife. If the lakes at the refuge are getting poisoned over time, we need to do what is best for wildlife.

There are a lot of selfish aspects to what the hunters want. It's not worth a few votes for congress representatives to help hunters that can also hunt other places. In the past some ponds have dried out

in drier years. If animals are getting poisoned we have to do what is right for them. The preferred alternative would not stop all hunting. In wet years the ponds will be full and in dry years they will be dry. Do what is best for the wildlife even if it takes away some hunting opportunities.

There was a study in the Big Bend area about how Peregrine Falcons were affected by selenium. There are lots more birds than waterfowl that visit the refuge that could be affected by selenium as well. Most birds of prey eat the easiest thing to catch, which could be a sick duck. The proposed solution (C1) to get rid of the selenium will solve a lot of the problems. The vegetation over the years has changed a lot with major increases in invasive species.

Citizen: Thank you to senators Tester and Baucus, if it weren't for them we wouldn't be here. Support for alternative B1. The drying rotation will take care of the issues. While selenium might be a problem, ducks are not flying around with one foot and do not look like they are being poisoned. We need to make this a refuge that people currently enjoy and will enjoy in the future. If C or B2 is chosen we will have a waterfowl area that people are not going to use because it will dry out.

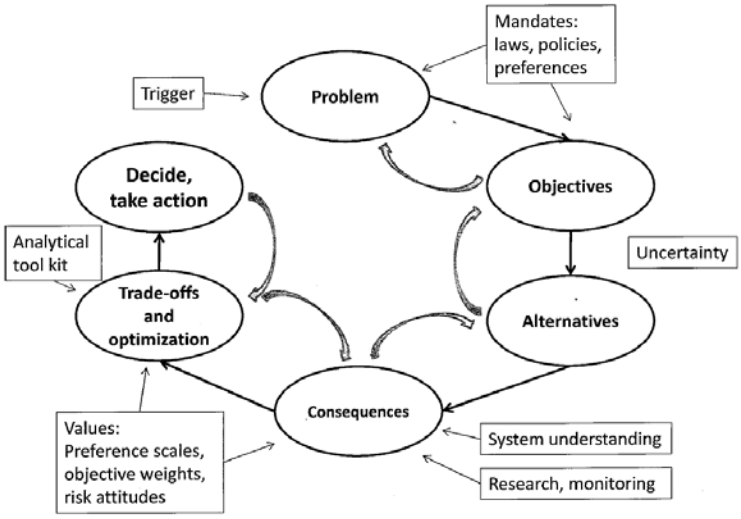
Citizen: No hunter or refuge user wants to see the refuge die. We all agree there are problems, but how do we fix them? Anti-option C, do not want to just pull the plug. Last year was a boom year with lots of water and ducks, this year there is no water, it's dry as a bone, and there are only two ducks out there. Within one year it went to that extreme. With alternative C there would only be a boom every 15–18 years. People who care about the refuge believe there must be some water on the refuge and that we cannot let it go dry. The rotational alternative seems to fit everybody's desire to see the refuge survive.

Citizen: Remembered when he was 12 years old going to Benton Lake. It had so much water and there was never a dry year. Now we have dry years. We don't want it to get worse. We are here for everybody including birdwatchers. You see water you see animals. If we let the refuge go dry there are not going to be any animals. You drive around the area and you see all these dry wetlands, we can't let another one go dry.

Structured Decision Making Process
October 2-5

I. Introduction

The facilitator presented the steps of the SDM process. Each step of the process has arrows going in both directions which indicate that each step is iterative and may need to be revisited during the SDM process.



II. Problem Statement

The first step of the SDM process involved developing a problem statement. Participants were divided into two groups and asked to develop a problem statement. Draft statements for each group are presented below.

