Mississippi Flyway Council

Waterfowl Management Workshop Summary

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August 24, 2009

DRAFT

The Mississippi Flyway Council and Technical Section met jointly on July 22 (1:00-5:00 PM) and July 23 (8:00-12:00 AM) in Manitowoc, WI, to explore the use of a structured decision making process to identify fundamental objectives for duck management in the Flyway. The workshop was facilitated by Dave Case (D. J. Case & Associates) and Mike Runge (U.S. Geological Survey) with assistance in facilitating small groups provided by Dale Humburg (Ducks Unlimited), Andy Raedeke (MO Dept. of Conservation) and Guy Zenner (IA Dept. of Natural Resources).

The objectives of the workshop were to develop:

1. Statements of fundamental goals and measurable objectives for duck management in the Mississippi Flyway.
2. A better understanding of the implications of multiple objectives and the concept of coherence.
3. Statements of priorities that will help guide future decisions.

Mike Runge opened the session with an introduction to structured decision-making processes and the value of using these methods to deal with multiple objectives. He then framed the problem and outlined the process that we would use to identify fundamental objectives. Guy Zenner gave the group a brief overview of the waterfowl and harvest management objectives developed by the Flyway over the past 50 years. Throughout its history, the Mississippi Flyway has, at least implicitly if not explicitly, been trying to balance objectives for harvest, habitat and hunter management.

Working in small groups (5), the participants were then asked to sort a list of 35 waterfowl management objectives into fundamental and means objectives, and to identify any fundamental objective that were missing, a process that took about 45 minutes. Fundamental objectives are the highest level objectives, while means objectives generally are achieved to help realize a more fundamental objective. When thinking about an objective and why it is important, if the answer is just because, then it is likely a fundamental objective. Mike also noted that an objective may have characteristics of both fundamental and means objectives. For example, maintaining the waterfowl hunting tradition may be considered a fundamental objective for those who consider maintaining the waterfowl hunting tradition for its own sake. On another level, it could be considered a means objective from the perspective of those who view waterfowl hunting as a means for supporting waterfowl and wetland conservation. In this case, maintaining the tradition of hunting would not be essential if waterfowl and wetland conservation could be supported through other means.
Using an Excel spreadsheet, each group's facilitator recorded the group's opinion on each objective. The individual group lists were compiled into a master list of fundamental and means objectives (Table 1). Groups also added objectives to the list, which stretched it to 55 objectives. The entire group then spent over an hour discussing these objectives and the rationale for categorizing them as fundamental or means objectives. The result was a pared down list of 13 fundamental objectives (Table 2). (Note: another group activity involving linking the means objectives with the fundamental objectives had been planned, but a lack of time prevented engaging the group in this exercise.)

The main group was then dismissed and Mike Runge led a small group, consisting of Dave Case, Dale Humburg, Guy Zenner (IA DNR), Andy Raedeke (MO DOC), Larry Reynolds (LA DWF) and Dave Luukkonen (MI DNR), to prepare the fundamental objectives in a format that would allow weighting

(this process took about 6 hours). First, this group attempted to hierarchically arrange the fundamental objectives. This step was necessary to ensure the Council members were weighting comparable objectives (Fig. 1). This process was also used to help determine if some of the fundamental objectives should be refined or consolidated; and to assist the small groups in further identifying which objectives were truly fundamental objectives and not means objectives. Although the small group did not completely organize the objectives into a hierarchy, they did condense the number of objectives from 13 to 7. They then specified measurable attributes for each objective.

The next step was to develop a consequence table (Table 3). First, the small group reached consensus on a small set of actions that included habitat, duck population, and hunter participation components. The habitat component consisted of either maintaining carrying capacity or increasing it by 20 percent, the duck population component consisted of managing at 90% on the right shoulder of the yield curve or at 100%, maximum sustained harvest, and the hunter participation component consisted of maintaining hunter numbers at the current level or increasing them by 20 percent. The various combination of these components resulted in 8 potential alternative actions. In the consequence table, each column represented an alternative and each row represented an objective and its measurable attribute. Each cell in the table represents the consequence of a specific decision alternative on reaching a single objective. For example, if minimizing costs were a fundamental objective, each cell in that row would represent how much each alternative identified in the columns would cost. The consequence tables are developed using the best available information. If uncertainties exist about potential consequences of a management action, an adaptive approach can be used to improve understanding of management actions. For the purposes of this exercise, we used the expert opinion of the small group to populate the consequence table.

On the second day, Andy Raedeke described how the consequence table was developed and led a discussion about the potential tradeoffs revealed in the consequence table. The group observed that none of the alternatives provided the best option across objectives. The group was also able to simplify the decision process by eliminating two dominated alternatives, that is alternatives that either were outperformed or tied other alternatives across all of the objectives. In this case, the alternative to maximize harvest and maintain habitat carrying capacity and hunter numbers at current levels and the alternative to maintain hunter numbers and carrying capacity at current levels while managing populations at the 90% point on the right shoulder of the yield curve could be eliminated. The group did not identify any objectives that had similar or identical consequences across the 8 alternatives. If they had, the objectives, termed irrelevant objectives, could have been eliminated to further simply the decision-making process. The two dominated alternatives were then eliminated before Mike Runge instructed Council members on a method to weight objectives.

