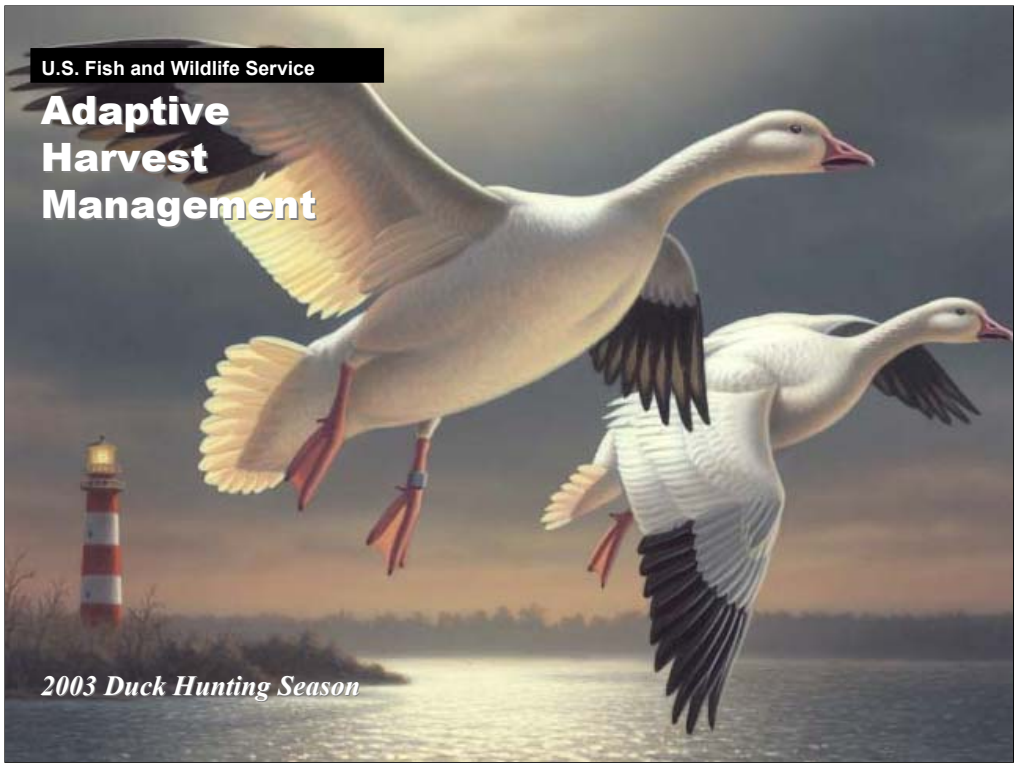


•presentation provides a summary of the annual AHM report for 2003

•**Disclaimer**: Nothing in this presentation represents an official position of the USFWS on the selection of the 2003 duck-hunting regulations. It is intended merely to support the established administrative process for promulgating regulations.

•presentation was prepared by Fred Johnson, Division of Migratory Bird Management, USFWS (phone 352-378-8181 x372)

What is AHM?

A process…

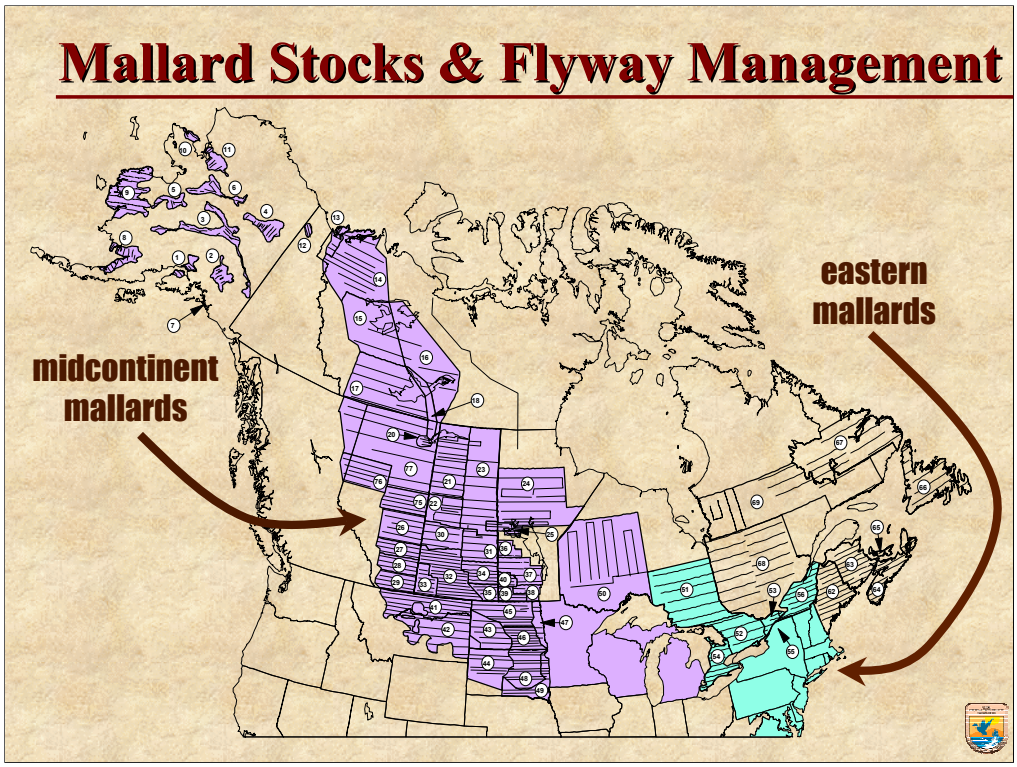
- for prescribing hunting regulations, which are optimal with respect to agreed-upon objectives and regulatory options

- that explicitly accounts for uncertainty in regulatory impacts

- and that involves learning from experience

What are the benefits?