Group 1 Draft Problem Statement: Benton Lake no longer experiences 3-10 year drying cycles that are critical to wetland health and sustainability. The spring-dominated flooding cycle has been replaced with a fall-dominated flooding cycle that negatively impacts wetland health. Fall-dominated flooding cycle has consistently provided recreational opportunities that the public values and has come to expect. Maintaining and restoring wetland health while providing a balance with appropriate/compatible recreational opportunity is challenging. Wetland health is greatly affected by selenium accumulation. Wetland health is impacted by selenium inputs entering the system from the surrounding watersheds, historic accumulation already in the wetland basin, and management of future inputs into the wetland basin. Invasive species, botulism, anaerobic conditions, and other factors are also impacting the wetland health and need to be considered. There is uncertainty in the system and how management actions may affect wetland health. Adaptive management approach is necessary to account for the uncertainty.

Group 2 Draft Problem Statement: The USFWS has authority under federal law and mandates to manage Benton Lake, one unit of the Benton Lake National Wildlife Refuge Complex. Every 15 years they go through a public planning process (CCP) to provide direction and guide management of Benton Lake and the entire Complex. For more than 50 years Benton Lake has been operated in a similar way resulting in multiple unexpected problems and impacts. High and potentially toxic levels of selenium concentrations, shift from diverse vegetative community type to a monotypic community type with invasive plant species, cost increases for water pumping that may not be sustainable, expectations for certain recreational opportunities, and a decline in productivity of vegetative and bird species. All the participating interests in developing the CCP for Benton Lake and the refuge complex agree there are problems that need to be addressed and solved. Disagreement has developed on what solutions are best without significantly impacting interest groups recreational opportunities. The CCP should identify a balance approach to solving the problems while addressing the concerns of the interest groups.

Participants reconvened as a group to discuss and refine the two draft statements. The group then worked together to create the final consensus problem statement.

Consensus Problem Statement: The USFWS has authority under federal law and mandates to manage Benton Lake, one unit of the Benton Lake National Wildlife Refuge Complex as a refuge and breeding ground for birds. Every 15 years, the Service goes through a public planning process (CCP) to provide direction and guide management of Benton Lake and the entire Complex. For more than 50 years Benton Lake has been managed in a way that does not include multi-year drying cycles, resulting in multiple unexpected problems and impacts to wetland health and sustainability. These include high, and potentially toxic, levels of selenium from natural runoff from the surrounding watershed and artificial pumping, a shift from diverse vegetative community type to a monotypic community type with invasive plant species, botulism, increased costs for water management, and a decline in productivity of breeding birds. The natural spring flooding cycle has been augmented with an artificial, fall-dominated flooding cycle that has consistently provided recreational opportunities that the public values and has come to expect. All participating interests in developing the CCP for Benton Lake agree there are problems that need to be addressed using adaptive management; however there is disagreement about how to solve these problems while supporting recreational opportunities.

III. Fundamental Objectives

The next step of SDM involved developing fundamental objectives. Participants were divided into two groups to develop a list of fundamental objectives which are presented below.

Group 1 Revised Draft Fundamental Objectives

1. Reduce accumulated selenium in pools above the minimum threshold.
2. Reduce selenium inputs to the refuge from the watershed and pumping.
3. Decrease selenium below existing levels.
4. Keep selenium concentrations below minimum hazard in pools currently below minimum threshold.
5. Increase the diversity of native vegetation species composition to provide food, cover and shelter for breeding birds.
6. Decrease and eliminate invasive species.
7. Reduce the risk of increased bird mortalities due to botulism.
8. Minimize costs to stay within budget allocations.
9. Increase production of grassland birds.
10. Increase production of wetland-dependent birds.
11. Increase production of shorebirds.
12. Increase production of waterfowl.
13. Create public support.
14. Increase hunting opportunity.
15. Increase wildlife observation and photography opportunity.
16. Increase interpretation and environmental education.
17. Minimize direct impacts to other users/partners associated with pumping operations.
18. Meet or enhance complex objectives.

Group 2 Revised Draft Fundamental Objectives

1. Decrease invasive species.
2. Reduce risk of botulism.
3. Minimize costs to stay within budget and FTE allocations.
4. Increase upland habitat productivity for all birds
5. Increase wetland habitat productivity for water-dependent birds.
6. Increase waterfowl hunting opportunity.
7. Increase other hunting opportunity.
8. Increase wildlife viewing and non-consumptive user opportunity.
9. Increase interpretation and environmental education.
10. Improve public support.
11. Prevent reproductive harm from Selenium to wildlife, especially birds.
12. Maintain management flexibility.
13. Minimize pumping impacts to other users/partners outside of BLNWR.
14. Achieve Complex objectives.

