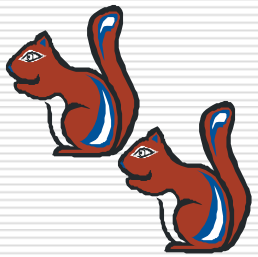


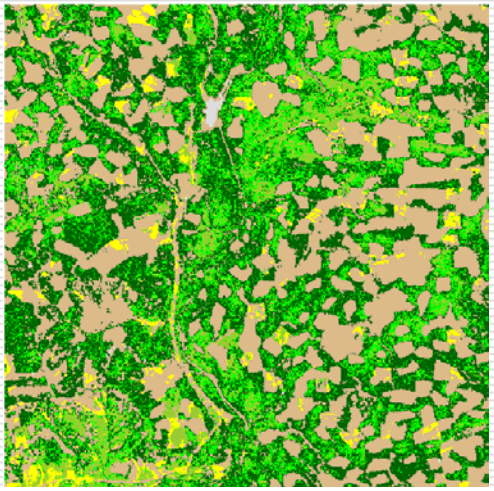
What we will cover today

Definition of Habitats

1. Why Wildlife-Habitat link
2. Measuring Habitats
3. Fieldwork
4. History and Future of Habitats

What is a habitat

The Habitat meets the Animal's requirements for type of vegetation, soil, air, rainfall, light intensity and food.



On the Habitat-Wildlife Link

Wildlife Population Sizes
are a function of Habitat Adequacy

On the Habitat-Wildlife Link

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“Wildlife is managed through habitat” (Braun 1996)

On the Habitat-Wildlife Link

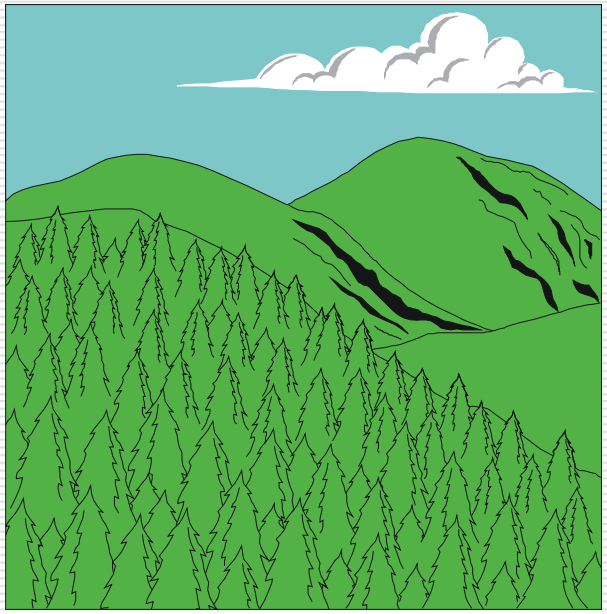
Wildlife Population Sizes are a function of Habitat Adequacy

“Wildlife is managed through habitat” (Braun 2005)

??

How Habitat links with Wildlife

1. Habitat provides food
2. Habitat provides cover
3. Habitat provides mates
4. Habitat supports reproduction



Knowing a habitat can also help to identify an animal.

Knowing the preferred habitat is crucial to conserve animals.

Habitats and Ecosystems

e.g. a coastal river estuary

Producers, Consumers, Energy Flow, Seasonality, Biomass…

Why we need to know the Habitat-Wildlife Link

“Wildlife is managed through habitat” (Braun 2005)

Wildlife can only survive when its habitat remains.

