

What is Wildlife Management?



- Webster's Definitions
 - Wild
 - Living in a state of nature, as animals that have not been tamed or domesticated
 - Management
 - To control or direct
 - Contradictions?

What is Wildlife Management?

- Means of control
 - Manage habitats
 - Manage people
 - Manage the individuals in a population



What is Wildlife Management?



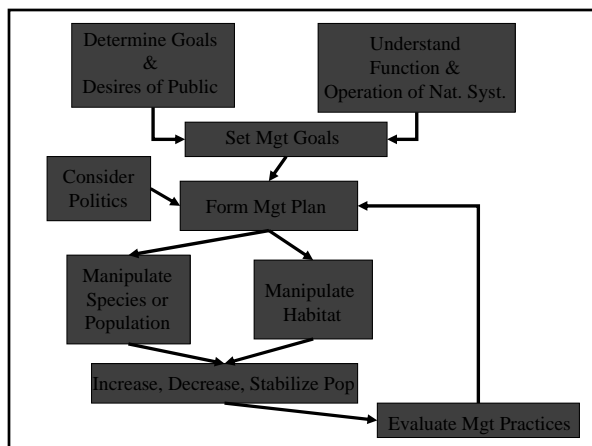
- For whom do we manage?
 - The Resource
 - Hunters
 - Anglers
 - Ranchers
 - Farmers
 - Timber industries
 - Business
 - Landowners
 - Miners
 - Bird watchers
 - Society
 - Future generations?

Review of Wildlife Fundamentals

- Game vs. Nongame
- Consumptive vs. Nonconsumptive Users

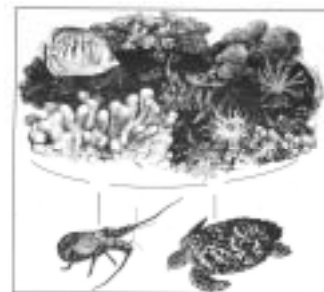
Goals of management:

- 1) population increase
- 2) population decrease
- 3) maintain population
- 4) harvest population on sustained yield basis



Review of Wildlife Fundamentals

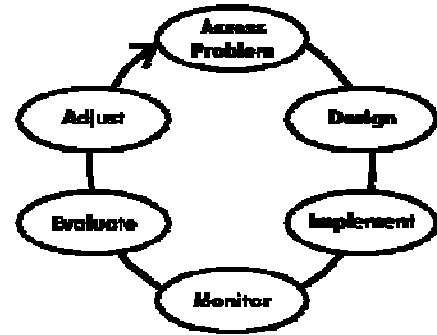
- Single-species vs. Ecosystem Mgt
- Coarse-filter vs. Fine-filter



Review of Wildlife Fundamentals

adaptive management: given current scientific understanding,

- 1) implement mgt. strategy, but
- 2) monitor effects and adjust



Adaptive Management

Benefits & Uses of Wildlife Resources

- Economics
 - direct expenditure (all related expenses)
 - market value (no habitat mgt costs)
 - unit-day value (direct + market)
 - willingness to pay
- Consumption
 - food
 - recreation

Survey of Wildlife-Related Recreation

	1955....	1980	1985	1991	1996
	10%	10% (\$ 8.5B)	9 % (\$10B)	7% (\$12B)	7% (\$17B)
	18%	25% (\$17B)	26% (\$28B)	20% (\$25B)	18% (\$36B)
	???	49% (\$ 4B)	74% (\$14B)	39% (\$18B)	31% (\$29B)

Benefits & Uses of Wildlife Resources

- Non-consumptive recreation
 - (truly non-consumptive?)

Benefits & Uses of Wildlife Resources

- Other benefits
 - aesthetics & quality of life
 - cultural
 - education & research
 - ecological

Public Attitudes, Ethics, Values

- Natural resources professionals =
 - stewards of the resource
 - servants to the public
- Stakeholder groups are diverse:
 - loggers
 - farmers
 - homeowners
 - anglers
 - naturalists
 - hunters
 - anti-hunters
 - hikers
 - bird-watchers
 - tax-payers

Public Attitudes, Ethics, Values

- Resource managers must measure, evaluate, integrate:
 - 1) socioeconomic elements
 - 2) cultural elements
 - 3) political elements

Public Attitudes, Ethics, Values

- Components of Public Attitudes:
 - Emotions (positive or negative views)
 - Beliefs = perceptions (cognitive component based on available info)
 - Intentions & Actions

- Attitudes toward animals (Stephen Kellert)
 - 1) Naturalistic – wildlife, out-of-doors
 - 2) Ecologicistic – wildlife spp. & habitats
 - 3) Humanistic – indiv. Animals
 - 4) Moralistic – ethical treatment
 - 5) Scientific – attributes & functions
 - 6) Aesthetic – artistic & symbolic
 - 7) Utilitarian – practical value
 - 8) Dominionistic – master & control
 - 9) Negativistic – indifferent, fear, dislike

Public Attitudes, Ethics, Values

- Values – preferred outcome based upon belief systems
- e.g., preservation vs. conservation
- e.g., animal rights & welfare

What is Wildlife Management?