- a systematic and coherent framework for addressing controversial harvest-management issues
- a clearer distinction between science (*predicting* consequences) and management goals (*valuing* consequences)
- a well-defined role for monitoring programs in setting regulations
- an explicit accounting for various sources of uncertainty in regulatory effects, and the reduction in that uncertainty over time
- a more transparent process (accountability)
- a more objective, better informed, and less contentious decision-making process



•Breeding mallards are distributed widely across North America and there likely are geographic differences in optimal levels of harvest. The challenge is to vary hunting regulations among Flyways in a manner that recognizes each Flyway's unique breeding-ground derivation of mallards.

•Currently, 2 stocks of mallards are recognized for the purposes of AHM. The USFWS continues to use a constrained approach, in which the regulatory strategy for the Atlantic Flyway is based solely on the status of eastern mallards. The strategy for the western 3 Flyways continues to be based on the status of midcontinent mallards. This approach to managing multiple mallard stocks remains provisional until its implications are better understood, and until a more comprehensive approach to AHM for multiple-stocks is developed.

•Efforts are on-going to identify a western mallard stock, and to assemble the monitoring & assessment tools necessary to manage these mallards within a AHM framework.

2003 Regulatory Alternatives

Regulation	Flyway			
	Atlantic[a]	Mississippi	Central[b]	Pacific[c]
Shooting hours	one-half hour before sunrise to sunset			
Framework dates				
Restrictive	Oct 1 - Jan 20	Saturday nearest Oct 1 - Sunday nearest Jan 20		
Moderate and Liberal	Saturday nearest Sep 24 - last Sunday in Jan			
Season length (days)				
Restrictive	30	30	39	60
Moderate	45	45	60	86
Liberal	60	60	74	107
Bag limit (total / mallard / female mallard)				
Restrictive	3 / 3 / 1	3 / 2 / 1	3 / 3 / 1	4 / 3 / 1
Moderate	6 / 4 / 2	6 / 4 / 1	6 / 5 / 1	7 / 5 / 2
Liberal	6 / 4 / 2	6 / 4 / 2	6 / 5 / 2	7 / 7 / 2

[a] The states of Maine, Massachusetts, Connecticut, Pennsylvania, New Jersey, Maryland, Delaware, West Virginia, Virginia, and North Carolina are permitted to exclude Sundays, which are closed to hunting, from their total allotment of season days.
[b] The High Plains Mallard Management Unit is allowed 8, 12, 23, and 23 extra days in the very restrictive, restrictive, moderate, and liberal alternatives, respectively.
[c] The Columbia Basin Mallard Management Unit is allowed seven extra days in the very restrictive, restrictive, and moderate alternatives.

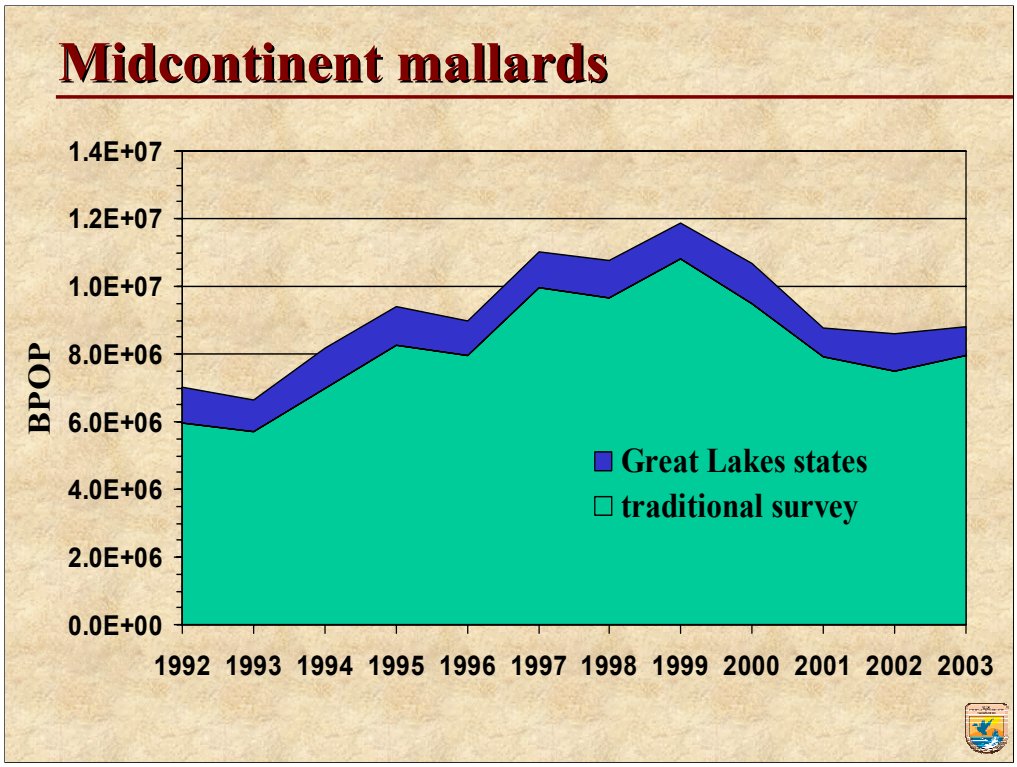
•For the 2003 season, the USFWS made 2 significant changes to the set of regulatory alternatives.