Council members, in consultation with their Tech Section staff, were given a table that included the 7 objectives, their measurable attributes, and their lowest and highest score in the consequence table (Table 4). They were asked to first rank the objectives from highest two lowest and then weight the objectives on a scale of 1-100 to show the relative importance of each ranking. It was noted that the weights for several objectives could be equal, or nearly so, if a Council member felt that several objectives were equally (or nearly equally) important. These weights were then summarized (averages, ranges) and the group discussed the relative weighting that resulted (Table 5).

Mike Runge then demonstrated how these weightings could be used to determine a preferred alternative that reflected the weights given to objectives by Council members. First, he normalized the values in the consequence table on a scale of 0 to 1 with 0 being the lowest score in each row and 1 being the highest. He then took the average weights from the Council members for each objective and

multiplied them by the normalized consequence table scores. These weighted scores were then summed for each set of actions to determine the preferred alternative (Table 5). Based on this exercise the preferred alternative was to increase carrying capacity and hunter participation by 20%, while managing harvest at the 90% point on the right shoulder of the yield curve. Discussion ensued about the patterns that developed in the weighted consequence table and the tradeoffs that it illustrated.

The group then divided into 5 small groups to discuss these results, including the weighting process, missing objectives, and any problems they could identify with the process. After a half hour of small group discussions, the group facilitators reported back to whole body (see Appendix A for group discussion summaries). Discussions then ensued on the issues raised by individual groups. Some these issues were as follows:

1) The consequence table did not adequately address the issue of costs. The hypothetical actions in the consequence table have inherent cost in dollars and cents. Increasing carrying capacity has enormous costs associated with it. These costs were not addressed in the table and they must be to compare the competing objectives.
2) The fundamental objectives need to be more clearly defined. For example, ecosystem goods and services mean different things to different people. There were questions as to whether this should be a fundamental objective or just viewed as a by product of sound duck habitat management.
3) Questions arose about the scope of the problem being addressed through this multiple-objective decision exercise. It is possible that Joint Ventures, especially those engaged in management activities for multiple species, will face more trade-offs between fundamental objectives relating to waterfowl management versus managing for other wetland dependent species. At an even broader level for states and Joint Ventures, habitat management trade-offs may revolve around providing ecosystem goods and services (e.g., what role does a wetland play influencing the quality of a watershed, coastal environment, or river system), providing habitat to meet life history needs for wetland dependent species (e.g., spawning habitat for fish versus fishless habitat for amphibians), or providing resources for ducks (e.g., corn vs. other types of food resources). Should these types of trade-offs be considered in the context of state and Joint Venture participation in the North American Waterfowl Management Plan?
4) Since the weighting process involves both an agreed upon set of fundamental objectives and a limited set of decision alternatives, similar amounts of attention will need to be given to eliciting fundamental objectives and reaching consensus upon the range of proposed alternatives. In this exercise, we focused almost exclusively on eliciting fundamental objectives. At some point, a process will need to be developed to specify the range of management alternatives. Some of the hypothetical actions that we used may be unrealistic. For example, we may be lucky to maintain current hunter participation or current habitats, so increasing either of these by 20% may be unrealistic. It may be more realistic to consider decreases in participation and declines in habitat quality or quantity.
5) Are maximizing harvest opportunity and hunt quality simply means to maintaining the duck hunting tradition or are they fundamental objectives in and of themselves? What does "opportunity" mean and how should "quality " be defined? If hunter satisfaction is the measurable attribute for "Hunt Quality," how do we define and measure satisfaction?
6) Are the measurable attributes appropriate for the objectives? For example, is "Neq" an appropriate metric for healthy populations or should this simply be the absolute population size? Is "Heq" a good proxy for harvest opportunity or does "opportunity" mean something else and therefore it may need a better metric?
7) During initial discussions, maintaining the relationship between harvest, habitats, and hunters was suggested as a fundamental objective, but it was not included in the final list. There was

some discussion that this could be considered as the overarching fundamental objective or goal. As a fundamental objective, it was ambiguous what "maintaining the relationship" really means? If this were an objective, how would we measure it? For example, the recommendation to go from a liberal to restrictive season does not take into account hunters perceptions, tradition, or satisfaction. These appear to be important considerations in regulations deliberations, which suggests that we are missing a fundamental objective.

8) There needs to be agreement on measureable attributes for the objectives and on the consequences of specified actions on objectives for this process to effectively clearly define the best course of action(s) to achieve the fundamental objectives. This will take some time.
9) There was some confusion about the difference between our fundamental goals and alternatives. Our alternative actions were stated as outcomes pertaining to habitat, population size, and hunter numbers and the objectives receiving the highest weights pertained to achieving desired outcomes regarding populations, habitat, and hunter numbers.

Mike Runge wrapped up the discussions noting that the process had raised some previously hidden or embedded, but important, objectives for waterfowl management in the Flyway. It was further noted that this is just the first step in identifying objectives for waterfowl management in the Flyway and that meshing the objectives of this group with those of the JVs and the Human Dimensions Working Group would present additional challenges.