- Approaches
 - Preservation
 - Hands off
 - Conservation
 - Use of natural resources in such a fashion so as to guarantee it use in perpetuity
 - Management
 - Manipulation of populations or habitats towards a specific goal
 - Increase
 - Remove
 - Stabilize



What is Wildlife Management?



- “Wildlife management recognizes the reality and operation of ecological communities and that man’s activities often greatly disrupt them, thence that it is often desirable from the human viewpoint to work with these communities and attempt to modify or manage them in man’s interest.”
 - Ira Gabrielson - Director U.S. Bureau of Biological Surveys (U.S. Fish and Wildlife Service)

What is Wildlife Management?

- Aldo Leopold
 - “..the art of making land produce sustained annual crops of wild game for recreational use.”
 - Hunting restrictions
 - Predator control
 - Habitat preservation
 - Game stocking
 - Environmental modification



History of Wildlife Management

- Humans colonize N.A. – Quaternary Period, Pleistocene Epoch – ice ages 10,000 ybp
- Large mammal extinctions (exploitation?) = 66% of megafauna extinct
- 500 ybp, Europeans arrive....
 - Spanish bring horses, livestock
 - Other Europeans exploit fisheries, fur, meat, feathers.... (1870-1915)

History of Wildlife Management

- Fur trade & near extinction of beaver (*Castor canadensis*)
- Market hunting
 - Near extinction of bison : 60M to ~150



History of Wildlife Management

- Market hunting
 - Bison
 - Successful extinction of passenger pigeon
 - immense abundance (400 km long, 1800)



History of Wildlife Management

- Passenger pigeon
 - immense abundance (400 km long, 1800)
 - 1878 – 3 months, 1.5 M pigeons from MI to market



History of Wildlife Management

- Passenger pigeon
 - last sighting 1899
 - 14-yr old boy shot last wild pigeon in Ohio (1900)
 - last captive pigeon died:
 - Male (1912)
 - Female (1914)



History of Wildlife Management

- Habitat loss & Exploitation



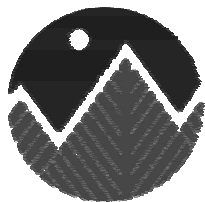
Wildlife management historical perspective

- Nineteenth century
 - Wildlife predators widely condemned as thieves and killers.
 - States hired professional hunters to kill bears, wolves, coyotes, foxes, mountain lions, bobcats, skunks, weasels, eagles, hawks, and crows.

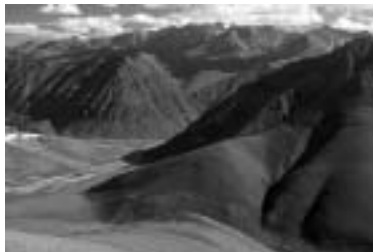


Conservation in the 20th Century 1930's

- Wildlife Management & Land Ethic



The Wilderness Society
- founded 1935
- Leopold = co-founder





History of Wildlife Management

- Fear of losing species at such fast rates (especially game species).....birth of modern wildlife conservation movement...

History of Wildlife Management

Example:

wood ducks

- nearly extinct early 1900's
- overhunting & habitat loss (artificial nests)

wild turkeys

- extirpated from much of range by 1930
- overhunting , reintroduction MI 1950-60's

History of Wildlife Management

Example: (MI)

American marten

- extinct 1930's
- overhunting & habitat loss
- reintroduce 1960's to 1980's (special concern?)

fisher

- extinct 1920's
- overhunting & habitat loss
- reintroduction 1960's (harvest by 1989)

Modern Wildlife Management

- Aldo Leopold
 - wrote *Sand County Almanac*
 - wrote *Game Management*
 - 1st university wildlife program (UW-Madison)
 - Land Ethic

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise. ...To keep every cog and wheel is the first precaution to intelligent tinkering."

(Aldo Leopold, champion of conservation & father of wildlife biology)

“In short, a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his [her] fellow-members, and also respect for the community as such.”