•Based on recommendations from the Flyway Councils, the USFWS eliminated the very-restrictive alternative. Harvest rates expected under the very-restrictive alternative did not differ significantly from those under the restrictive alternative, and the very-restrictive alternative was expected to be prescribed for only about 5% or less of all hunting seasons.

•Also based on Flyway recommendations, the USFWS placed a constraint on closed seasons in the 3 western Flyways when the midcontinent mallard population >=5.5 million (traditional survey area plus MI, MN, & WI). This constraint will significantly reduce the frequency of closed-season prescriptions (to about 17% of all years), apparently with no adverse biological impact. Based on current biological assessments, closed hunting seasons do not appear to be necessary from the perspective of sustainable harvesting when the midcontinent mallard population (traditional survey area plus the Great Lakes region) exceeds 5.5 million. The impact of maintaining open seasons above this level also appears to be negligible for other midcontinent duck species (scaup, gadwall, wigeon, green-winged teal, blue-winged teal, shoveler, pintail, redhead, and canvasbacks). However, the USFWS notes that closed seasons targeted at particular species or populations could still be necessary in some situations regardless of the status of midcontinent mallards.

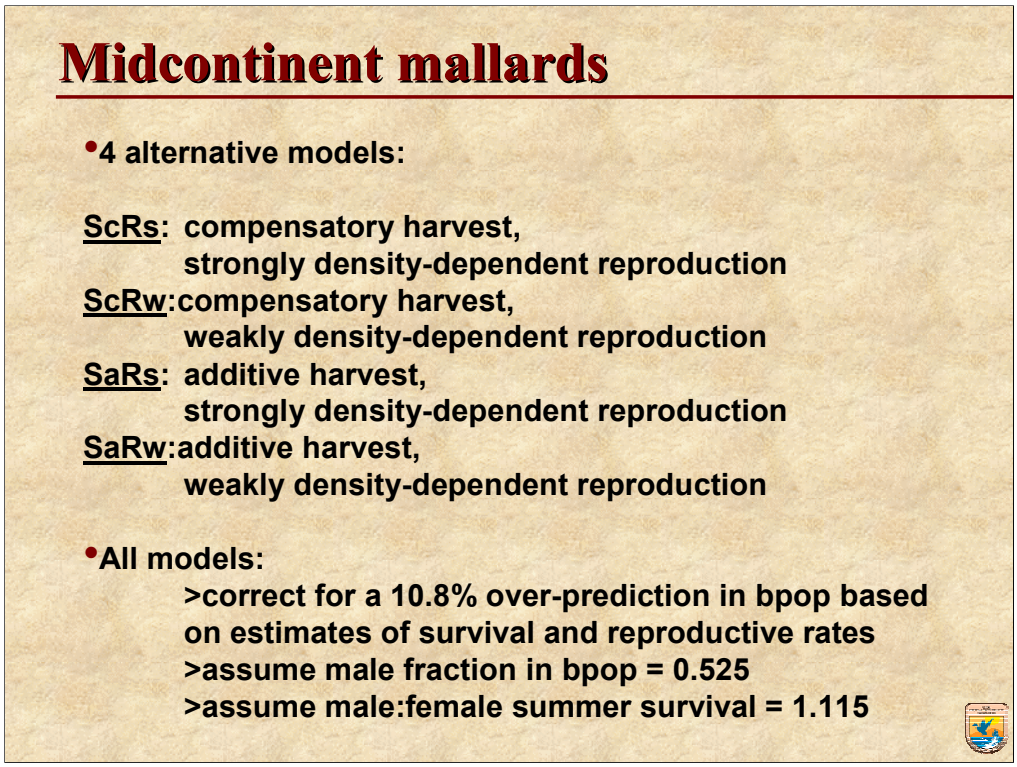
•The Atlantic and Mississippi Flyway Councils also recommended to limit changes in annual regulations to one step because it is expected to significantly reduce temporal variability in hunting regulations, as well as lower the prospect of closed hunting seasons. These benefits are expected to accrue with little or no impact to the size of the mallard population or harvest. However, the Central and Pacific Flyway Councils opposed the “one-step” constraint, principally because it would significantly reduce the frequency of liberal seasons. The USFWS thus believes that further discussion of the “one-step” constraint is needed to develop consensus regarding the trade-offs inherent in this constraint. Therefore, the USFWS will not implement the “one-step” constraint for the 2003-04 duck-hunting season.