Tom Hauge closed the session by looking forward to the next steps will need to be taken to clearly define the Flyway's fundamental objectives in waterfowl management and to incorporate them into the next revision of the North American Waterfowl Management Plan. He noted, however, that it was clear from the discussions in this workshop, as well as discussions on other Flyway issues, that we already integrate harvest, habitat, and hunter considerations in our deliberations. We always have. We are just now trying to do it in a more explicit manner so there is little question about what we are really trying to achieve and to ensure that we develop a course of action that allows us to successfully allocate resources to achieve these fundamental objectives.

Dave Case wrapped up the session with some turning point questions on the value and quality of the workshop. Overall, the participants felt the workshop was worthwhile and the objectives of the workshop had been achieved. The results of this poll are in Appendix B.

Table 1. Fundamental or means objectives as identified by small groups.

#	Objective	Fundamental or Means?					
		Group 1	Group 2	Group 3	Group 4	Group 5	Summary
1	Maintain duck populations as part of North American fauna	F	F	F	F	F	5
2	Increase duck populations that are at low levels so special regs are unnecessary	M	M	M		M	0
3	Produce enough birds to satisfy hunters	M	F	F		M	2
4	Maintain all duck populations at NAWMP goal levels	M	M	M		M	0
5	Increase duck recruitment	M	M	M		M	0
6	Increase duck survival, i.e., reduce natural mortality	M	M	M		M	0
7	Provide equitable harvest opportunities among states (define "equitable" in this case)	F	F	F		M	3
8	Provide equitable harvest opportunities among Flyways (define "equitable" in this case)	F	F	F		M	3
9	Provide maximum opportunity to pursue abundant ducks	M	M	M		M	0
10	Maximize harvest	M	F	F		M	2
11	Maximize harvest opportunity	M	M	F		M	1
12	Minimize/eliminate closed seasons	M	M	M		M	0
13	Minimize/eliminate partial seasons	M	M	M		M	0
14	Minimize hybrid seasons	M	M	M		M	0
15	Minimize species-specific regulations	M	M	M		M	0
16	Minimize the frequency of restrictive seasons	M	M	M		M	0
17	Avoid jumping from a liberal season to a restrictive season in successive years	M	M	M		M	0
18	Minimize chances of accidental violations	M	M	M		M	0
19	Maintain simple, easy to understand, and easy to comply with hunting regulations	M (F)	M	M		M	0
20	Stabilize duck hunting regulations, i.e., minimize year to year regs changes	M	M	M		M	0
21	Increase and improve duck breeding habitat	M	M	M		M	0
22	Increase and improve duck wintering habitat	M	M	M		M	0
23	Increase and improve duck migration habitat	M	M	M		M	0
24	Increase/maintain hunter participation	F	F	F	F	M	4
25	Maximize hunter satisfaction (i.e., reduce hunter complaints)	F	M	F		M	2
26	Maintain/increase political & financial support for private/public habitat mgmt efforts	F	M	M		M	1
27	Increase funding for federal/state agencies	M	M	M		M	0
28	Improve waterfowl population and harvest estimates	M	M	M		M	0
29	Increase funding for duck friendly Farm Bill programs	M	M	M		M	0
30	Increase habitat conservation efforts by NGOs	M	M	M		M	0
31	Minimize costs for habitat development, restoration and management	M	M	M		M	0
32	Improve communication with hunters	F	M			M	1
33	Improve communication with non-hunters	F	M			M	1
34	Increase support for waterfowl hunting by the general public	M	M	M		M	0
35	Maintain the relationship between habitat, populations, and hunters	F	F		F	F	4
36	Insure cooperation among jurisdictions (state, flyway, partners, etc.)	F					1
37	Maintain/increase wetlands for ecological goods and services	M	M	F	F		2
38	Healthy populations of ducks (low disease, low contamination)		F				1
39	Perpetuate the diverse traditions of duck hunting	F	F		F	F	4
40	Increase understanding of biological mechanisms driving populations		M				0
41	Maintain quality habitat		M				0
44	Maintain season framework date extensions						0
45	Maintain/increase hunter numbers						0
46	Maintain political support for hunting						0
51	Provide more public hunting opportunities					M	0
52	Provide reasonable opportunity for hunting	means to participation, satisfaction, tradition					
53	Maximize quality of hunting	means to satisfaction					
54	Provide non-consumptive uses for ducks/habitat						
55	Promote conservation ethic in the public at large						

Table 2. First draft of fundamental objectives.

Objective	Fundamental or Means?					
	Group 1	Group 2	Group 3	Group 4	Group 5	Summary
Maintain duck populations as part of North American fauna	F	F	F	F	F	5
Provide equitable harvest opportunities among states (define "equitable" in this case)	F	F	F		M	3
Provide equitable harvest opportunities among Flyways (define "equitable" in this case)	F	F	F		M	3
Maximize harvest	M	F	F		M	2
Maximize harvest opportunity	M	M	F		M	1
Increase/maintain hunter participation	F	F	F	F	M	4
Maximize hunter satisfaction (i.e., reduce hunter complaints)	F	M	F		M	2
Maintain the relationship between habitat, populations, and hunters	F	F		F	F	4
Maintain/increase wetlands for ecological goods and services	M	M	F	F		2
Healthy populations of ducks (low disease, low contamination)		F				1
Perpetuate the diverse traditions of duck hunting	F	F		F	F	4
Provide non-consumptive uses for ducks/habitat						
Promote conservation ethic in the public at large						

Figure 1. Hierarchical relationship of fundamental objectives for duck management.

