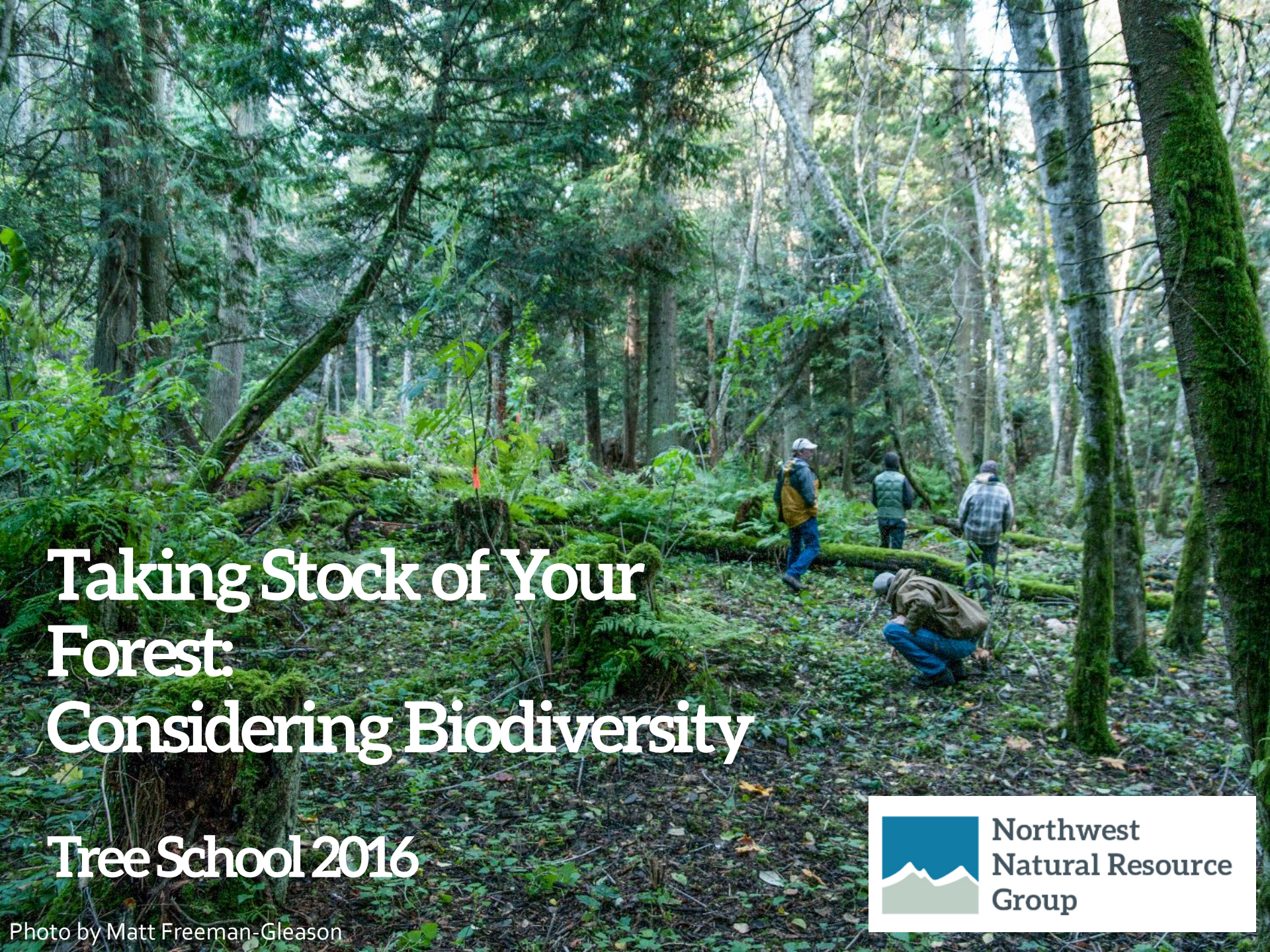


Taking Stock of Your Forest: Considering Biodiversity

Tree School 2016

Photo by Matt Freeman-Gleason

Northwest Natural Resource Group

Who we are

What we will cover

- What is an inventory and how is it used
- Types of inventory methods
- Importance of biodiversity
- Managing woodlands for biodiversity
- Tools for evaluating biodiversity

About an hour inside

About an hour and a half outside!

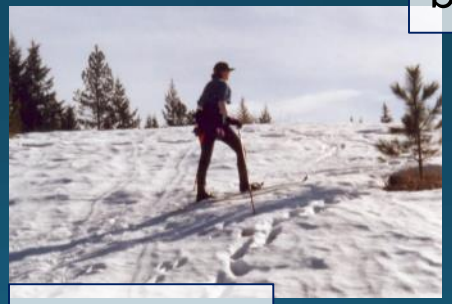
Why is your land important to you? How do you use it?

a nice place to live

a place for wildlife

produce timber

maintain biodiversity



recreation

edible products

pass it on to my kids

plant more trees

What is an inventory?

- A measure of what you have and where it is
- May be based on a sample or a census
- Methods and measurements must match your objectives and constraints
- An important part of your management plan

Do you have a management plan?

Photo by Matt Freeman-Gleason

Have you ever done a forest inventory on your property?

"Traditional" Timber Inventory Resources

- EC 1129: Tools for Measuring Your Forest
- EM 9058: Measuring Your Trees
- PNW 630: Basic Forest Inventory Techniques for Family Forest Owners

All available at http://extension.oregonstate.edu/catalog

Inventory methods

fast & easy

takes time & work

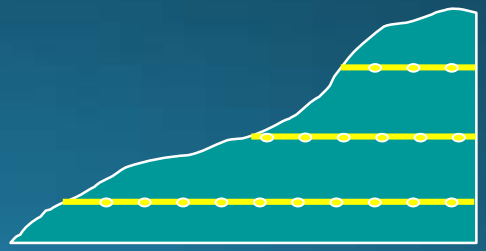
"guess-timate"

data-based

- Aerial photo/map
- Drive-by

- Walk through

- Sampling – plots or transects



Inventorying

- Decide what information you want before you start.
- A good inventory is time consuming.
- Collect information on multiple resources in one visit to save time and effort.