•The USFWS continues to offer extended framework dates in the moderate and liberal alternatives.



•The total population of midcontinent mallards has varied from 6.7 million to 11.8 million over the period of record (Great Lakes states' estimates only available from 1992). The Great Lakes states make up about 12% of the total population on average.

•This year's total population estimate was 8.8 million mallards, statistically unchanged from 8.6 million last year.



•Last year, the set of population models for midcontinent mallards was revised extensively to account for an apparent bias in estimates of survival or reproductive rates.

•Two alternative hypotheses are considered for each of the survival and reproductive processes. Common to all models are the fixed parameter values depicted here.

•The set of alternative population models suggest that carrying capacity (average population size in the absence of harvest) for an average number of Canadian ponds is somewhere between about 6 and 16 million mallards. The population model with additive hunting mortality and weakly density-dependent recruitment (SaRw) leads to the most conservative harvest strategy, whereas the model with compensatory hunting mortality and strongly density-dependent recruitment (ScRs) leads to the most liberal strategy. The other two models (SaRs and ScRw) lead to strategies that are intermediate between these extremes.

Midcontinent mallards

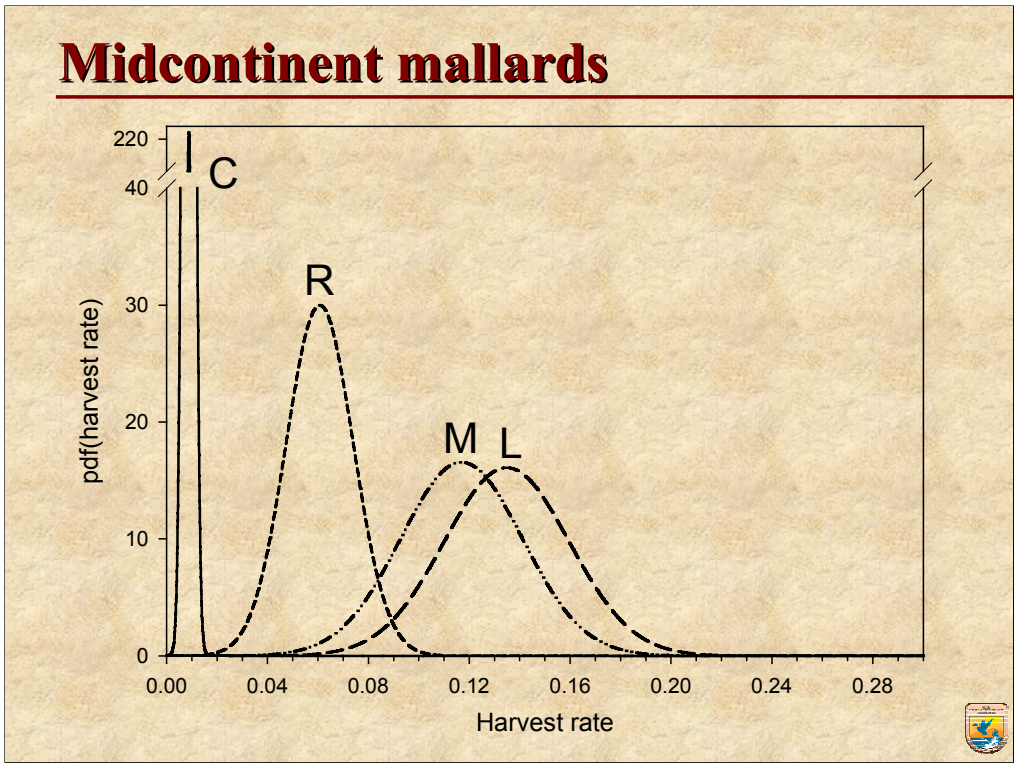
Year	Compensatory mortality	Additive mortality	Strongly d-d R	Weakly d-d R
1996	0.50	0.50	0.50	0.50
1997	0.50	0.50	0.47	0.53
1998	0.50	0.50	0.45	0.55
1999	0.44	0.56	0.15	0.85
2000	0.46	0.54	0.15	0.85
2001	0.46	0.54	0.14	0.86
2002	0.45	0.55	0.13	0.87
2003	0.42	0.58	0.09	0.91

•Each year, the weights associated with each of the 4 population models are updated based on a comparison of predicted and observed mallard population sizes.

•Evidence for additive hunting mortality remains equivocal. And it will continue to be difficult to distinguish between the additive and compensatory hypotheses because both hypotheses predict similar effects within the range of traditional harvest rates. Much more extreme harvest rates (either more restrictive or more liberal) would be needed before these hypotheses would predict differences in growth rate that could be detected via the May survey.

• Currently, model weights strongly support the weakly density-dependent reproductive hypothesis.

•However, the audience is warned that models sometimes can make reliable predictions of population size for reasons having little to do with the biological hypotheses expressed therein (because there is no formal study design with experimental controls and replication and randomization of treatments).