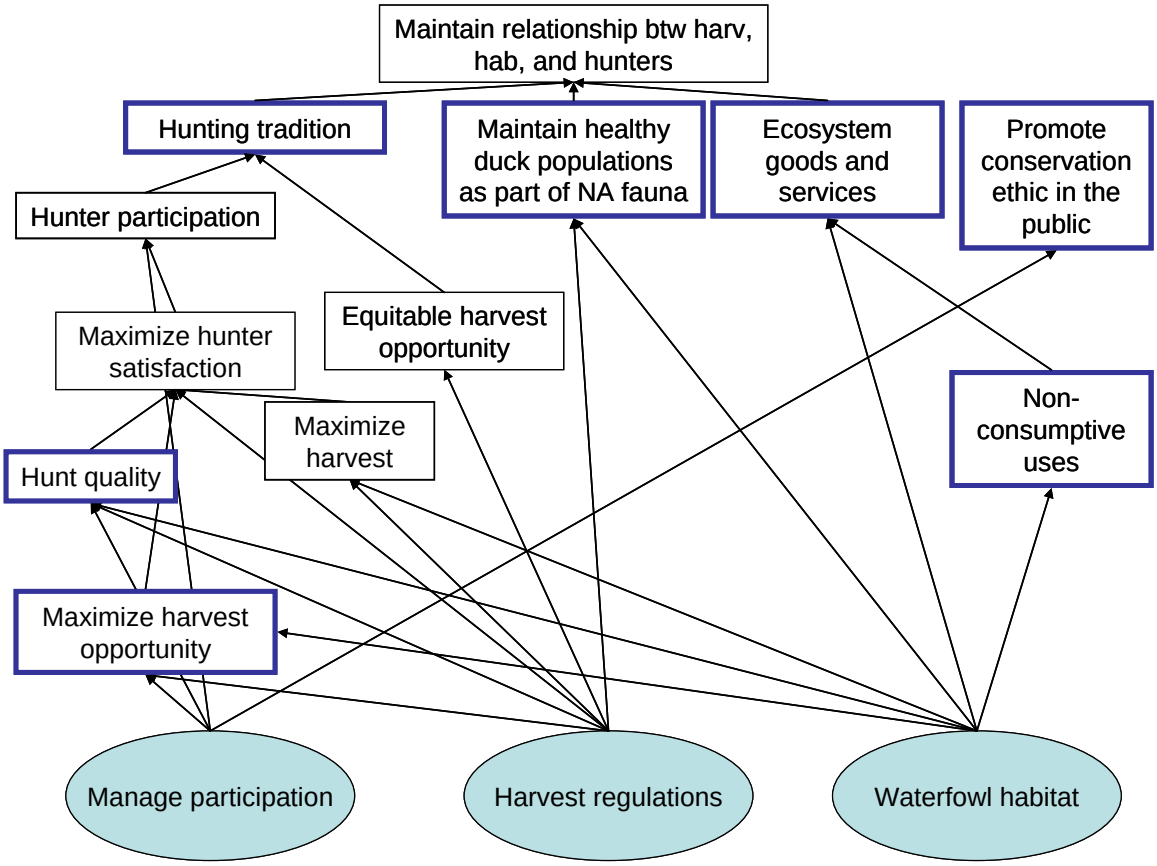


Table 3. Draft consequence table for 7 fundamental objectives for duck management in the Mississippi Flyway (Yellow equals the highest ranked alternative and magenta the lowest ranked alternative for each objective).

	Strategic Action	1	**2**	**3**	**4**	5	**6**	**7**	**8**
	Shoulder	90	90	90	90	100	100	100	100
	K	100	100	120	120	100	100	120	120
	Participation	100	120	100	120	100	120	100	120
Fundamental Objective	**Measurable Attribute**								
Maintain duck hunting tradition	Number of people who identify themselves as duck hunters	100	110	105	120	95	105	100	115
Maintain healthy duck populations as part of NA fauna	Equilibrium duck population size	0.658	0.658	0.79	0.79	0.5	0.5	0.6	0.6
Ecosystem goods and services	Wetland acres (not counting farmed wetland)	95	100	110	120	95	100	110	120
Promote conservation behavior in the public	Annual total of public and private dollars for habitat conservation ($billion)	$10	$11	$9.8	$10.5	$10	$11	$9.8	$10.5
Non-consumptive uses	Wetland/associated upland bird viewing-days/year (1000s)	770	700	924	840	585	532	702	638
Hunt quality	Proportion of hunters who say they were satisfied or very satisfied with their season	0.48	0.44	0.55	0.48	0.38	0.35	0.44	0.38
Maximize harvest opportunity	Annual equilibrium harvest	0.045	0.045	0.054	0.054	0.05	0.05	0.06	0.06

Table 4.