What information to collect?

It depends on your objectives!

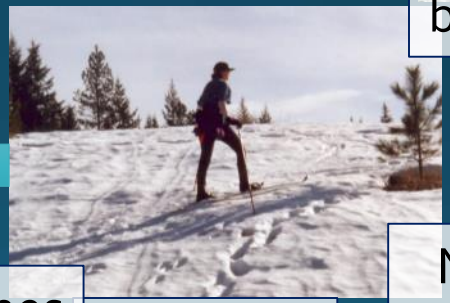
Your inventory should reflect how you use your land

Tree species
Size
Volume
Growth rate

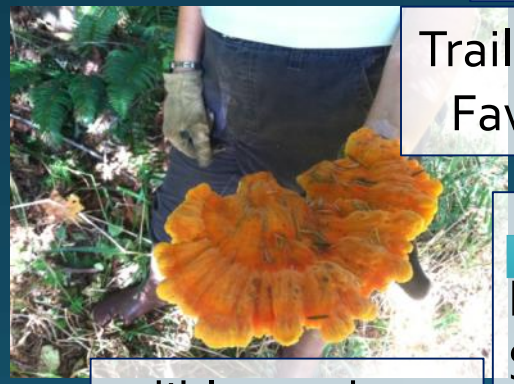
produce timber

maintain biodiversity

a place for wildlife



Trails and roads
Favorite spots



Food sources
Habitat elements
Species observed

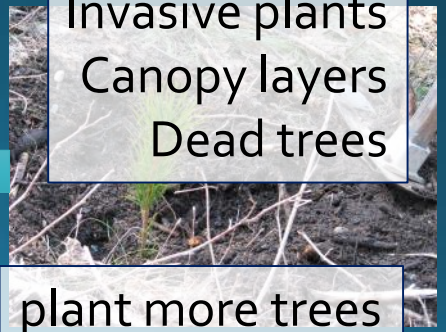
Mushroom patches
Berries

recreation

Native plants
Invasive plants
Canopy layers
Dead trees

edible products, wildcrafting

Soil condition
Existing vegetation

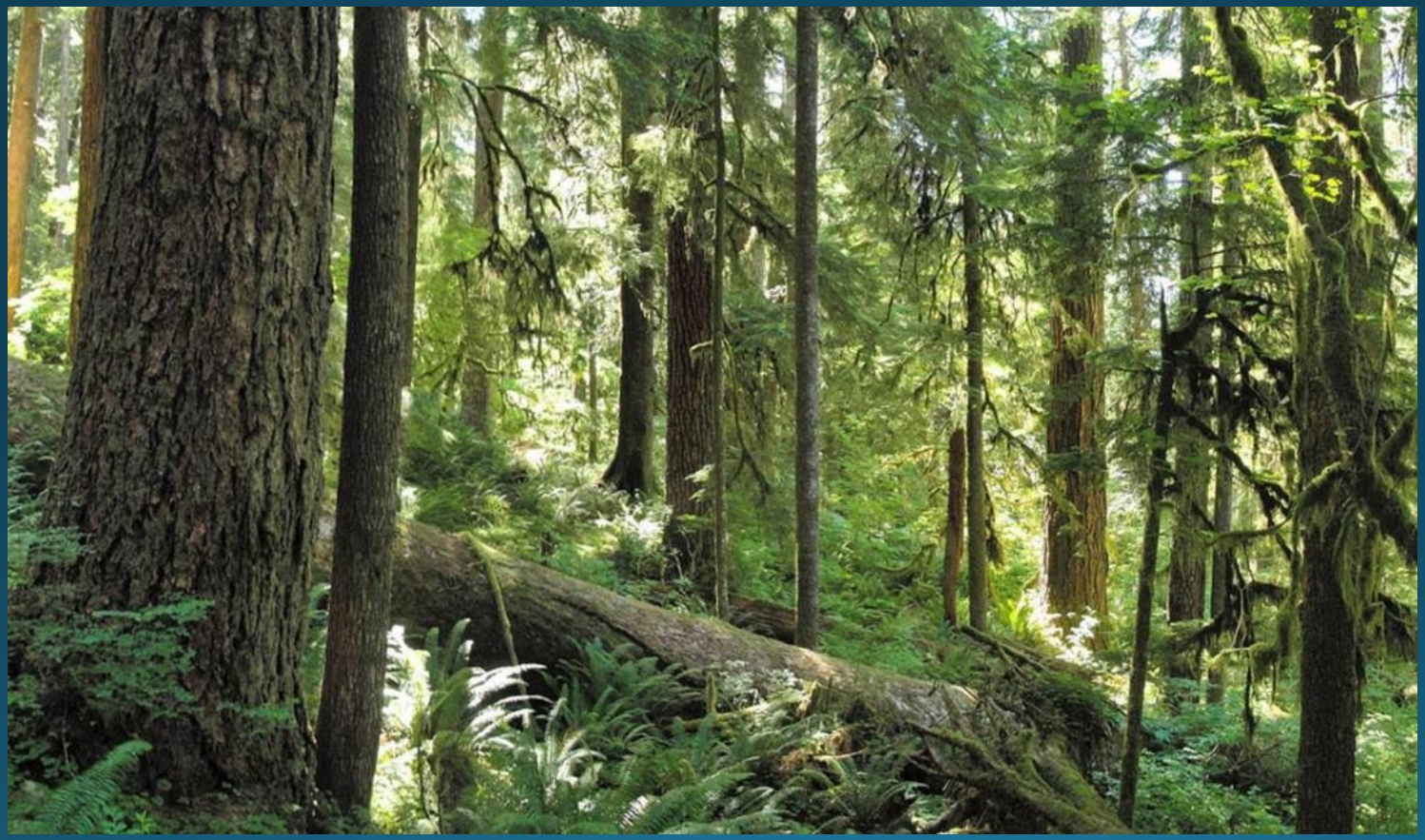


plant more trees

What is biodiversity?