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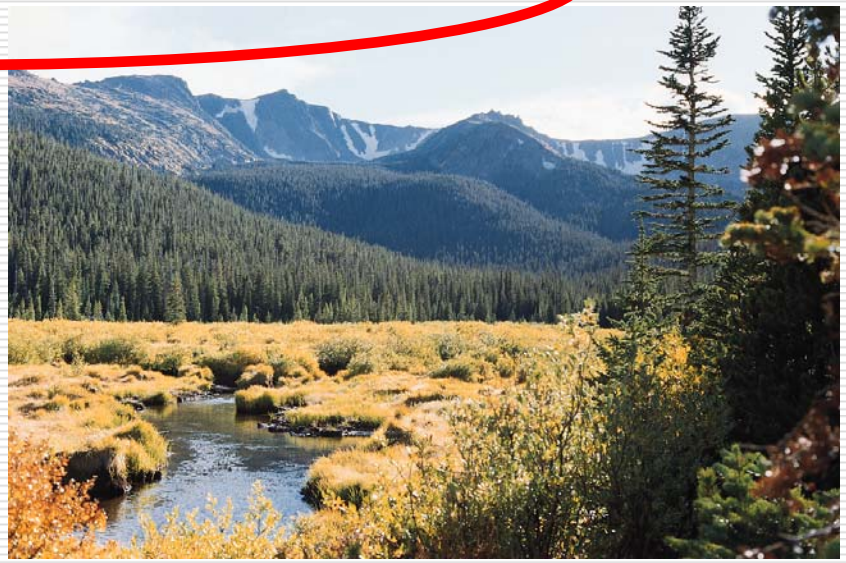

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…known (i) in mutually accepted and (ii) generalizable terms and (iii) described with unambiguous terminology

=> habitat use, niches, habitat choice, habitat selection, habitat preference (=>Resource Selection Function RSF)

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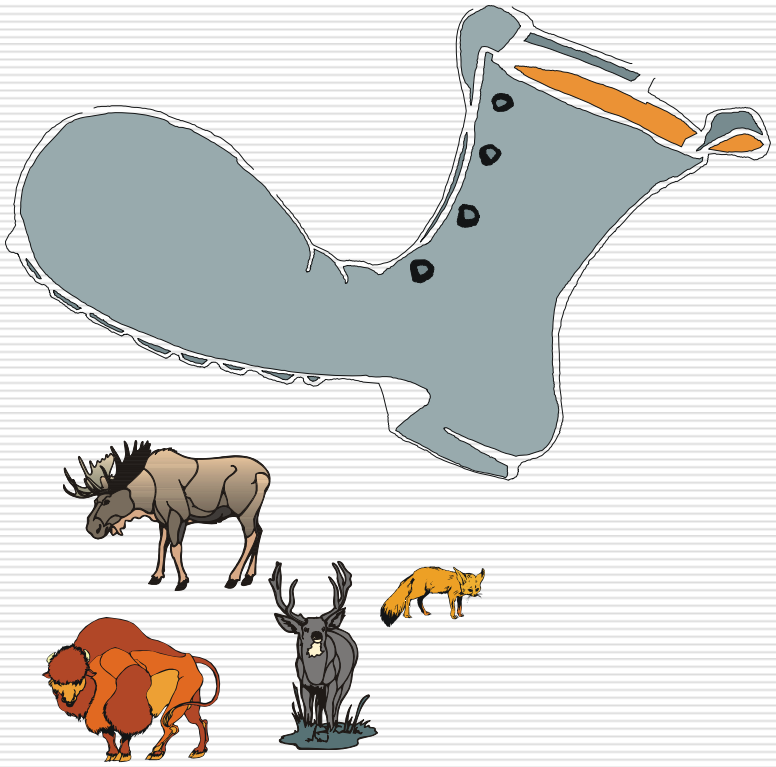
Increased Habitat Loss: The Human Footprint



Habitat Stratification

Stratification (=grouping into homogenous classes) by:

Location

Vegetation type

Vegetation age

Human treatment

Elevation, Slope and Aspect

Climate

Soil

Wildlife Species Ranges ...

Habitat Classification

Classifying into homogenous spatial units (=polygons):

-land cover classes

-land use classes

-biogeographical units

-climate regions

-vegetation age

-timber volume

Habitat Measurements

A selection of classic measurements to express wildlife habitat in a characteristic and representative way:

-Species Composition (animals or plants)
-Ground vegetation (species, cover, abundance)
-Tree Density & Volume
-Layering
-Percent Canopy Cover
-Biomass
-Habitat Structure
-Landscape Structure
-Temporal Variation

How to measure Habitat ?

