ADAPTIVE HARVEST MANAGEMENT

Definition
- “Management in the face of uncertainty”
- It acknowledges that there is a response of the environment to management activities as attempts to evolve its strategies based on continually gained knowledge of the system and its responses.
- Responses of management activities cannot be predicted with certainty
- Called adaptive because the harvest strategy evolves to account for knowledge via comparisons of observed and predicted sizes of breeding populations.
- It follows a structured test process and adjusts accordingly
- It encourages integration of research and management
- Problem – the model relies on mallards only. It is still in the early stages of development. Models have been developed for NOPI, ABDU, WODU, CANV, & CANG.

Prior to 1995 USFWS “chased yearly populations. When populations where down they restricted limits. When populations were up there was a liberal harvest.

How does it work?
Cycle of monitoring, assessment and decision making
- This cycle helps clarify the relationship between management action and the actual environmental response.

Uncertainty is recognized which influences the framework

4 Sources of uncertainty
- Environmental variation - yearly variations in environment that influence waterfowl populations
- Partial controllability – managers have an inability to precisely predict or control harvest rates.
- Partial observability – there is limited precision in the estimation of population size, reproduction and harvest rates.
- Structural uncertainty – incomplete understanding of how biological systems work and respond to management.
  - The most controversial – is hunting additive or compensatory?
  - Compensatory – the ducks would die anyway, hunting is a substitute for natural mortality
  - Additive – mortality above what is normally expected. It adds to the number that would have occurred naturally
Ex: ptarmigan – hunting mortality can be 5x higher than what would be expected naturally. Other times hunting can be compensatory so long as hunting take is at or less than 15% of population

This uncertainty limits manager’s ability to predict impact of duck hunting

Components of AHM
- There are a limited number of regulatory alternatives for annual harvest management. These include: bag limits, dates (beginning and end dates, splits, etc) and season length.
- Population models describe each hypothesis on harvest effects and environmental conditions on waterfowl abundance.
- There is a measure of reliability for each model.
- There is a mathematical description of objectives of harvest management which allows for comparisons of alternative regulatory strategies.

4 models of AHM
- Additive harvest mortality
- Compensatory harvest mortality
- Weak density dependent reproductive success
- Strong density dependent reproductive success
  - Additive + weak is the most conservative harvest strategy
  - Compensatory + strong is the most liberal harvest strategy

AHM Implementation
1. Select regulatory alternative based on environmental conditions and the reliability of each model.
2. Predictions are determined for the size of the breeding population for the next year.
3. In the following year current breeding population estimates are obtained the reliability of each model is updated – either higher or lower to reflect the predication ability from the previous year – the cycle then begins again.

Reliability of additive mortality is 58%
Reliability of weak density dependent is 91%

Season lengths are set for the 4 flyways – earliest Sept 1, latest Mar 10. The states then set hunting dates within on when waterfowl are most abundant in state.

Max season length – 107 days
Longest season length is in pacific flyway shortest is Atlantic flyway

Adjustment in these season lengths is very effective in reducing annual harvest
- Ex: WODU in Atlantic and MS flyway – harvest didn’t increase until season was lengthened from 40 to 60 days
**Bag Limits** and season length are the cornerstone of waterfowl management

Shooting a fixed number of birds. Ex: Ar regulations 6 total. No more than 4 mallards – 2 of which may be hens.

“Regulation index” = season length * bag limit. – It is correlated positively with duck stamp sales

- hunters are less likely to hunt in years of restrictive limits
- liberal limits in pacific flyway and conservative limits in Atlantic flyway – which reflects the difference in waterfowl abundance and hunter numbers

Increase in bag limits has greater effect on harvest when the bag limit is low

- ex: in Idaho – limit was increased from 2 to 3 which raised total harvest by 28% . When the limit was raised from 5 to 6 it only raised total harvest by 4%

**History**

1900 – Lacey Act - prohibited interstate movement of all illegally harvested wild game

1913 – Weeks – McLean Act – ended spring waterfowl hunting and the marketing of migratory birds

1916/1918 – Migratory Bird Treaty Act – gave the government the power to regulate migratory bird hunting seasons and provided the legal framework for waterfowl conservation as it exists today

- Amendments: 1998 – unlawful to bait ducks. 2004 – applied only to native spp

1929 – Migratory Bird Conservation Act – Protected crucial habitat to be preserved and managed for migratory birds. Allowed for the acquisition of refuges.

1934 – “Duck Stamp Act” The migratory Bird Hunt and Conservation Stamp Act

1937 – Federal Aid in Wildlife Restoration Act – “Pittman and Robertson Act” Funding for management purposes via 10% federal excise tax on arms and ammunition.

1930 – The flyways became administrative units

1948 – Regulations for hunting became based on the flyway concept

1950s & 60s – special seasons were implemented as waterfowl populations plummeted (prolonged drought in PPR) USFWS focused on under harvested spp as a response to increase hunter opportunity

1965-1967 – Sept teal season – tested in MS and Central Flyways 1969 became option for states. It was designed for BWTE. Limit 4/day. High harvests of non-teal eliminated the program due to diminished waterfowl populations, but it was recovered in the 1990s.
1977- Early WODU season – special season to hunt WODU in the south. Local populations were impacted and determined to be a major contributor to harvest. Band recoveries – only occurred more than 30km from banding site.

**Other historical tactics**

Shooting hours – 30 min before and after sunrise – spp not affected by earlier than sunrise shooting hours – 10% harvested before sunrise. 65% between sunrise and noon.

Zoning and Split seasons – used as a means of upping hunter opportunity

Special Management units – unique harvest opportunities ex: Columbia basin special mallard area – 4 additional mallards are able to be shot.

**Point System**

1973 in all flyways

The problem with bag limits is that they require hunters to ID birds on the wing before they are shot. Most hunters cannot accurately do it so a new method was needed which led to the point system.

Wanted to direct harvest toward certain spp and sexes and well as reduce bag limit violations.

Assigned “points to ducks AFTER they were shot. 10-100 points per spp. Females carried more points.

High point values to ducks needing protection – ex: CANV

Low point values to those that were abundant or lightly harvested – ex: BWTE

A running tally was kept until the limit of 100 points was reached.

It successfully shifted hunting pressure among spp and sexes but did not increase harvest beyond conventional harvest.

Problem – reordering was a big issue especially for law enforcement.

- Reordering – adding up points in a sequence other than which they were shot
- Illegal
- Allows for a larger daily bag
- Unenforceable unless wardens actually watched the hunt

Widely used in the 70s and 80s everywhere but pacific flyway

Suspended in 1988 due to decline in prairie nesting ducks. Offered again in 1990 but the restrictions were so high that most states chose bag limits. Eliminated again in 1994 due to compliance concerns and low evidence that it actually redirected harvest.