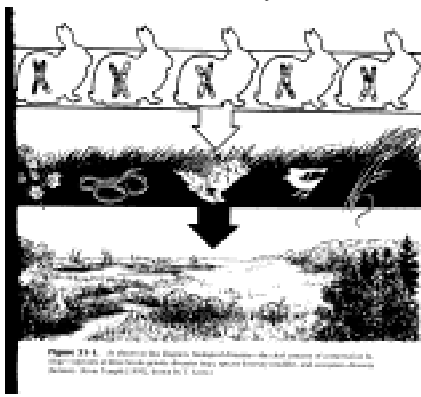
Aldo Leopold

Modern Wildlife Management



- J.N. “Ding” Darling
 - political cartoonist/conservationist
 - appointed chief of Bureau of Biological Survey (“National Biological Service”) by FDR
 - Cooperative Wildlife Research Units

Biodiversity



Why is Biodiversity Important?

- Genetic diversity and:
 - evolution
 - reproduction
 - adaptation
 - disease

Why is Biodiversity Important?

- Species Diversity and:
 - Evolution
 - Community stability
 - Predator-prey relations (keystone predators)
 - Umbrella species

Why is Biodiversity Important?

- Ecosystem Diversity and:
 - Evolution
 - Flow of Energy & Nutrients
 - Disturbance & change

Diversity = Richness + Evenness

- **richness**: count of # species
- **evenness**: relative abundance of species

Ecosystem A

4 oak species

bl oak = 40

wh oak = 30

r oak = 20

pin oak = 10

Ecosystem B

3 oak species

bl oak = 120

wh oak = 60

r oak = 20

pin oak = 0

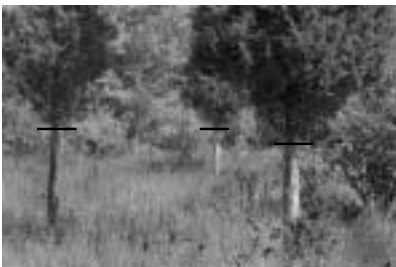
Three Scales of Diversity



A = B = alpha (α) diversity – within habitat

C = beta (β) diversity – among habitat

D = gamma (γ) diversity – geographic scale



Diet:

Catholic diet depending on what is available in their habitat. In Michigan forests, buds and twigs of maple, sassafras, poplar, aspen and birch (to name a few) are consumed, as well as many shrubs. Conifers are often utilized in winter when other foods are scarce. Whitetail deer are crepuscular, feeding mainly from before dawn until several hours after, and again from late afternoon until dusk.

Wildlife Law

Wildlife Conservation Authority: Legal Sources

- 1) statutory law – enacted by Congress
e.g., Clean Air (Water) Act, ESA, NEPA
- 2) common law – court decisions from traditional law
e.g., negligence, trespass...
- 3) case law – courts resolve dispute over statutory & common law
e.g., suing to prevent listing

Wildlife Laws

- **1900. Lacey Act.** Prohibited the transportation of illegally taken wildlife, fishes, plants, and other organisms across state borders and prohibited the importation of certain exotic species.
- **1913. Migratory Bird Act.** Federal government assumed regulatory powers over migratory birds.
- **1918. Migratory Bird Treaty Act.** Provided for coordination between the U.S. and Canada in managing migratory birds and later amended to include other nations.

Wildlife Laws

- **1931. Predatory Mammal Control Program.** Authorized the Department of Agriculture to study and control predatory mammals causing damage to crops and livestock.
- **1934. Migratory Bird Hunting Stamp.** Required that waterfowl hunters purchase a duck stamp and monies generated be spent on wetland conservation programs.
- **1934. Fish and Wildlife Coordination Act.** Authorized the Department of the Interior to assure the welfare of fish and wildlife in water development programs initiated or licensed by federal agencies.

Wildlife Laws

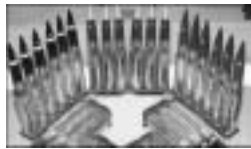
- **1935. Creation of the Cooperative Wildlife Research Units.** The units conducted research and established graduate programs in wildlife science at state universities.
- **1937. Federal Aid in Wildlife Restoration Act.** Imposed a federal excise tax on sporting arms and ammunition with proceeds to be distributed to states for wildlife-related projects.
- **1969. National Environmental Policy Act (NEPA).** Required federal agencies to submit environmental impact statements describing potential negative effects of any major project on the environment (including wildlife) before the project begins.