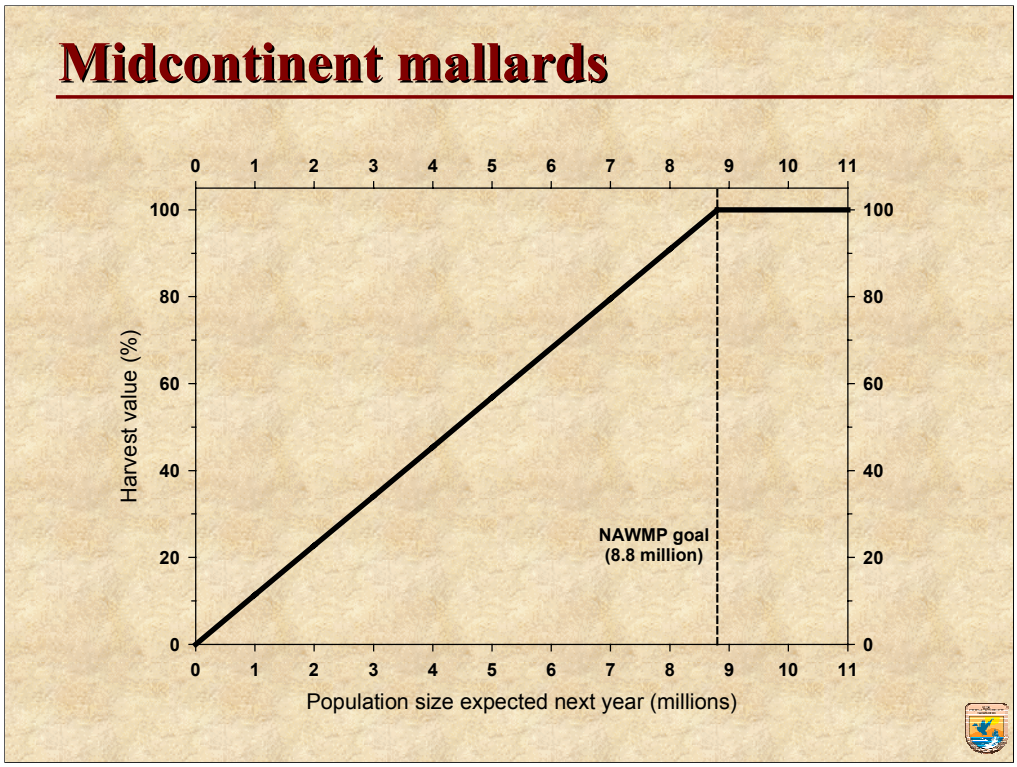


•These are the distributions of expected harvest rates under the 2002 regulatory alternatives in the 3 western Flyways (the y-axis represents the realtive probability of different harvest rates).

•Bayesian statistical methods are used for generating and updating predictions of harvest rates associated with the set of regulatory alternatives. Essentially, the idea is to use historical information to develop initial harvest-rate predictions, to make regulatory decisions based on those predictions, and then to observe realized harvest rates. Those observed harvest rates, in turn, are used to update the predictions.

•Using this approach, predictions of harvest rates of midcontinent mallards under the regulatory alternatives have been updated based on special banding studies conducted since 1998.

•Results from the 2002 hunting season suggest that use of the extended framework dates was responsible for a marginal increase in harvest rates of midcontinent mallards of 1.6 percentage points (i.e., a harvest rate increase from 11.9% to 13.5% under the liberal alternative, and from 10.1% to 11.7% under the moderate alternative), which is similar or slightly less than what was expected.