Participants reconvened as a group to discuss and refine the fundamental objectives. The group worked together to develop the final list of fundamental objectives presented below. The objectives are not listed in any particular order.

Consensus Fundamental Objectives

1. Decrease invasive species.
2. Reduce risk of botulism.
3. Minimize cost.
4. Increase upland habitat productivity for all breeding birds.
5. Increase wetland habitat productivity for water-dependent breeding birds.
6. Increase waterfowl hunting opportunity.
7. Increase other hunting opportunity.
8. Increase wildlife viewing and non-consumptive user opportunity.
9. Increase interpretation and environmental education.
10. Improve public support.
11. No net increase of selenium in any pool over time.
12. Prevent reproductive harm from selenium to wildlife, especially birds.
13. Maintain management flexibility and adaptability.
14. Minimize direct pumping impacts to other users/partners outside of BLNWR.
15. Enhance ability to achieve Complex objectives.

IV. Alternatives

The next step was to identify management options or alternatives. Participants began by identifying the five alternatives presented in the Draft CCP and Environmental Assessment. The group then brainstormed four additional alternatives for consideration and analysis in the SDM process. A brief description of each alternative (A-G) follows. (For a full description of Alternatives A-C2, please see the draft CCP).

Alternative A. Current Management. Annual flooding supported by pumping water from Muddy Creek to supplement natural runoff. Provides fall water for waterfowl hunting every year. Models indicate that selenium levels will become highly toxic in as little as 9-17 years.

Alternative B1. Individual wetland units would receive short-term drying rotations. Annual flooding would be supported by pumping water from Muddy Creek to supplement natural run-off. Provide waterfowl hunting every year.

Alternative B2. Initial, basin-wide dry period to “reset” the system. When wetland health has improved sufficiently, pumping may be incrementally reintroduced and reevaluated annually. Up to a 15% reduction in waterfowl hunting.

Alternative C1. Supplemental pumping would not occur except to achieve wetland health objectives or to maintain water rights. Infrastructure would remain. Selenium input would be reduced by at least 40%. Up to a 60% reduction in waterfowl hunting.

Alternative C2. No supplemental pumping would occur. Removal of water management infrastructure and decommissioning of pump house.

Alternative D. Dry out ponds 1 and 2 simultaneously and rotate water through lower units until vegetation, selenium objectives are met. Include 4B as an option for brood habitat and refuge. There will be water on Benton Lake every fall through annual pumping. Water saving infrastructure will be enhanced.

Alternative E. Dry out ponds 1 and 2 simultaneously and rotate water through lower units until vegetation, selenium objectives are met. Include 4B as an option for brood habitat and refuge. There will be fall flooding for a minimum of 11 out of 15 years, with a maximum of 3 consecutive years. Water saving infrastructure will be enhanced.

Alternative F Dry out ponds 1 and 2 simultaneously and rotate water through lower units until vegetation, selenium objectives are met. Include 4B as an option for brood habitat and refuge. Annual pumping may be reduced but at least 1 pond will be flooded for waterfowl hunting every fall. Water saving infrastructure will be enhanced.

Alternative G. Dry out ponds 1 and 2 simultaneously and rotate water through lower units until vegetation, selenium objectives are met. Include 4B as an option for brood habitat and refuge. Annual pumping may be reduced with a maximum of 4 out of 15 years without opportunity for waterfowl hunting, and no more than 3 consecutive years. Water saving infrastructure will be enhanced.

V. Consequences Analysis

The group worked together to assign a measureable attribute and desired direction for each fundamental objective that would be used to evaluate each alternative's ability to meet the objective.