=> Habitat Quantification via **Fieldwork (on the ground)**

=> Habitat Quantification via Remote Sensing (Satellite, Aerial Photography, LIDAR etc.)

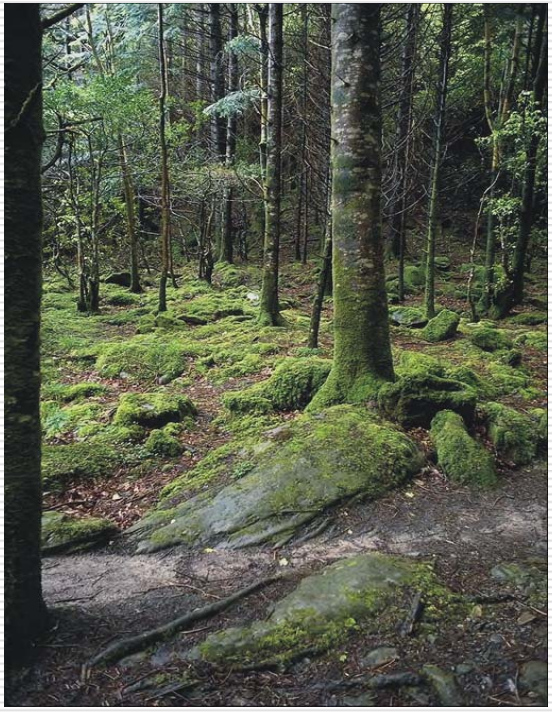
=> Habitat Quantification via GIS

PS. Is Field work really required and efficient ?

Habitat Structure

A tough variable… needs extra and careful consideration for measuring

For instance:
- -vegetation layering
- -terrain ruggedness
- -steepness
- -patterns of vegetation
- -patterns of terrain



Habitat Heterogeneity

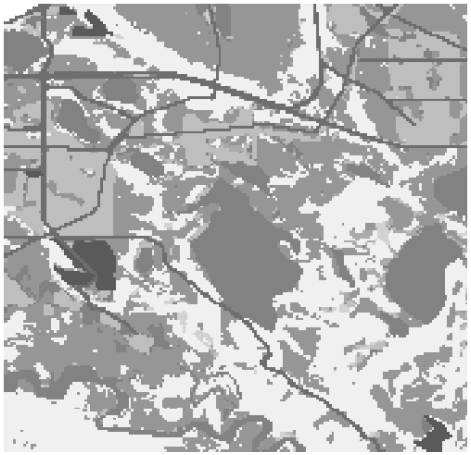
A selection of expressions:

Range
Variance
CV (Coefficient of Variation)
Total
Wien's heterogeneity index H
Wien's heterogeneity index HI
Interdispersion
Juxtaposition
Spatial Diversity Index
Inherent Diversity Index
Total Diversity Index
Relief Index
Landsurface Ruggedness Index

Habitat Quantifications: Landscape Metrics

Landscape Metrics

Landscape Sample
- Closed Forest
- Open Forest
- Herbaceous
- Shrub
- Bogs
- Non-forested features
- Linear Features
- Disturbed Sites
- No Data



Example:

Overall Spatial Structure

Area_MN 33.9 ha

ENN_MN 234 m

...they summarize a landscape in quantitative terms...