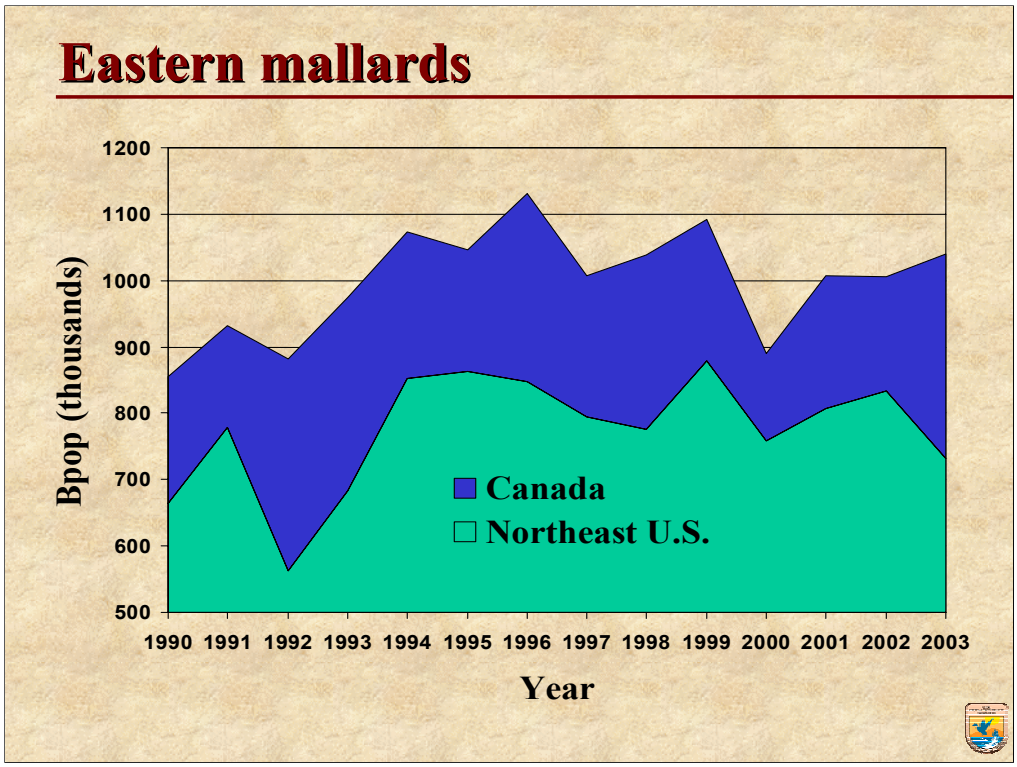
•The current management objective for midcontinent mallards includes the NAWMP goal (8.2. million in the traditional survey area + 0.6 million in MI, MN, & WI). The idea is to maximize sustainable harvest, but to devalue harvest whenever regulatory decisions are expected to produce a population size next year below the NAWMP goal. This balance of harvest and population objectives results in a regulatory strategy that is more conservative than that for maximizing long-term harvest, but more liberal than a strategy to attain the NAWMP goal (regardless of effects on hunting opportunity)

Midcontinent mallards

	Ponds									
Bpop	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
<=5.25	C	C	C	C	C	C	C	C	C	C
5.5-6.5	R	R	R	R	R	R	R	R	R	R
6.75	R	R	R	R	R	R	R	R	M	M
7.00	R	R	R	R	R	R	M	M	M	L
7.25	R	R	R	R	M	M	L	L	L	L
7.50	R	R	R	M	L	L	L	L	L	L
7.75	R	M	M	L	L	L	L	L	L	L
8.00	M	M	M	L	L	L	L	L	L	L
8.25	M	L	L	L	L	L	L	L	L	L
>=8.5	L	L	L	L	L	L	L	L	L	L

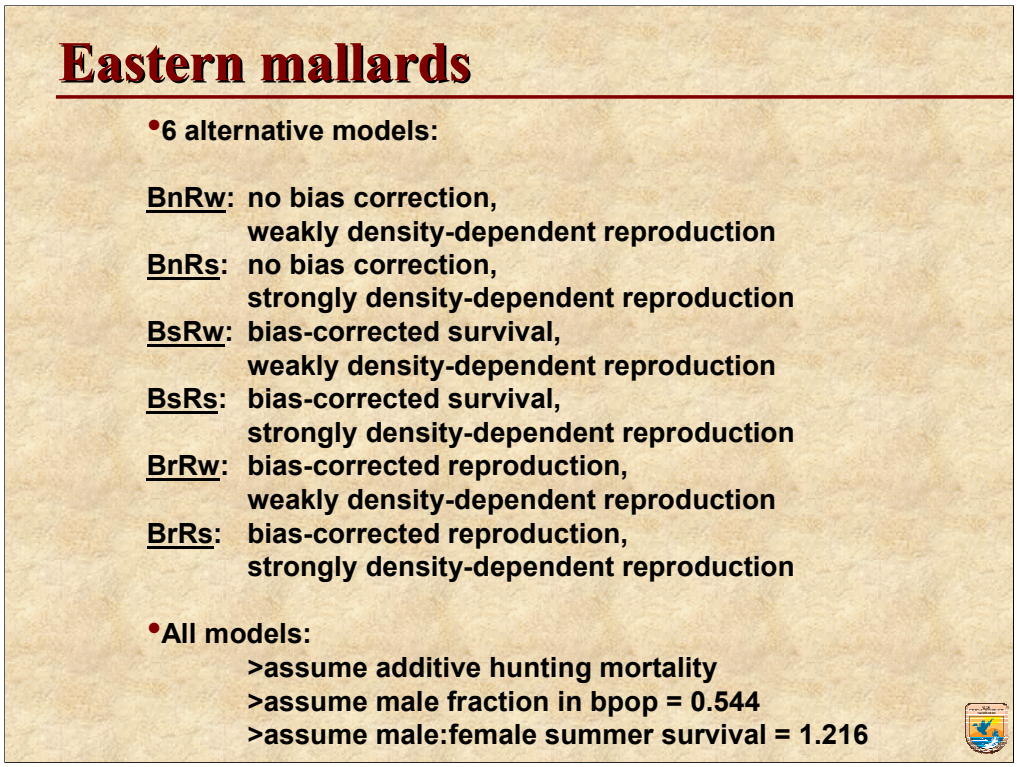
•The 2003 optimal regulatory strategy for midcontinent mallards was based on: (1) the revised regulatory alternatives, including the closed-season constraint; (2) updates of regulation-specific harvest rates; (3) current population models and updated model weights; and (3) the dual objectives to maximize long-term cumulative harvest and achieve a population goal of 8.8 million midcontinent mallards.