The variety of life forms within an ecosystem

- Trees, plants, fungi, moss, amphibians, birds, mammals, insects, etc.....



Importance of biodiversity

- Ecosystem function
- Predator-prey relationships
- Nutrient cycling
- Risk management

"To keep every cog and wheel is the first precaution of intelligent tinkering."

— Aldo Leopold, Round River

"Every day the forests have something new to teach us – if we are paying attention."

Reasons for tracking biodiversity in your forest

- It can be fun, interesting and educational!
- To help us track the status and changes in forest health – on the forest scale and landscape scale
- Quantification of biodiversity might help with building markets that financially support the forest
- Practical, long term, economic self interest encourages us to monitor the health of the forest
- Monitoring is often a good way to draw in and accelerate the interest and involvement of the wider family, particularly the younger generations
- Participation in coordinated citizen science is a form of public service

Reasons for NOT tracking biodiversity in your forest

- Lack of skill, knowledge, and/or time
- Potential risk of finding some organism that might limit what you can do
- Just not of interest

Forest organisms work for us…

How do/can we work for them?

Biodiversity cornerstones

- Snags & Down Wood

- Deciduous Trees & Shrubs

- Canopy structure

- Water

Snags and down wood

- 93 species of wildlife use snags (mostly birds)
- Down logs provide hiding cover and travel corridors
- Rule of thumb:

BIGGER IS BETTER

(most species will use snags >25" dbh)

Snag types

Hard Snag

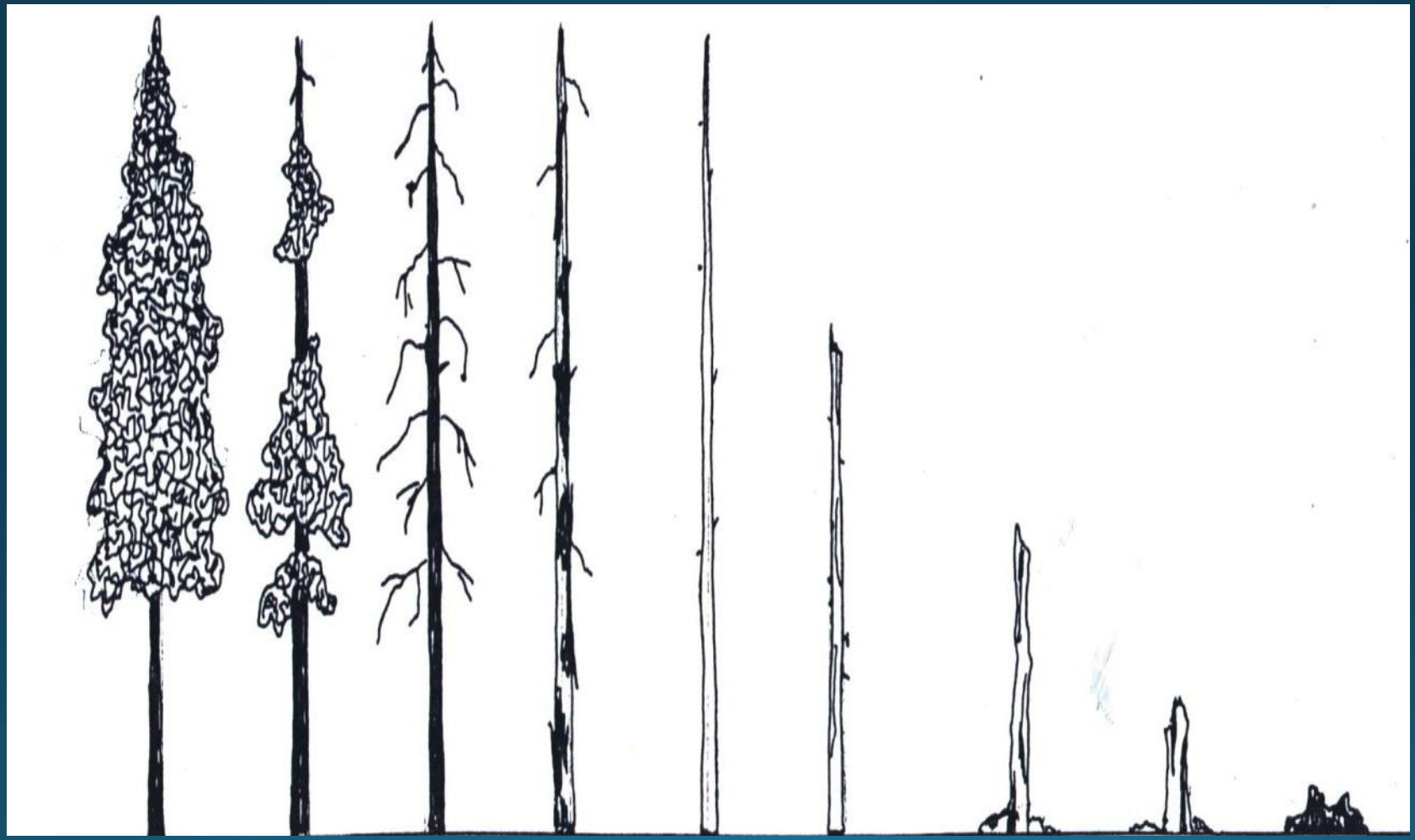
Limbs and bark retained, top often intact