Fundamental Objective	Measurable Attribute	Worst Case	Best Case	Rank	Score
Maintain duck hunting tradition	Number of people who identify themselves as duck hunters	95	120		
Maintain healthy duck populations as part of NA fauna	Equilibrium duck population size	0.5	0.79		
Ecosystem goods and services	Wetland acres (not counting farmed wetland)	95	120		
Promote conservation behavior in the public	Annual total of public and private dollars for habitat conservation ($billion)	9.8	$11		
Non-consumptive uses	Wetland/associated upland bird viewing-days/year (1000s)	532	924		
Hunt quality	Proportion of hunters who say they were satisfied or very satisfied with their season	0.35	0.55		
Maximize harvest opportunity	Annual equilibrium harvest	0.045	0.06		

Table 5.

Fundamental Objective	Measurable Attribute	Worst Case	Best Case	Score (Min)	Score (Max)	Rank	Score (Avg)	Weight (Avg)
Maintain duck hunting tradition	Number of people who identify themselves as duck hunters	95	120	30	100	3	87.0	0.157
Maintain healthy duck populations as part of NA fauna	Equilibrium duck population size	0.5	0.79	80	100	1	95.6	0.173
Ecosystem goods and services	Wetland acres (not counting farmed wetland)	95	120	30	100	2	89.2	0.161
Promote conservation behavior in the public	Annual total of public and private dollars for habitat conservation ($billion)	9.8	$11	20	98	4	75.9	0.137
Non-consumptive uses	Wetland/associated upland bird viewing-days/year (1000s)	532	924	20	90	7	58.3	0.106
Hunt quality	Proportion of hunters who say they were satisfied or very satisfied with their season	0.35	0.55	30	95	6	72.7	0.132
Maximize harvest opportunity	Annual equilibrium harvest	0.045	0.06	30	100	5	73.7	0.133

Table 6.

Strategic Action	1	**2**	**3**	**4**	5	**6**	**7**	**8**
Shoulder	90	90	90	90	100	100	100	100
K	100	100	120	120	100	100	120	120
Participation	100	120	100	120	100	120	100	120
Fundamental Objective								
Maintain duck hunting tradition	100	110	105	120	95	105	100	115
Maintain healthy duck populations as part of NA fauna	0.658	0.658	0.79	0.79	0.5	0.5	0.6	0.6
Ecosystem goods and services	95	100	110	120	95	100	110	120
Promote conservation behavior in the public	$10	$11	$9.8	$10.5	$10	$11	$9.8	$10.5
Non-consumptive uses	770	700	924	840	585	532	702	638
Hunt quality	0.48	0.44	0.55	0.48	0.38	0.35	0.44	0.38
Maximize harvest opportunity	0.045	0.045	0.054	0.054	0.05	0.05	0.06	0.06

	Normalized Scores								Weights
Fundamental Objective									
Maintain duck hunting tradition	0.200	0.600	0.400	1.000	0.000	0.400	0.200	0.800	0.157
Maintain healthy duck populations as part of NA fauna	0.545	0.545	1.000	1.000	0.000	0.000	0.345	0.345	0.173
Ecosystem goods and services	0.000	0.200	0.600	1.000	0.000	0.200	0.600	1.000	0.161
Promote conservation behavior in the public	0.167	1.000	0.000	0.583	0.167	1.000	0.000	0.583	0.137
Non-consumptive uses	0.607	0.428	1.000	0.786	0.136	0.000	0.434	0.271	0.106
Hunt quality	0.658	0.442	1.000	0.659	0.181	0.000	0.448	0.165	0.132
Maximize harvest opportunity	0.000	0.000	0.600	0.600	0.333	0.333	1.000	1.000	0.133
Weighted Score	0.299	0.462	0.650	0.822	0.106	0.277	0.426	0.611	

APPENDIX A
Breakout Group Discussions of Process

Group 1 – M. Runge, facilitator

Objectives

- Missing objective: minimize cost. There might be a number of different kinds of costs: outright expenditures, reallocation of existing funds/staff, etc.
- Are all of these fundamental objectives, or mean?
    - Non-consumptive uses?
    - Hunt quality, maximize harvest?
    - MO might have gotten it right; some of those might be means? Not in agreement on this.
- Should maximize harvest opportunity really be there?
- Ecosystem goods & services—is this a fundamental objective of *duck* management? Or just a side benefit of duck management?
    - From JV standpoint, see huge benefit it tying duck management to societal needs (flood management, carbon, Gulf anoxic zone, etc.). Could lead to substantial increase in dollars.
    - For some, this really is the most important objective. Maybe not for carbon sequestration, but when stated as wetland acres (or associated upland), this is really important.
    - "Ecosystem goods & services" is nebulous. Easier to focus on wetland acres.
    - If you could attain the other objectives without wetland habitat, would we still pursue wetland habitat. Do we want it in and of itself.
- Attribute of "N(eq)" for healthy populations objective. Is this a good measurable attribute? It's more than just absolute population size? Biological functioning of population. Stability of the population.
- Don't have species-specific objectives yet. They might belong as subcomponents of the "healthy duck populations" objective.
- Attribute of H(eq) is a poor proxy for harvest opportunity. How do you measure opportunity? A big part of this is access. Also, days.
- "Maintain the relationship between harvest, habitat, and hunters" was an important fundamental objective but didn't get brought forward. Should it? How would you measure it? What does this mean?
    - Rigid mathematical models by species cranking out regulations; it's difficult for the states to build back the human dimension aspects. Disconnect between Arlington and rank-and-file duck hunter. E.g., recommendation to go from Liberal to Restrictive; doesn't take into account hunters perception, tradition, satisfaction. This is about not having all the right objectives in the optimizations.
- {90,120,120} not a high preference
    - What does 90% really mean for harvest opportunity and distribution of season choices.
- {100, 120, 100} like this
    - Increasing K
    - Maintains participation; if you could maintain things, you'd be doing well. Realistic goal, maybe even lofty.