•Based on a spring population survey of 8.80 million mallards and 3.52 million Canadian ponds, the prescription is for a liberal season in 2003 for the three western Flyways.



•The total population of eastern mallards has varied from 856 thousand to 1.1 million over the period of record. The northeastern U.S. accounts for about 77% of the total population on average.

•This year's total population estimate was 1.04 million mallards, statistically unchanged from 1.00 million last year.



•As with midcontinent mallards, the set of population models for eastern mallards was extensively revised last year to: (a) eliminate dependence on the Breeding Bird Survey; and (b) to allow for the possibility of a positive bias in estimates of survival and reproductive rates.

•As in the past, the model set continues to include competing models of strongly and weakly density-dependent reproduction. All models assume that harvest is an additive form of mortality.

•The estimated male fraction of the breeding population and the ratio of male and female summer survival rates are similar to those used for midcontinent mallards.

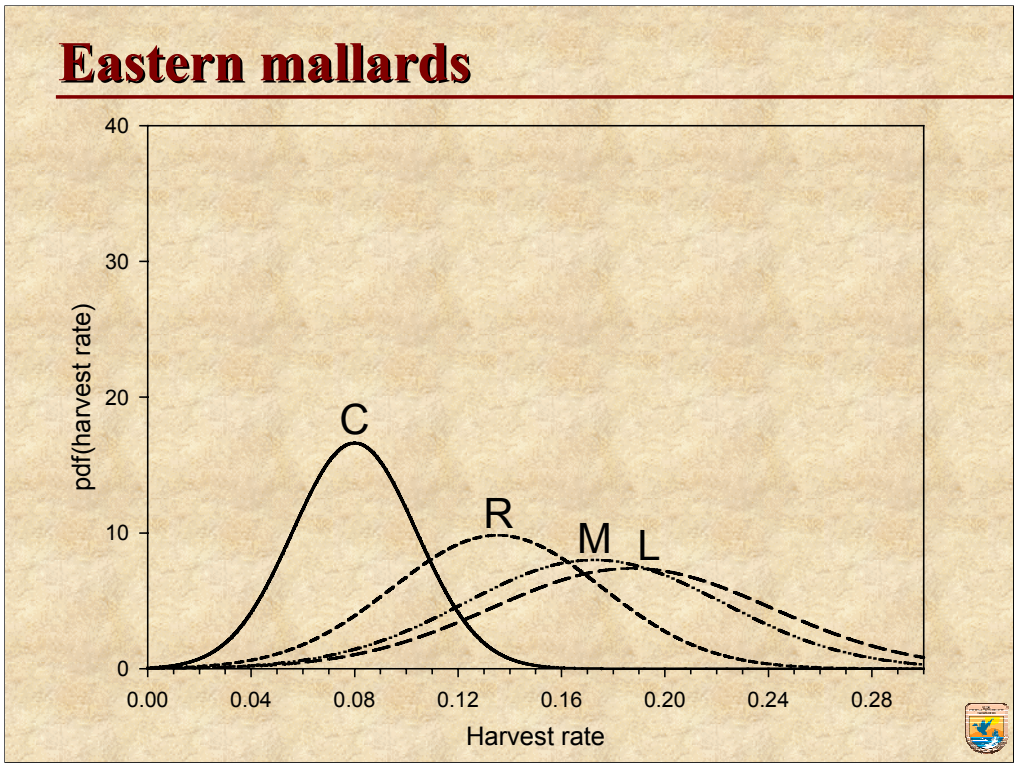
•Model-specific regulatory strategies based on the hypothesis of weakly density-dependent reproduction are considerably more conservative than those based on the hypothesis of strongly density-dependent reproduction. The three models with weakly density-dependent reproduction suggest a carrying capacity (i.e., average population size in the absence of harvest) >2.0 million mallards, and prescribe extremely restrictive regulations for population size <1.0 million. The three models with strongly density-dependent reproduction suggest a carrying capacity of about 1.5 million mallards, and all prescribe liberal regulations for population sizes >300 thousand.

Eastern mallards

Year	No bias	S bias	R bias	Strong d-d R	Weak d-d R
1997	0.166	0.418	0.415	0.539	0.461
1998	0.234	0.372	0.393	0.546	0.454
1999	0.389	0.282	0.329	0.548	0.452
2000	0.147	0.404	0.449	0.551	0.449
2001	0.272	0.345	0.383	0.680	0.320
2002	0.296	0.325	0.379	0.682	0.318
2003	0.446	0.245	0.309	0.702	0.298

•Weights for the alternative models of eastern mallard population dynamics were calculated based on an assumption of equal model weights in 1996 (the last year data was used to develop most model components) and on predictions of year-specific harvest rates.

•The model best predicting observed population size has varied among years; accordingly, there is no single model that is clearly favored over the others at the end of the time frame. However, we note that the three models with strongly density-dependent reproduction currently account for 70% of the total model weight.