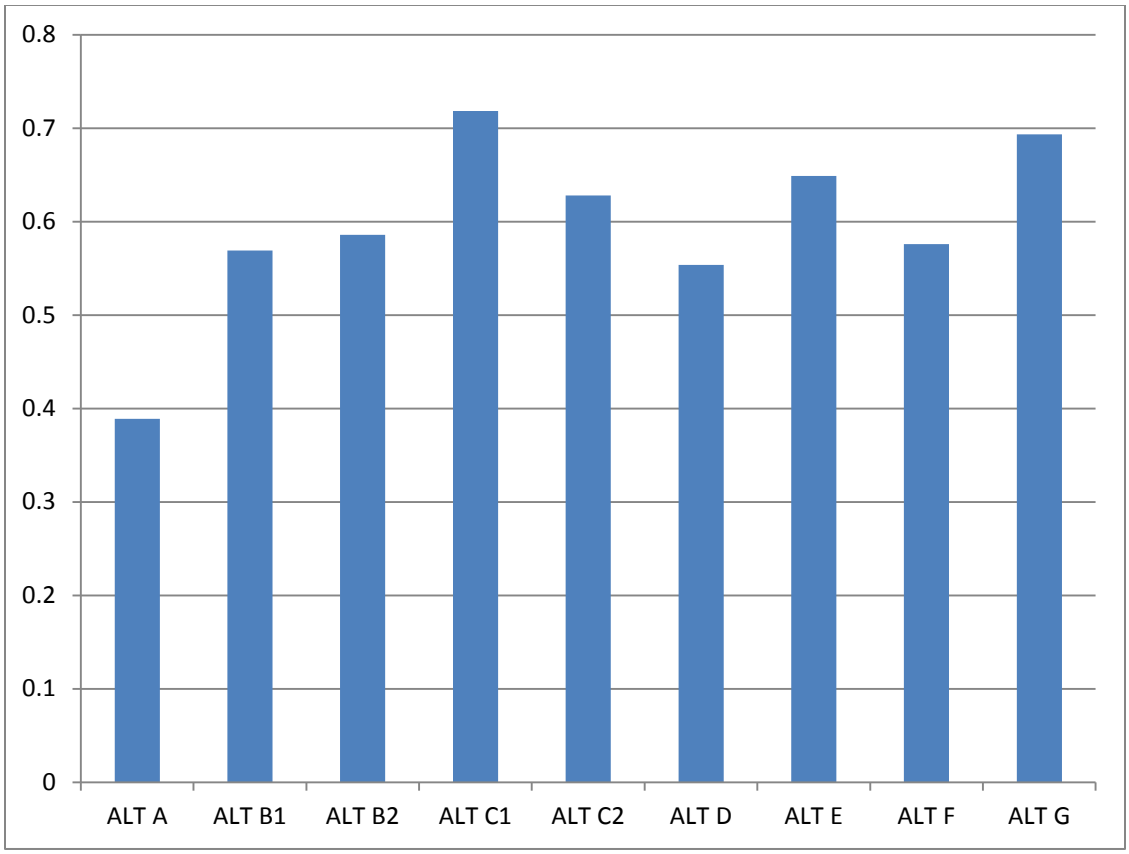
1. Decrease invasive species. (-3-3; -3=reduce invasives; 0=status quo; 3=increase invasives; minimize)
2. Reduce risk of botulism. (-2-2; -2=reduced risk; 0=status quo; 2=increased risk; minimize)
3. Minimize costs. ($; minimize)
4. Increase upland habitat productivity for all breeding birds (-2-2; -2=decreased productivity; 0=status quo; 2=increased productivity; maximize)
5. Increase wetland habitat productivity for water-dependent breeding birds(-4-4; -4=decreased productivity; 0=status quo; 4=increased productivity; maximize)
6. Increase waterfowl hunting opportunity. (-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity; maximize)
7. Increase other hunting opportunity. (-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity; maximize)
8. Increase wildlife viewing and non-consumptive user opportunity. (-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity; maximize)
9. Increase interpretation and environmental education. (-2-2; -2=decreased I&E; 0=status quo; 2=increased I&E; maximize)
10. Improve public support (-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity; maximize)
11. No net increase of selenium in any pool over time.(0-5; 0=no probability, 5=high probability; maximize)
12. Prevent reproductive harm from selenium to wildlife, especially birds (0-5; 0=no probability, 5=high probability ; maximize)
13. Maintain management flexibility and adaptability (-2-2; -2=decreased flexibility; 0=status quo; 2=increased flexibility; maximize)
14. Minimize direct pumping impacts to other users/partners outside of BLNWR (0-3; 0=low impact, 3=high impact; maximize)
15. Enhance ability to achieve Complex objectives (-2-2; -2=decreased ability; 0=status quo; 2=increased ability; maximize)

The group scored each objective across all the alternatives to create the following consequences table.