Habitat Quantifications: An Example

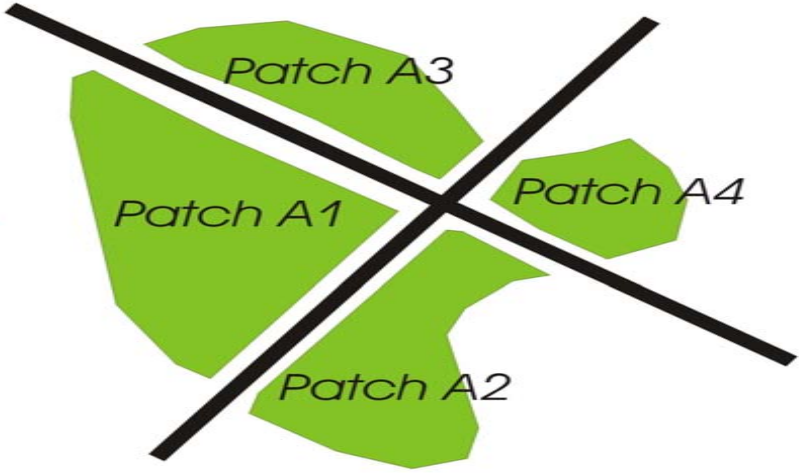
Landscape Metrics

Patch A is "undisturbed"

No. of Patches=1

Patch Size = 10 ha

Patch A is dissected with two new seismic lines



No. of Patches=4

Mean Patch Size = (4+3+2+1)/4=2.5ha

Large Scale Habitat Quantifications

Landscape Metrics

Patch Size

Edge Density

Patch Shape

Coefficient of Patch Size

Landcover Type Diversity…

Can be computed for the entire landscape or for specific landcover classes and patches.

=> mostly GIS based

Considerations when dealing with Vegetation

Species composition varies

Spatial distribution can be complex

Temporal variation in structure

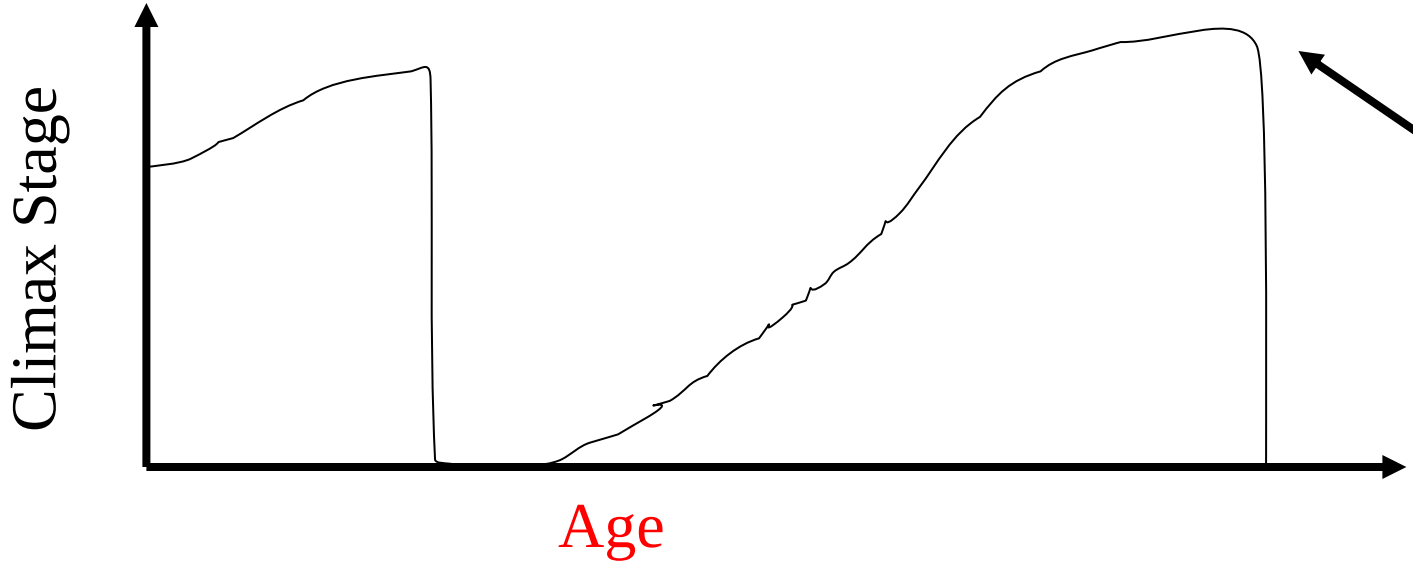
Turn-over rate and succession

Biomass

Overall stand and/or landscape structure

Definition problems across disciplines

Natural Succession ("Bio Engine")