Soft Snag

Limbs and bark shed, decaying, may have holes, top often broken out

Year 0

Year 100



Deciduous trees and shrubs

- Important food source
- Mast-producing shrubs
- Flowering shrubs


Credit: J. Bottorff


Credit: S. Fitzgerald


Credit: J. Bottorff

Canopy structure

Vertical Structure

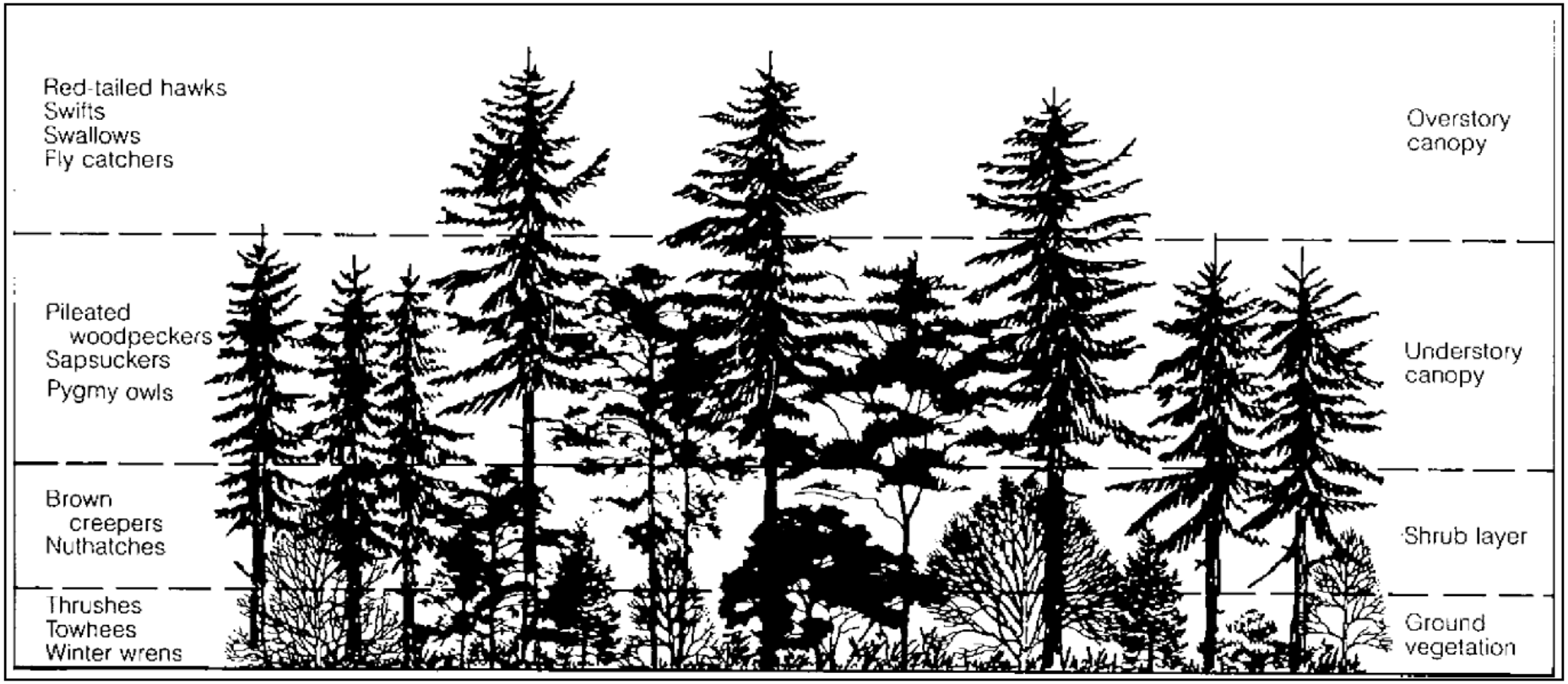
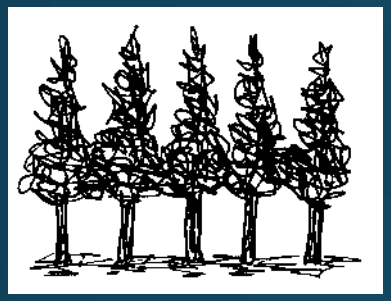
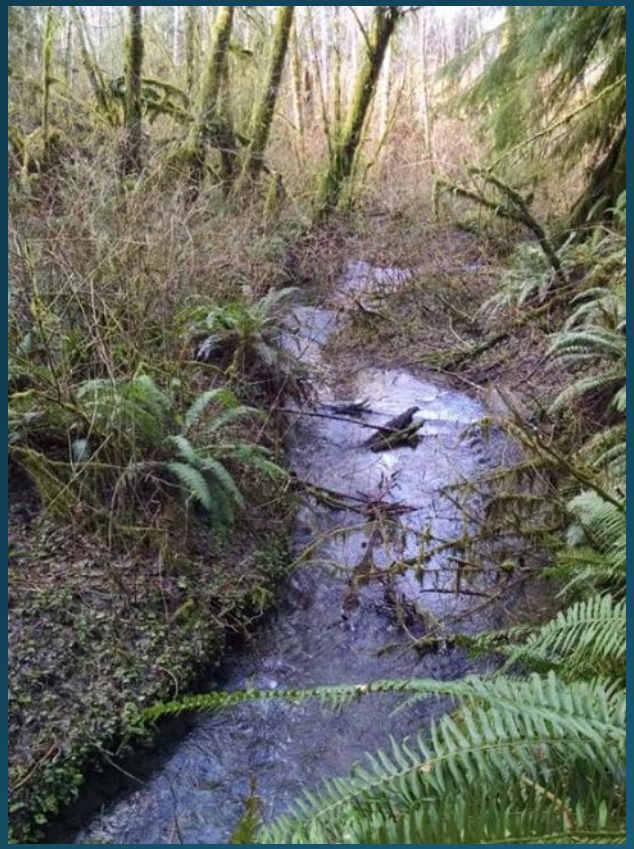