FUNDAMENTAL OBJECTIVE	ATTRIBUTE	DIRECTION	ALT A	ALT B1	ALT B2	ALT C1	ALT C2	ALT D	ALT E	ALT F	ALT G
Decrease invasive species	(-3-3; -3=reduce invasives; 0=status quo; 3=increase invasives	min	3	-1	-2	-3	-3	-2	-2	-2	-2
Reduce risk of botulism	(-2-2; -2=reduced risk; 0=status quo; 2=increased risk	min	-2	-2	-1	-2	-2	-1	-1	-1	-1
Minimize costs	$	min	1.8	2.7	2	1.5	2.7	2.7	2.2	2.4	2
Increase upland habitat productivity for all breeding birds	(-2-2; -2=decreased productivity; 0=status quo; 2=increased productivity	max	0	-1	1	2	2	-1	1	-1	1
Increase wetland habitat productivity for water-dependent breeding birds	(-4-4; -4=decreased productivity; 0=status quo; 4=increased productivity	max	-3	1	1	3	4	1	2	1	2
Increase waterfowl hunting opportunity	(-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity	max	2	1	-1	-2	-2	1	0	1	0
Increase other hunting opportunity	(-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity	max	0	1	2	2	2	1	2	1	2
Increase wildlife viewing and non-consumptive user opportunity	(-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity	max	2	2	0	-1	-1	2	1	1	1
Increase interpretation and environmental education	(-2-2; -2=decreased I&E; 0=status quo; 2=increased I&E; maximize)	max	1	2	2	2	2	2	2	2	2
Improve public support	(-2-2; -2=decreased opportunity; 0=status quo; 2=increased opportunity	max	-1	2	1	1	1	2	2	2	2
No net increase of selenium in any pool over time.	0-5; 0=no probability, 5=high probability	max	0	1	4	5	5	2	3	2	3
Prevent reproductive harm from Selenium to wildlife, especially birds	0-5; 0=no probability, 5=high probability	max	0	3	5	5	5	5	5	5	5
Maintain management flexibility and adaptability	(-2-2; -2=decreased flexibility; 0=status quo; 2=increased flexibility	max	-1	-1	0	-1	-2	-1	1	1	2
Minimize direct pumping impacts to Muddy Creek	0-3; 0=low impact, 3=high impact	min	0	0	2	3	3	0	2	1	2
Enhance ability to achieve Complex objectives	(-2-2; -2=decreased ability; 0=status quo; 2=increased ability	max	0	-2	-1	2	1	-2	-1	-1	0

Upon completion of the consequences table, the facilitator presented the resulting rank of each alternative's ability to meet the fundamental objectives.