Fieldwork

Fieldwork requires:

Leadership

Planning and Preparation

Data Forms

(Digital) Data Bases

Preliminary Field Test (Pilot Study)

Training of Field Crew + (Frequent) Feedback Sessions

Data Analysis and Publication

PS. Take psychological effects serious!

Fieldwork Design

Some Methods:

Full survey

Quadrats/Plots

Plotless Methods

Line Intercept

Occular Estimates

Point Intercept

Bitterlich Variable Radius Method (tree volume)

(Meaningful) Fieldwork Variables

- Biomass
- Cover
- Dimension Analysis
- Plant Height
- Tree Trunk Dimensions
- Wood Volume
- Tree Age
- Use of Plants
- Fruits & Flowers

Analysis of Fieldwork Data

Hardcopy Data Sheets

Digital Database

Sophisticated Analysis

=> Generalization, e.g. towards landscape

Results into Publication, e.g. peer-reviewed

Usually Time Delay

Implementation Delay in real World of Management & Policy

Landscapes of the Future

The Year 2100 will probably have:

-sub-urbanized landscapes

-fragmented and perforated landscapes

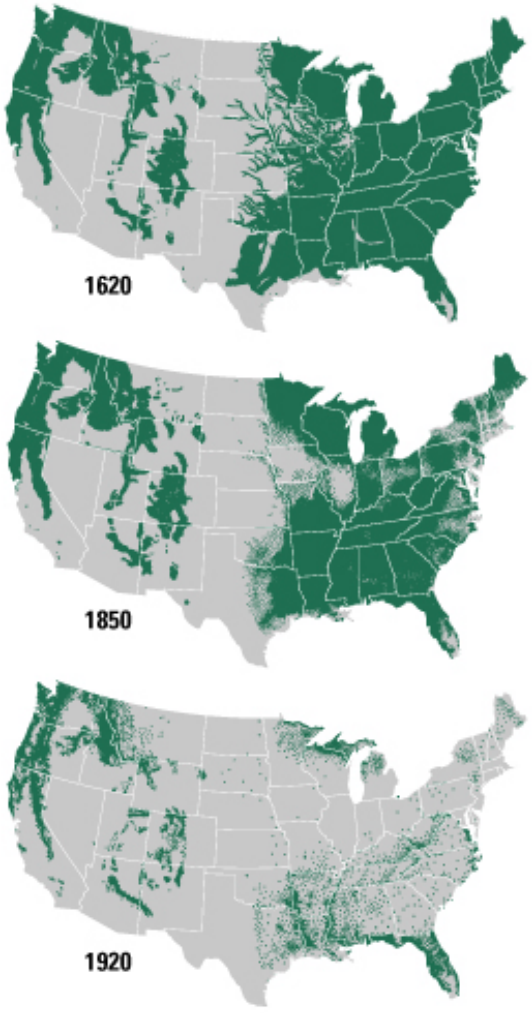
-landscapes with an impoverished diversity