Figure 2. An example of the birds that utilize the vertical diversity in a mature Douglas-fir forest. *From Brown (1985)*

Horizontal & Vertical Canopy Structure

	One Story	Two Stories	Three Stories
Uniform			
Patchy			

Water



Other forms of biological diversity


Source: born1945, *flickr.com*

Inventory methods

fast & easy

takes time & work

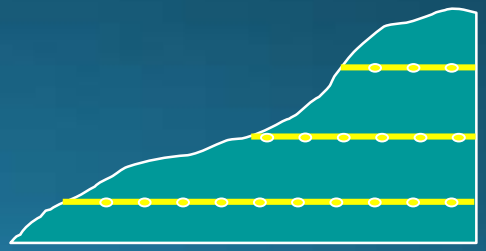
"guess-timate"

data-based

- Aerial photo/map
- Drive-by

- Walk through

- Sampling – plots or transects



Aerial photos and maps can tell you a lot

- Google Earth – www.earth.google.com
- Oregon Explorer – www.oregonexplorer.info
- Forest Planner – www.forestplanner.ecotrust.org


Aerial photo: Google Earth
2014

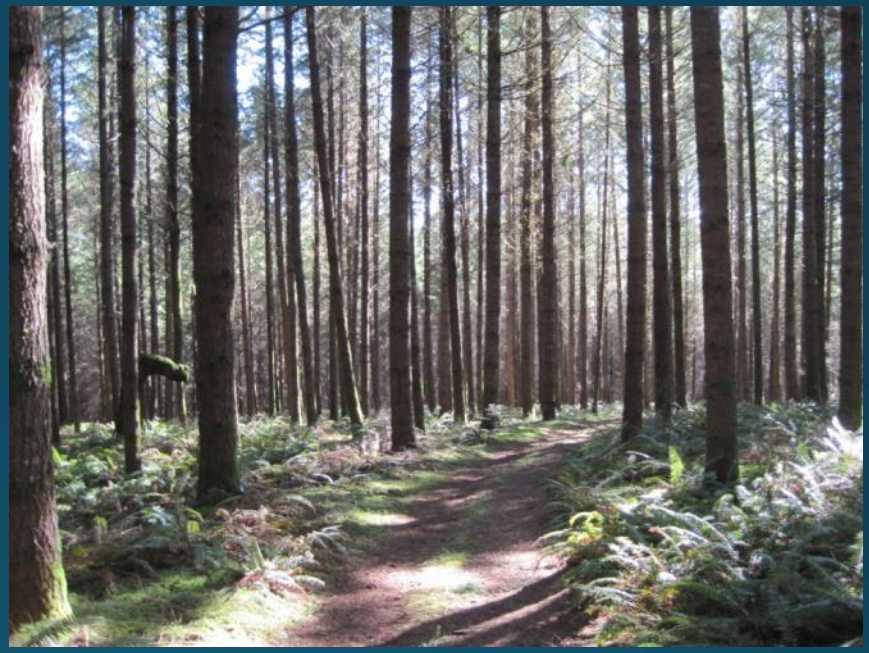

Aug 14, 2010
N
2010
© USFWS
© 2011 Google
©2010 Google
598 ft
Imagery Date: Aug 15, 2010
45°42'47.98" N 123°01'46.03" W elev 0 ft
Eye alt 2069 ft


May 30, 2002
2002
© USFWS
© 2011 Google
Image U.S. Geological Survey
598 ft
Imagery Date: May 1, 2002
45°42'47.98" N 123°01'46.03" W elev 0 ft
©2010 Google
Eye alt 2069 ft

The “drive by” looks like it’s alder

The “walk through”

- Walking along a trail or path that allows you to observe the interior of the stand/forest.
- Probably not a randomly chosen route.



What can you observe on a walk through?

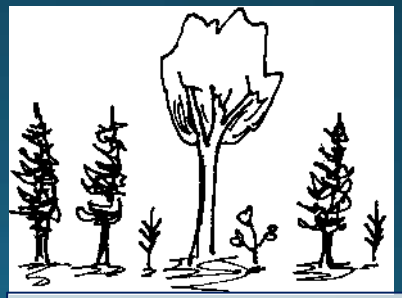
understory plants

hardwoods

canopy gaps

wildlife sign

down logs



canopy structure

Needs a closer look:

- Snags
- Mushrooms
- Regenerating seedlings
- Nesting holes

When a walk through is appropriate…

- If your stand or property is small
- If you just want a general idea of what is there
- If you don't need quantitative information
- If the site is very difficult to walk through (steep, brushy, poison oak, etc.)

CONDUCTING A FOREST BIODIVERSITY ASSESSMENT

A Guide for Forest Owners and Land Stewards

http://nnrg.org/resources/monitoring-and-inventory-tools/

Northwest Natural Resource Group

NORTHWEST CERTIFIED FORESTRY

Prepared by Northwest Natural Resource Group
In coordination with:
Forest Stewardship Council-US
World Wildlife Fund-Sweden
& Swedeen Consulting

FOREST BIODIVERSITY ASSESSMENT

Douglas-fir/Mixed coniferous forests west of the Cascades - Pacific Northwest Version 1.0 Date:_____ Stand:_____