Unweighted Alternatives Ranking



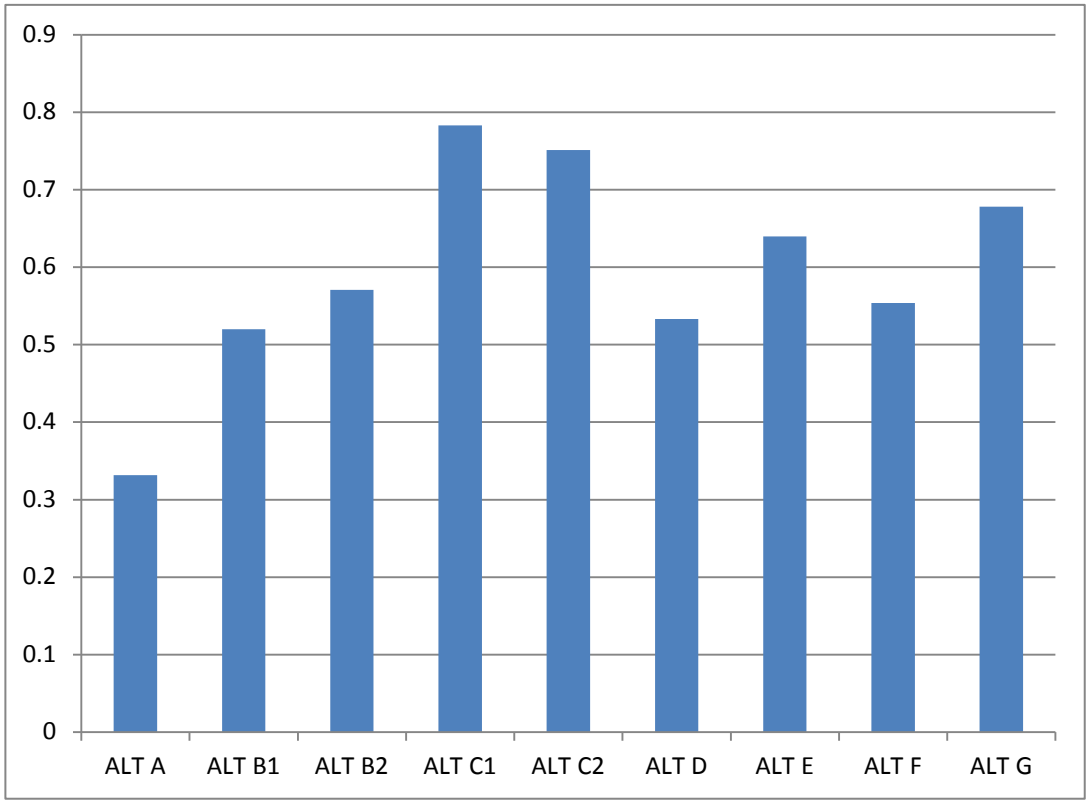
Weighting and Trade Offs

The next step of the process involved ranking and weighting each fundamental objective relative to each other to indicate relative importance of each objective. For this process participants were divided by agency into two groups to rank and weight each objective to reflect each agency's mission, purpose and viewpoint. The result of the ranking and weighting for each alternative by agency are presented in the following pages.

USFWS Weights

Decrease invasive species	0.094
Reduce risk of botulism	0.070
Minimize costs	0.012
Increase upland habitat productivity for all breeding birds	0.094
Increase wetland habitat productivity for water-dependent breeding birds	0.117
Increase waterfowl hunting opportunity	0.076
Increase other hunting opportunity	0.006
Increase wildlife viewing and non-consumptive user opportunity	0.076
Increase interpretation and environmental education	0.012
Improve public support	0.070
No net increase of selenium in any pool over time.	0.106
Prevent reproductive harm from Selenium to wildlife, especially birds	0.117
Maintain management flexibility and adaptability	0.029
Minimize direct pumping impacts to Muddy Creek	0.002
Enhance ability to achieve Complex objectives	0.117