-managed landscapes

-'same' across the entire globe

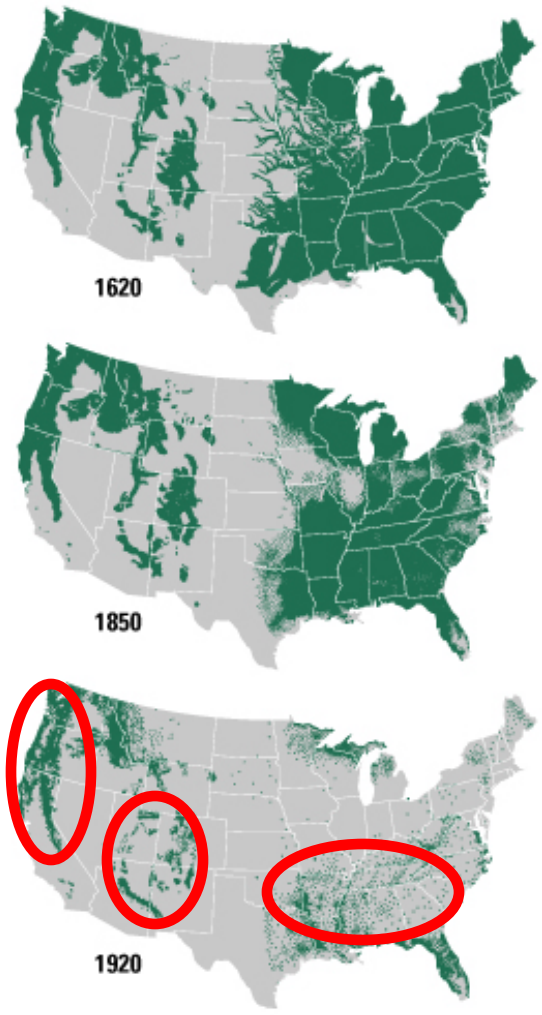
=> a reflection of our 'day to day' business values and ethics…

Landscape Lessons from History



An example:
Approximate area of virgin Old-growth forest in the contiguous United States 1620, 1850 and 1920

Landscape Lessons from History



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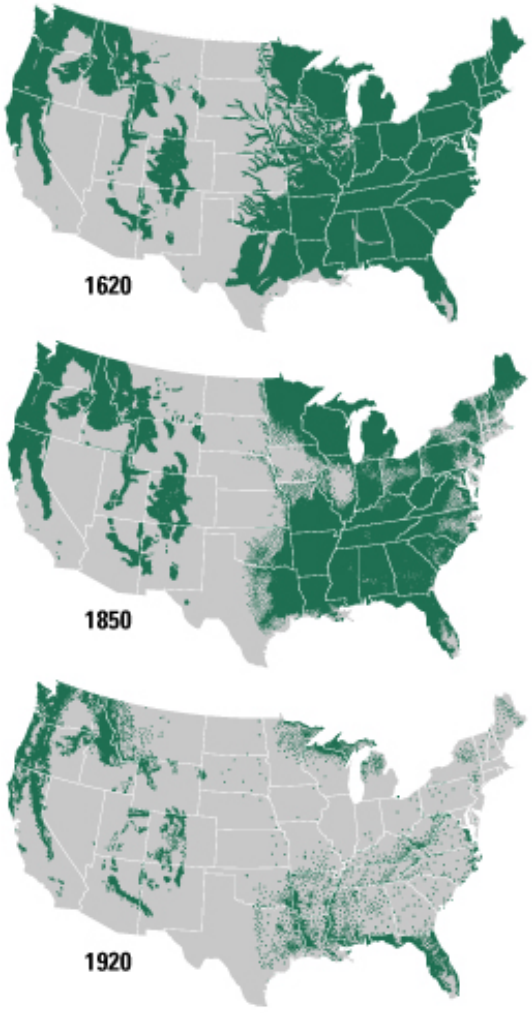
=> Causes ?!

Should we know better by now ?

Landscape Lessons from History



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PS. Resources are inexhaustible ?!
Instead, exploitation switch...

=> Wildlife Effects ?!

=> Sustainability ?

Steady State Economy ?!

Relatedness and Interactions of:

-Economical Growth

-Condition and Shape of Habitat and Landscapes

-Endangerment and Extinction of Wildlife

see Brian Czech WWW and Presentations

So why again Habitat ?

Wildlife Biologists need to know Wildlife and its Habitats!

Wildlife cannot live without Habitat!

Wildlife is managed through Habitat!

Habitat is currently lost and converted!

End of Session

Any Questions ?