TOPOGRAPHY & SITE CHARACTERISTICS	D
1. Site on SE - SW facing slope steeper than 20 % (1:5)	○
2. Site on NE - NW facing slope steeper than 20 % (1:5)	
3. Forested slope steeper than 60 % (3:5)	○
4. Conspicuous gorge or ravine	○
5. Conspicuous cliff, scree or talus slope	○
6. Large boulder(s) or rocky outcrop(s)	○
FOREST DYNAMICS	
7. Small (< 0.25 ac) canopy gaps	○
8. Medium (0.25-1 ac) canopy gap(s)	○
9. Larger (1-5 ac) canopy opening(s) created by wind or fire	○
10. Open or semi-open canopy	
11. Numerous naturally regenerating tree saplings	○
12. Ground vegetation very patchy and heterogeneous	○
13. Exotic shrubs and trees absent or nearly absent	○
14. Trees with bark charred by recent fire	
15. Living tree(s) with wounds or scars from fire	
16. Living tree(s) with wounds or scars from more than one fire	○
17. Numerous trees or tree tops broken by ice or snow	
18. Tree(s) felled by beaver or areas inundated by beaver	
HABITAT IN THE FOREST	
19. Conspicuous bald(s)	○
20. Open or semi-open prairie, native grassland or meadow area	○
21. Forested wetland area	○
22. Open wetland area	○
23. Forested spring or seep area	○
24. Riparian forest	○
25. Streambed with substantial amounts of large woody debris	○
26. Stream with section(s) of cascades	○
27. Streambed with section(s) of cobble or gravel	○
28. Large hollow and internally decayed tree(s)	○
29. Tree(s) with twig nests	○
30. Nesting holes in trees or snags	○
Site total	
Highest possible site total 24	

TREES	D
31. Some (native) nut-, berry- or fleshy fruit trees or shrubs	
32. Numerous (native) nut-, berry- or fleshy fruit trees or shrubs	○
33. Canopy composed of 3 or more tree species	
34. Canopy composed of 5 or more tree species	○
35. Numerous hardwood trees > 10" dbh	○
36. Some hardwood trees > 20" dbh	○
37. Numerous trees > 20" dbh	○
38. Some trees > 30" dbh	○
39. Numerous trees > 30" dbh	○
40. Some trees > 40" dbh	○
FOREST STRUCTURE	
41. Substantial amounts of understory and subcanopy trees	○
42. Canopy and sub-canopy trees of different diameters	○
43. Some large (veteran) trees from previous forest generation(s)	○
44. Numerous large (veteran) trees from previous forest generation(s)	○
45. Forest area(s) remaining or retained after fire, storm or logging	○
46. Some trees with thick branches or stem forks	○
47. Some tree trunks and branches covered by mosses and lichens	○
DEAD TREES, SNAGS AND DOWN LOGS	
48. Some standing dead or dying trees or snags > 10" dbh	
49. Some standing sun-exposed dead or dying trees or snags > 10" dbh	
50. Some standing dead or dying trees or snags > 20" dbh	
51. Numerous standing dead or dying trees or snags > 20" dbh	○
52. Some standing dead or dying trees or snags > 30" dbh	○
53. Some down logs > 20" diameter at mid-log	○
54. Some sun-exposed down logs > 20" diameter at mid-log	○
55. Some down logs > 30" diameter at mid-log	
56. Some down logs > 40" diameter at mid-log	○
57. Down logs in various different stages of decay	○
58. Some down logs covered by mosses	○
59. Some trees, snags or logs with shelf fungi	○
60. Signs of woodpecker foraging on trees, snags or logs	○
Stand total	
SITE & STAND TOTAL	
Highest possible stand total 24	
Highest possible combined total 48	

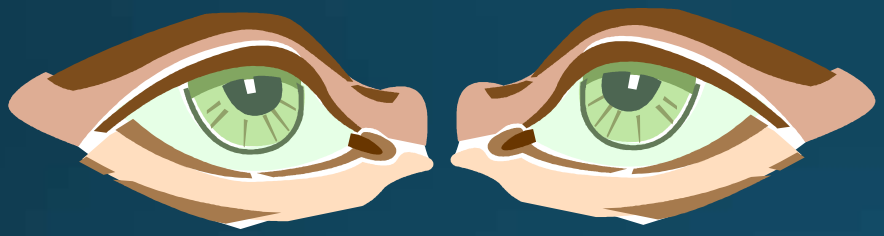
D = Douglas-fir/Mixed coniferous forests west of the Cascades
O = Oak/Douglas-fir - Oak/pine woodlands
E = Early seral reference condition
P = Ponderosa and Lodgepole pine forests east of the Cascades

Sampling

If you can't tell what you have for sure or you need more detailed information – consider sampling – put in some plots or transects.

Inventory tools

Most important tools!



Transects

- Linear sampling method
- Traverse the sampling area in a chosen direction
- Stop and record observations at designated intervals

Transect layout

- Start from a known linear reference
  - Road
  - Property boundary
- Lay out on map or aerial photo with known scale or legend
  - Does not have to be exact, but helps you determine how many transects you need and relationship to landmarks