- If we increase participation 20%, where are we doing to put them if we don't increase habitat?

Actions

- Regarding "Participation" action, we're just trying to maintain tradition, not increase, so maybe the alternatives should be 100 vs. 80.
  - Maintain tradition doesn't mean maintain status quo (in terms of hunter declines), but to get back to the historic levels.
  - 20% increase in participation might be impossible; we'd be lucky just to hold things steady.
  - There's an interesting issue of the message we send.
  - Just holding things steady might require a lot of work, to recruit hunters to replace those retiring.

Group 2 – D. Humburg, facilitator

Fundamental Objective	Measurable Attribute	Amended Objective	Amended Measurable Attributes
Maintain duck hunting tradition	Number of people who identify themselves as duck hunters		
Maintain healthy duck populations as part of NA fauna	Equilibrium duck population size		
Ecosystem goods and services	Wetland acres (not counting farmed wetland)		
Promote conservation behavior in the public	Annual total of public and private dollars for habitat conservation ($billion)		
Non-consumptive uses	Wetland/associated upland bird viewing-days/year (1000s)		
Hunt quality	Proportion of hunters who say they were satisfied or very satisfied with their season	Questions emerge about whether this is a fundamental objective	Balance between hunt quality and maximum opportunity
Maximize harvest opportunity	Annual equilibrium harvest	Maximize harvest opportunity while maintaining equitable distribution of harvest. Questions arose related to "fairness" or "equitable"	Harvest rate by flyway, average ducks per hunter, days per hunters. - This usually, however, is more perceived that real difference in harvest days or ducks - would be measured by attirudes rather than real data.
Minimize Cost - ensuring the most efficient and effective use of available conservation revenue	Equilibrium harvest / public and private revenue AND/OR Equilibrium population / public and private revenue AND/OR Participation objective / public and private revenue		

Group 3 – D. Case, facilitator

Fundamental Objective	Measurable Attribute
Maintain duck hunting tradition	Number of people who identify themselves as duck hunters
Maintain healthy duck populations as part of NA fauna	Equilibrium duck population size
Ecosystem goods and services	Wetland acres (not counting farmed wetland)
Promote conservation behavior in the public	Annual total of public and private dollars for habitat conservation
Non-consumptive uses	Wetland/associated upland bird viewing-days
Hunt quality	Proportion of hunters who say they were satisfied or very satisfied with the season
Maximize harvest opportunity	Annual equilibrium harvest

- Wrong attribute for "maximize harvest opportunity"—needs to be some measure of days of hunting opportunity, simplicity of regulations, access, etc.
- Should be "maximize HUNTING opportunity"
- Waterfowl hunting tradition—different hunter groups have different methods
- Tradition important re retention, may not be as important for recruitment
- Hunt Quality—not a fundamental objective, if we change max harvest opportunity to max hunting opportunity.
- Cost needs to be added as a fundamental objective—how to use $ most effectively (new or existing), regardless of how much you have
- Nonconsumptive uses—by product of duck pops and ecosystem services? May be lowest priority, but not eliminated? Important to hunting.
- Communications issue is important/needs to be considered. Not sure we know what "promote conservation behavior in the public" means
- What does "ecosystem goods and services" mean? Quality of life, wetlands and associated upland values, water quality, flood control . . . Water is a driving force for getting duck habitat work done.
- Maybe use the top tier in graphic as the fundamental objectives
- Consider that participation action may range—50%, 75%, 100% --that's the best we can hope for.

Group 4 – A. Raedeke, facilitator

The issue of money…costs minimization…

Issue..if you have limited amount of resources, how are you going to spend it. It is an allocation issue to a certain extent.

Does our current spending match…..these weighting…..would they match…..?????

By excluding costs…you can then measure how your current spending matches….

Fundamental..the one on top….all ducks….similarly…hunters…could be public use….

When you've lost most of your wetlands, it almost has to be a priority.

Issue in states that have few waterfowl hunter and lots of deer hunters, it then becomes an issue of how you get support to spend agency funds for wetland habitat when people want it spent for deer habitat. It is critical to create a constituency interested in wetlands. It could be for water quality or for other reasons.
The ecological goods and services remains the fundamental objective, creating constituency is a means objective.
If it is above duck management, then ecological goods and services can be ranked number one, more than just ducks.
Hunt quality and maximize harvest opportunity are means objectives to participation.
Nonconsumptive use….it is a means to create interest for creating habitat and hunter behavior.
This group viewed this as a means objective. Nonconsumptive users provide financial support.
Means to an end (6) – 2 thought it was a fundamental objectives
(top one…could be public use…hunting and non-use could then be under then)
Measuring attributes….could change the fundamental objective….
Graphic is important…..