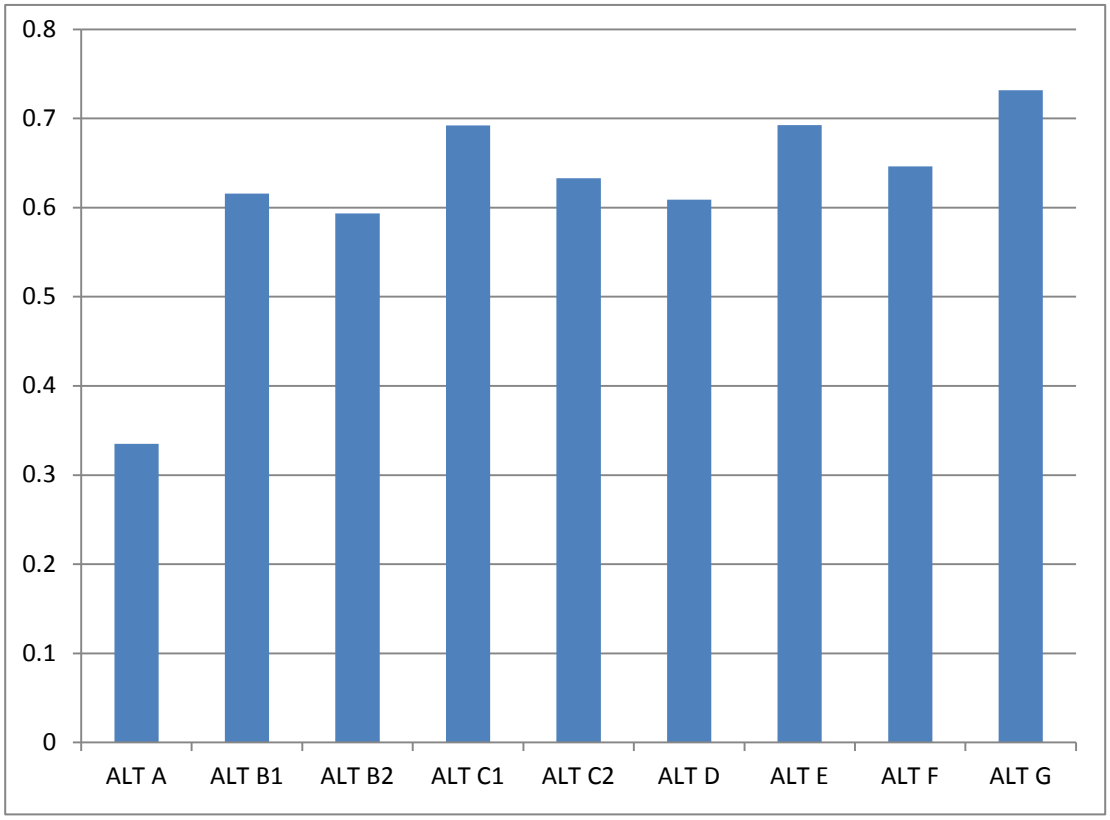
USFWS Alternatives Ranking with Weights



MTFWP Weights

Decrease invasive species	0.074
Reduce risk of botulism	0.074
Minimize costs	0.043
Increase upland habitat productivity for all breeding birds	0.032
Increase wetland habitat productivity for water-dependent breeding birds	0.106
Increase waterfowl hunting opportunity	0.085
Increase other hunting opportunity	0.021
Increase wildlife viewing and non-consumptive user opportunity	0.085
Increase interpretation and environmental education	0.064
Improve public support	0.096
No net increase of selenium in any pool over time.	0.085
Prevent reproductive harm from Selenium to wildlife, especially birds	0.096
Maintain management flexibility and adaptability	0.106
Minimize direct pumping impacts to Muddy Creek	0.011
Enhance ability to achieve Complex objectives	0.021