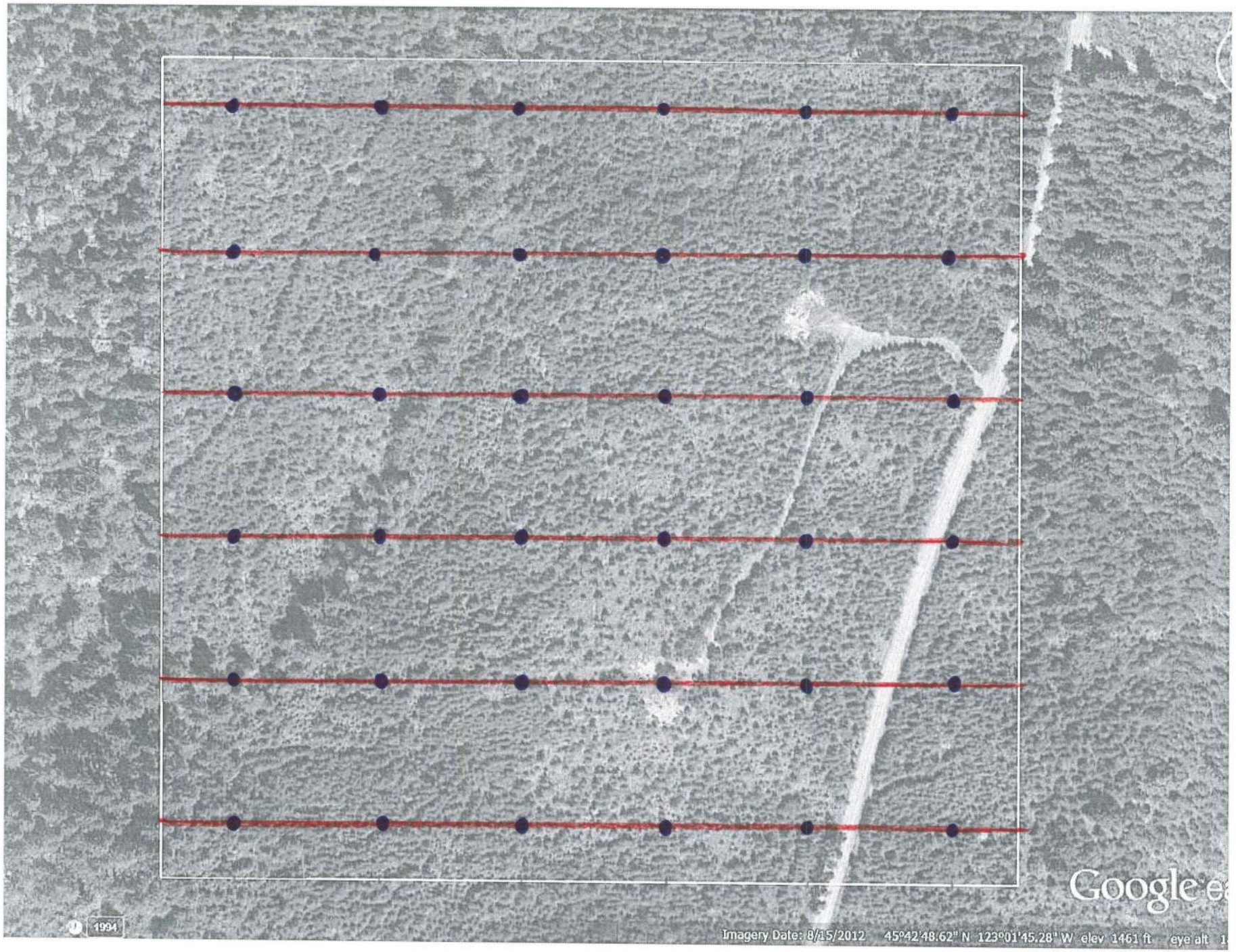

N
582 ft
© USFWS
© 2011 Google
©2010 Google
45°42'48.32" N 123°01'45.32" W elev 0 ft
Eye alt 2012 ft

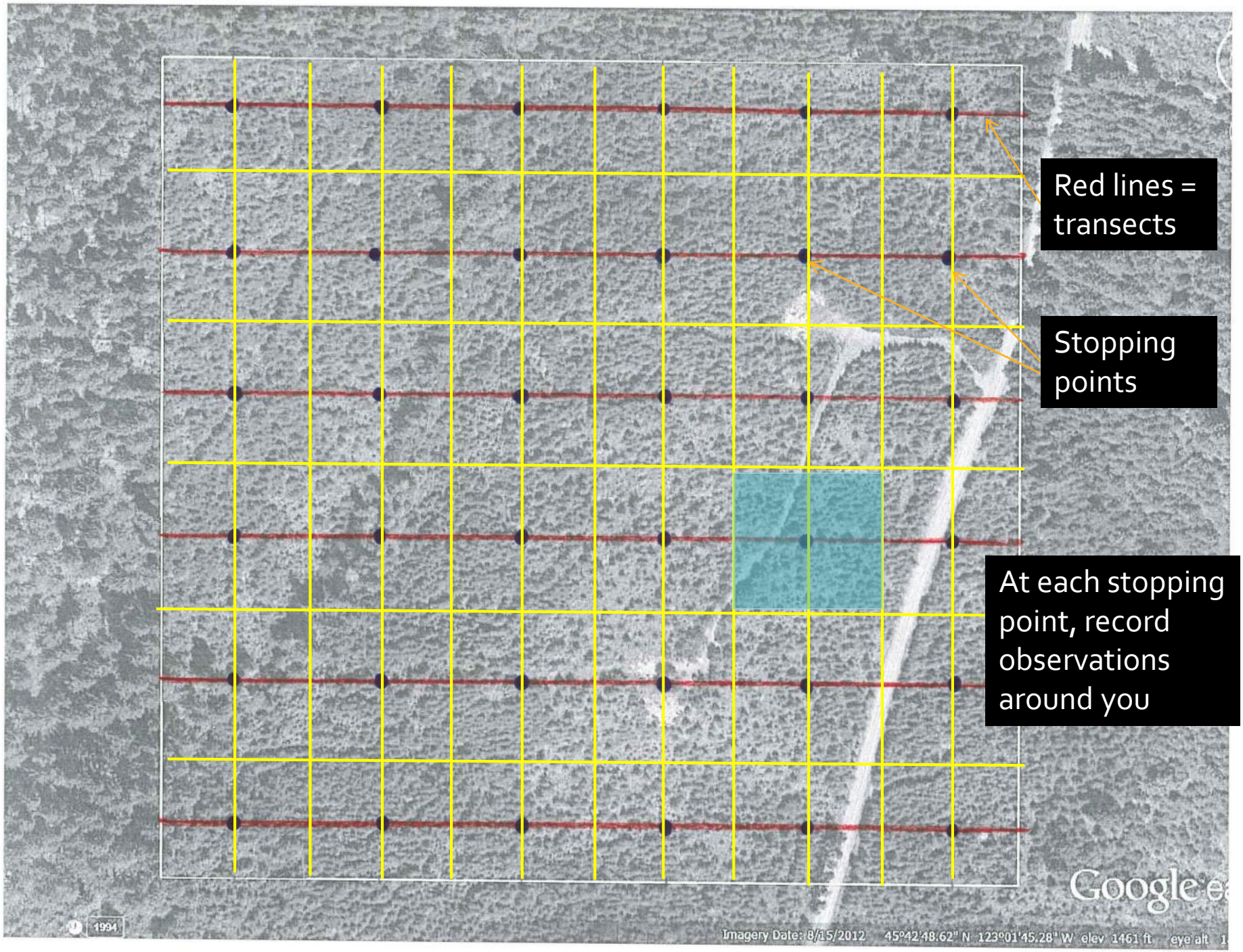

200 ft
The property line is the reference point
© USFWS
© 2011 Google
©2010 Google
582 ft
45°42'48.32" N 123°01'45.32" W elev 0 ft
Eye alt 2012 ft