Group 5 – G. Zenner, facilitator

What objectives are missing, misweighted, or scored incorrectly.
What if we don't have enough money to even maintain K much less increase it?
Regardless of the cost, we need to articulate the objectives we think are most important.

Problems with the analysis?
Should there be a second analysis, an economic analysis, that takes these objectives, assigns costs to them, and then determines the most cost effective action.
Make a costs table similar to the consequence table.
There is substantial disagreement with the impacts of the actions on the objectives as portrayed by the consequences. Agreement on the consequences is fundamental to using this methodology.

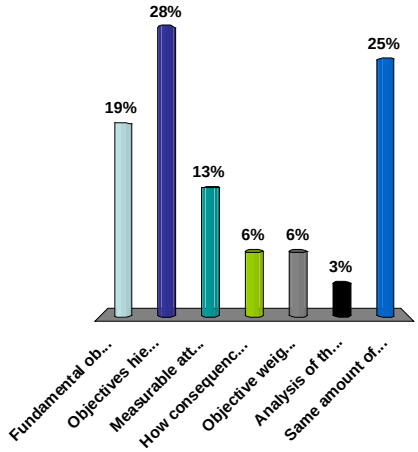
Problems with the fundamental objectives?
We need to articulate a single fundamental objective that incorporates hunt quality and maximizing harvest quality into maintaining the duck hunting tradition.
We are unsure what "maximizing harvest opportunity" really means and thus are unsure what measurable attribute should be used to monitor it. Possibly use some combination of season length and bag limit to measure harvest opportunity.
Should "hunt quality" be a fundamental objective?

Problems with measurable attributes?
Annual equilibrium harvest is not the right metric for maximizing harvest opportunity.
Satisfaction criteria should be incorporated in the metric for "Maintaining the duck hunting tradition" in addition to the number of people that identify themselves as duck hunters.

APPENDIX B
Workshop Evaluation

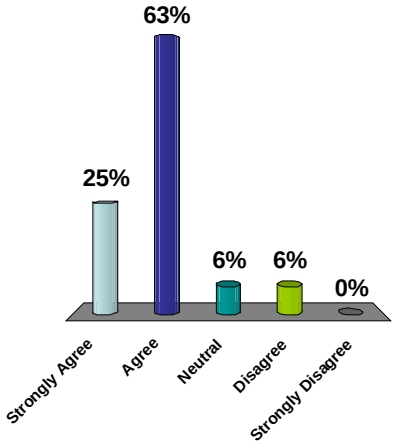
If we did this kind of workshop again, what do you think we should spend more relative time on:

1. Fundamental objectives
2. Objectives hierarchy
3. Measurable attributes
4. How consequences were developed
5. Objective weighting
6. Analysis of the table
7. Same amount of relative time



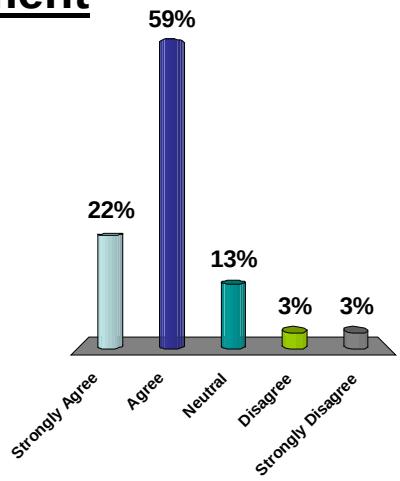
A "structured decision making" approach would be useful for <u>Harvest Management</u>

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



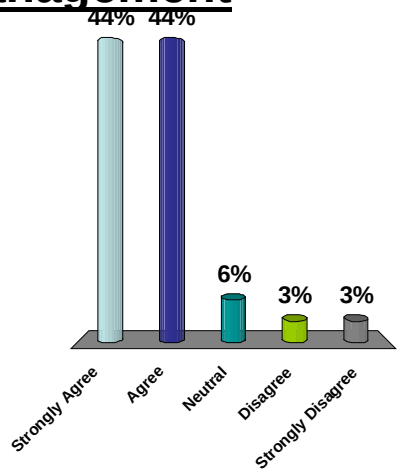
A “structured decision making” approach would be useful for <u>Habitat Management</u>

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



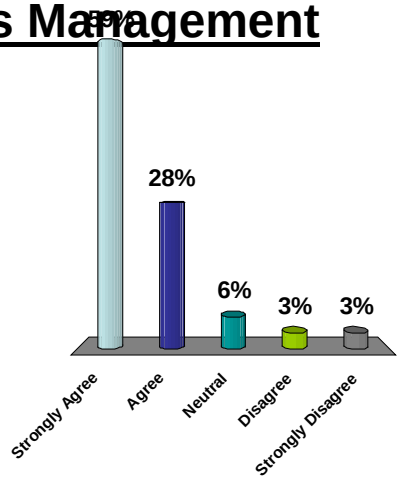
A “structured decision making” approach would be useful for <u>Human Dimensions Management</u>