Wildlife Laws

- **1972. The Marine Mammal Protection Act.** Established protection of marine mammals under the authority of the Department of Commerce.
- **1973. Endangered Species Act.** Initiated a list of endangered U.S. species. The 1973 version directed federal agencies to protect and restore endangered species and their habitats.
1980 **Fish & Wildlife Conservation Act** – P-R funds to nongame research & mgt
1980 **National Forest Mgt Act (NFMA)** – USFS & forest mgt plans
- **1985. Food Securities Act.** The Conservation reserve Program established a voluntary program for landowners to improve soil and water resources including fish and wildlife habitats.
- **1986. The North American Waterfowl Management Plan.** International agreement between the U.S. and Canada for restoring waterfowl populations across North America.

Who pays for Management

- Pittman-Robertson Act
 - 11 percent Federal excise tax on sporting arms, ammunition, and archery equipment
 - 10 percent tax on handguns
- Non-game check off
- Surveys show hunters contribute most of money to maintain wildlife



Wildlife Authority



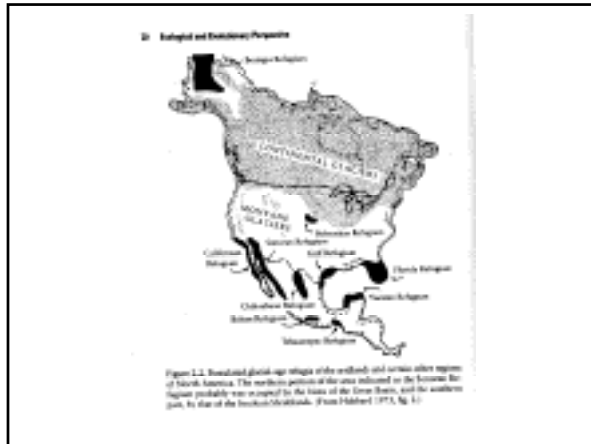
- **State governments (DNR)**
 - set seasons, limits, and license fees for harvesting game birds, mammals, and fish.
- **Federal agencies (Fish & Wildlife)**
 - Have regulatory powers over migratory birds
 - Manage national refuges
 - Coordinate endangered species programs
 - Administer federal aid to states
 - Negotiate international wildlife agreements

The Wildlifer's Tool Box

- Wildlife biology as a mastery of techniques?
- First need Science, Scientific Method, and Hypo-Thetico Deductive (H-D) Reasoning

Wildlife Habitat Ecology & Mgt

- Habitat from an evolutionary perspective
 - Species distribution relative to habitat dist'n
 - Climatic events
- Pleistocene Epoch & dist'n of modern species

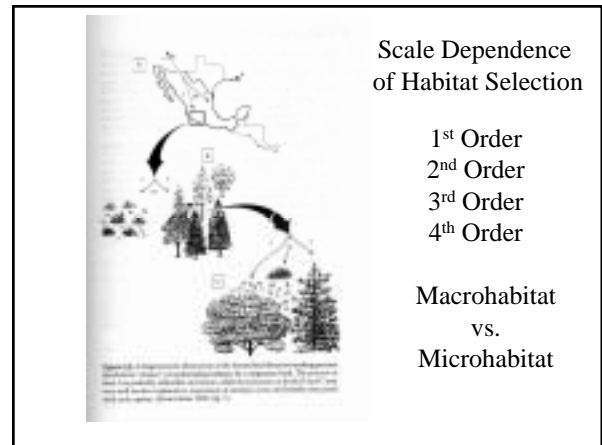


Concepts

- **Habitat** = species-specific resources available (relative quality)
- **Habitat Use** = manner in which species use resources
- **Habitat Selection** = hierarchical decision process (innate & learned) of what habitats to use
- **Habitat Preference** = based on selection of habitat, which are used more than others (preferred vs. avoided)

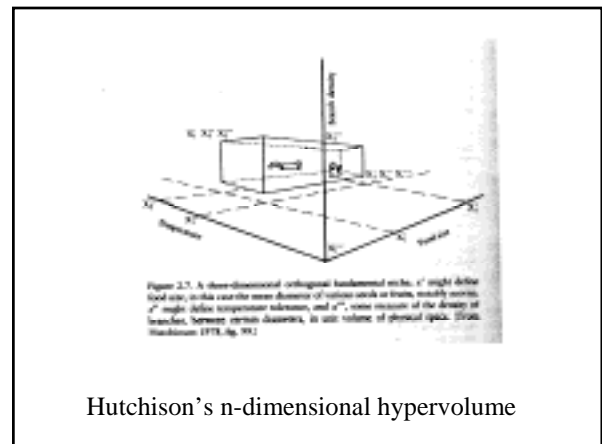
Concepts

- **Habitat Availability** = accessibility of resources
- **Habitat Quality** = positive relation with fitness (not just density)
- **Critical Habitat** = resources essential to the species....ESA designation....How is it determined?