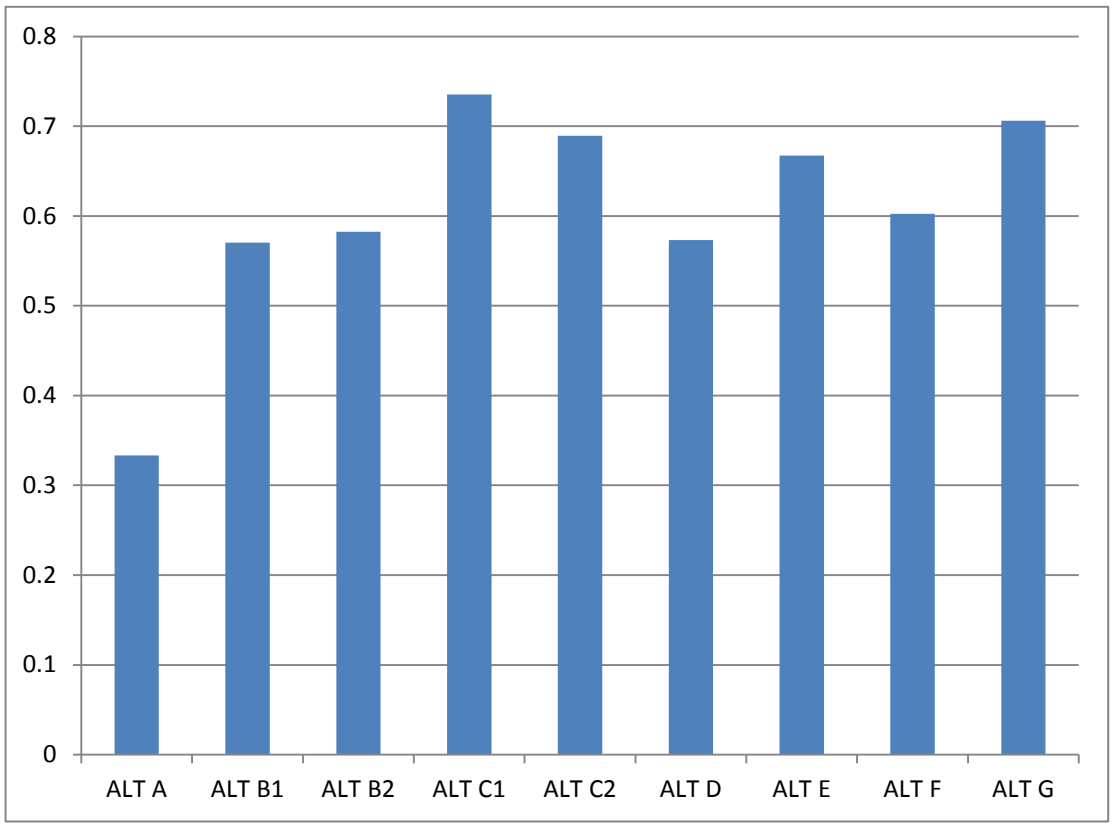
MTFWP Alternatives Ranking with Weights



USFWS and MTFWP Combined Weights

Decrease invasive species	0.084
Reduce risk of botulism	0.073
Minimize costs	0.028
Increase upland habitat productivity for all breeding birds	0.061
Increase wetland habitat productivity for water-dependent breeding birds	0.112
Increase waterfowl hunting opportunity	0.081
Increase other hunting opportunity	0.014
Increase wildlife viewing and non-consumptive user opportunity	0.081
Increase interpretation and environmental education	0.039
Improve public support	0.084
No net increase of selenium in any pool over time.	0.095
Prevent reproductive harm from Selenium to wildlife, especially birds	0.106
Maintain management flexibility and adaptability	0.070
Minimize direct pumping impacts to Muddy Creek	0.007
Enhance ability to achieve Complex objectives	0.067

USFWS and MTFWP Alternatives Ranking with Combined Weights



Final Consensus Alternative

The final discussion of the SDM process involved group discussion concerning the resulting rank of each alternative and then arriving at a consensus alternative. Although alternative C1 was the highest ranked alternative in the combined ranking, it was determined this alternative would result in extended dry periods that would have unacceptable impacts and the pace of implementation would be too rapid. The group then looked to the 2nd highest ranked alternative as the basis for the consensus alternative. Alternative G was the 2nd highest ranked alternative and became the basis for the final alternative. Some actions were identified as being common to all alternatives and those are presented below along with the consensus alternative.

Elements Common to All Alternatives

- When management objectives are met sustainably, hunting opportunity will be increased.
- Monitoring will be evaluated annually and if objectives are not being met over time, adaptive management of pumping and drying cycles may occur.
- All alternatives are contingent on availability of water and funding.
- Productivity is a proxy for hunt quality.

Consensus Alternative G

Characteristics of the consensus management alternative include: flexible water management including frequency and amount of pumping and location of water within the basin; water conserving modifications to existing infrastructure; improving water quality within the watershed; striving to provide some waterfowl hunting and fall/spring migration habitat at least 11 out of 15 years and basin-wide drawdowns no more than 4 out of 15 years; intensive management of habitat to improve wetland health and productivity; the reduction of selenium throughout the wetland basin; and the inclusion of an adaptive resource management approach. In consultation with the Service and FWP, the wet and dry cycles may be modified to ensure progress towards achieving habitat objectives.