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



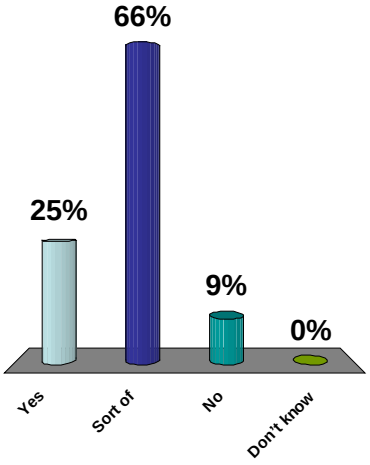
A “structured decision making” approach would be useful for <u>Integrating Harvest, Habitat and Human Dimensions Management</u>

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



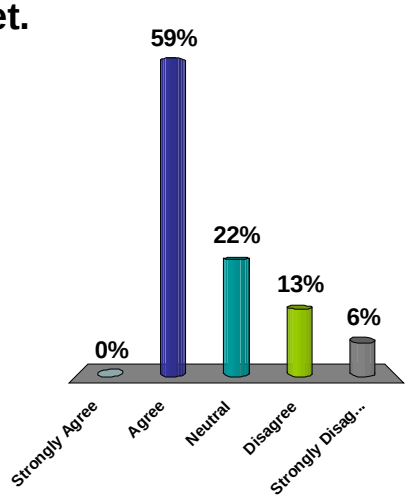
Do you feel that you understand “Structured Decision Making”?

1. Yes
2. Sort of
3. No
4. Don’t know



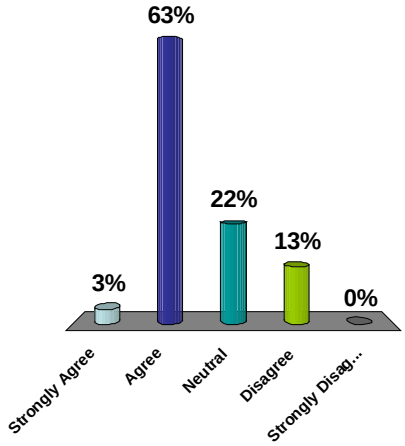
The meeting objective "*Statements of fundamental objectives for duck, habitat and hunter management in the Mississippi Flyway*" was met.

1. **Strongly Agree**
2. **Agree**
3. **Neutral**
4. **Disagree**
5. **Strongly Disagree**



The meeting objective "*A better understanding of the implications of multiple objectives and the tradeoffs among them*" was met.

1. **Strongly Agree**
2. **Agree**
3. **Neutral**
4. **Disagree**
5. **Strongly Disagree**



APPENDIX C

Mississippi Flyway Council
Waterfowl Management Workshop
July 22-23, 2009

Agenda, Draft July 21, 2009

Workshop Objectives

Statements of fundamental goals and measurable objectives for duck management in the Mississippi Flyway.
A better understanding of the implications of multiple objectives and the concept of coherence.
Statements of priorities that will help guide future decisions.

Wednesday, July 22

Identifying fundamental objectives, distinguishing from means objectives

1:00 p.m. Review workshop process and agenda—Case

1:10 Introduction to SDM, and multi-attribute decision making—Runge
- Why do you use SDM?
- How does multiple-objective SDM work?

1:40 Problem framing: what is the problem we're tackling in the next day? Waterfowl management writ large, with integration of harvest, habitat, and humans—Runge

1:55 Summary of past/current work—Zenner

2:10 Breakout instructions—Case
Developing a list of priority objectives

2:20 Breakout groups work

3:00 Full group discussion—Runge
Focus on fundamental objectives
- Are there missing objectives?
- Try to organize this list of fundamental objectives, see if there's a hierarchy

3:30 Breakout instructions—Case
Linking fundamental and means objectives

3:40 Breakout groups work

4:10 Full group discussion—Runge
Insights about fundamental objectives?

4:40 Adjust agenda for Thursday and wrap-up—Case

5:00 Adjourn

7:00-9:00 Evening Session for Planning Subgroup
- Clarify set of actions
- Develop measurable attributes
- Develop consequence table, with models and elicitation methods
- Set up weighting exercise, print out tables

Thursday, July 23

Look at fundamental objectives, tradeoffs, and how to manage those tradeoffs

8:00 a.m. Review consequence table—Raedeke

8:30 Elicit weights—Runge
Done by decision-makers: only council members get a vote; but they have technical staff assigned to them

9:00 Review the weighted outcomes and discuss patterns—Runge

9:20 Breakout instructions—Case
What objectives are missing, misweighted, not scored correctly? Compile a list of problems with the analysis, specifically about fundamental objectives.

9:25 Breakout groups work

10:05 Full group discussion—Runge
Reports from each breakout group

10:30 Discussion of coherence that arises out of prototype—Runge

11:10 Where do we from here?—Hauge

11:40 Wrap-up and workshop evaluation—Case

Noon Adjourn

Mississippi Flyway Council
Waterfowl Management Workshop
July 22-23, 2009

Breakout Groups

Group #	Council Member	Tech Member
Group 1	MN	IN
	IL	KY
	MS	AL
Group 2	WI	MN
	KY	TN
	LA	
Group 3	AL	WI
	TN	OH
		MS
Group 4	IA	MI
	OH	MO
	AL	LA
Group 5	MO	IA
	FWS	IL
		AR

* No council members from MI or IN