•For eastern mallards, predictions of regulation-specific harvest rates continue to depend exclusively on historical ("prior") information because no contemporary estimates of harvest rate are available. Updated predictions of harvest rates await the results of new band-reporting rate studies in eastern North America.

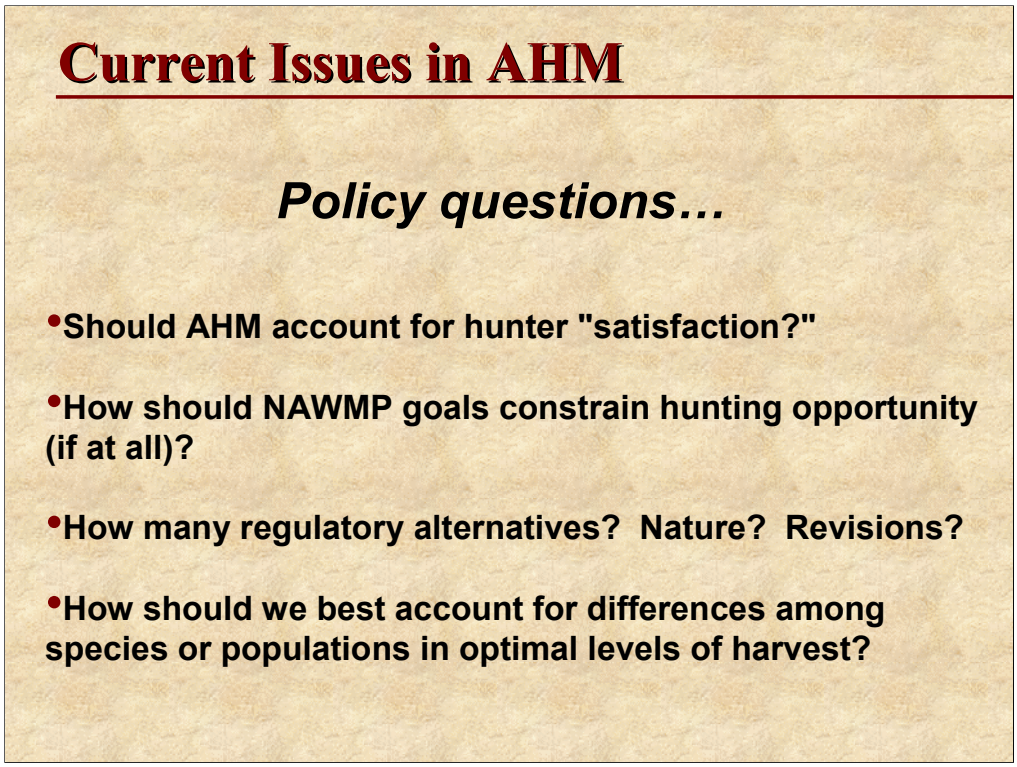
•The predicted harvest rates associated with a closed season are higher for eastern mallards than for midcontinent mallards because a large portion of the harvest occurs in Canada. Because there is no coordinated AHM strategy between the 2 countries, we make the conservative assumption that Canada would not necessarily close their duck hunting season at the same time as the U.S.

Eastern mallards

Mallards	Regulation
<=200	C
225	R
250	M
>=275	L

•We calculated an optimal regulatory strategy for the Atlantic Flyway based on: (1) the 2003 regulatory alternatives; (2) current population models and associated weights for eastern mallards; and (3) an objective to maximize long-term cumulative harvest. The resulting strategy suggests liberal regulations for all population sizes of record, and is characterized by a lack of intermediate regulations. The strategy exhibits this behavior largely because of the small differences in harvest rate among regulatory alternatives.

•Based on a breeding population size of 1.04 million mallards, the optimal regulatory choice for the Atlantic Flyway in 2003 is the liberal alternative.



•The AHM Working Group has begun a strategic discussion about future development and application of AHM. This discussion was motivated in part by the special session on AHM that was held at the 2000 North American Wildlife and Natural Resources Conference. That session offered a retrospective on the development of AHM, and described a number of policy issues affecting future progress. Relevant questions that need to be addressed include:

•Whether AHM should account explicitly for hunter satisfaction and, if so, how would it be measured and monitored? The Wildlife Management Institute has received federal aid to explore this issue and will work closely with the AHM Working Group to help frame the issue.

•NAWMP goals are not needed for the purposes of resource protection because it is implicit in an objective to maximize long-term cumulative harvest. However, there may be other rationale for including NAWMP (or other population) goals. The difficulty is to agree to the extent to which hunting opportunity should be constrained by such goals.

•There continues to be some dissatisfaction with the current regulatory alternatives and a comprehensive review is needed. What should these alternatives look like and how often should they be re-visited?

•Perhaps the greatest challenge will be extending the AHM framework to account explicitly for species other than mallards.

•The International Association of Fish & Wildlife Agencies has convened a task force of recognized leaders in waterfowl management to help address these questions. The task force is working closely with the Flyway Councils and USFWS, and is hoping to present its first set of recommendations later this fall.

For More Information

AHM website at:
http://migratorybirds.fws.gov

•The website contains background information, annual AHM reports, reports from the AHM Working Group, relevant news releases, and Federal Register documents.