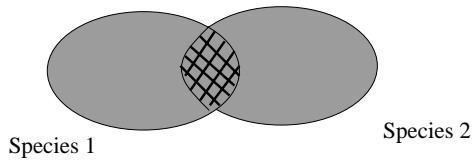
Concept of Habitat Selection

- Wildlife perceiving correct configuration of habitat needed for survival – differences based on age/experience/chance? – hierarchy to decision process
- Niche concept (time/place/functional role) & habitat selection
- For example, in open habitats, bats use low-frequency / long-distance calls (ultrasound) while foraging
- Whereas, bats in closed canopy settings = constant/high frequency = detect wing beats



Concept of Habitat Selection

- Hutchinson = **n-dimensional hypervolume** as explanation of the niche
- Fundamental vs. Realized Niche



Managing Forested Habitat

- Silvicultural treatments
 - Even-age vs. Uneven-age Mgt

Even-Age Mgt

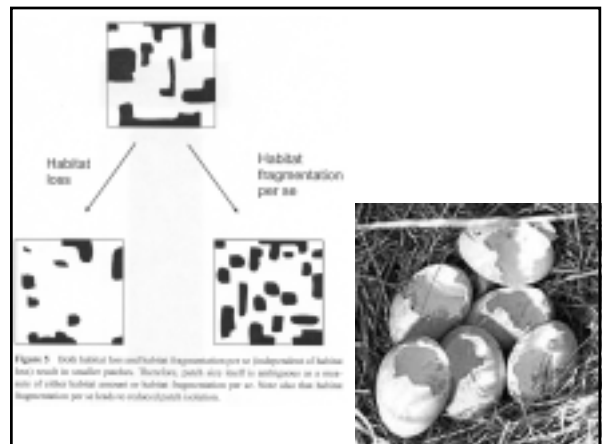
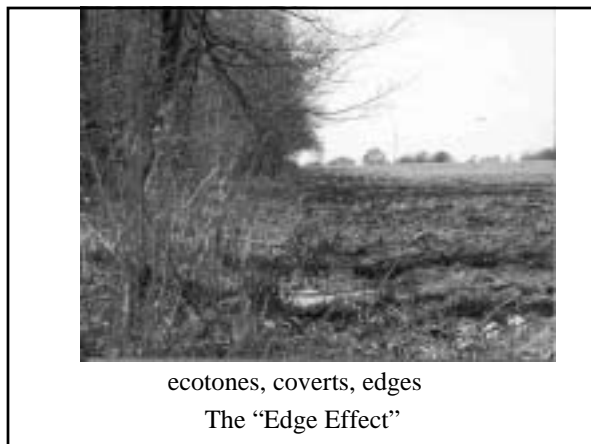
Clearcutting – removal of blocks....

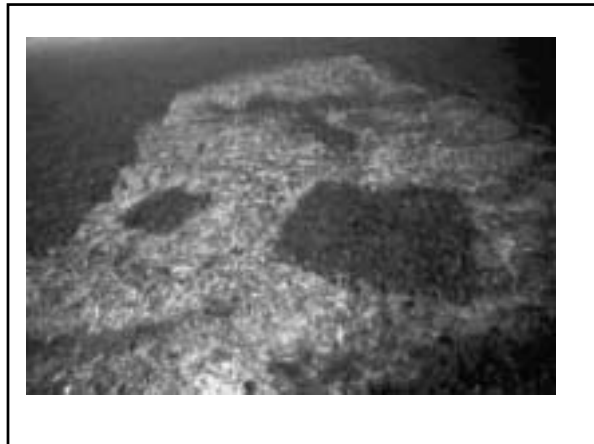
Seed Tree – widely spaced single trees left

Shelterwood – removing bands of trees in stages

Uneven-Age Mgt

Selection





Core Areas – Interior Habitat

“Not all habitat patches are the same”

- habitat-interior species
- Area-sensitive species

Countering Edge Effects & Habitat Fragmentation

- Increase edge complexity

Countering Edge Effects & Habitat Fragmentation

- Increase edge complexity
- Develop connective corridors

Linking Core Areas & Refuges

Proposed Wetlands Project for Central Appalachian Mountains



Multiple-Use Module (MUM) Network

- Refuges (nodes) connected by corridors