200 ft
The road is the reference point
© USFWS
© 2011 Google
©2010 Google
582 ft
45°42'48.32" N 123°01'45.32" W elev 0 ft
Eye alt 2012 ft


NW Pumpkin Ridge Rd
© 2011 Europa Technologies
© 2011 Google
©2010 Google
256 ft
2005 - Aug 15, 2010
45°42'46.01" N 123°01'46.34" W elev 1470 ft
Eye alt 2130 ft


If property lines are well marked
Minimizes uphill/downhill travel
NW Pumpkin Ridge Rd
© 2011 Europa Technologies
© 2011 Google
©2010 Google
256 ft
2005 - Aug 15, 2010
45°42'46.01" N 123°01'46.34" W elev 1470 ft
Eye alt 2130 ft


1994
Imagery Date: 8/15/2012 45°42'48.62" N 123°01'45.28" W elev 1461 ft
Google

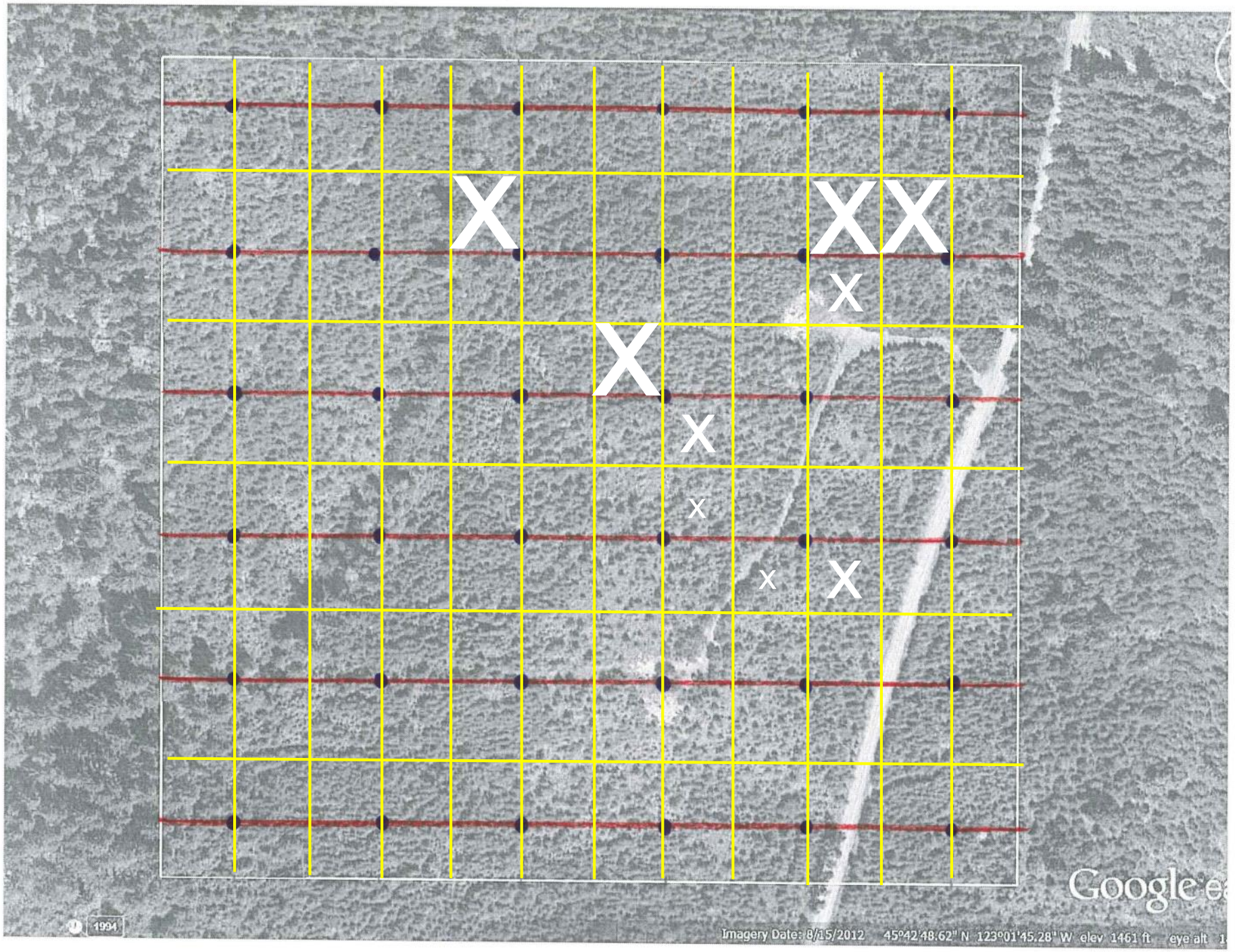

Red lines = transects
Stopping points
At each stopping point, record observations around you
1994
Imagery Date: 8/15/2012 45°42'48.62" N 123°01'45.28" W elev 1461 ft

Quantitative data can be subjective….

Few

Some

Lots


1994
Imagery Date: 8/15/2012 45°42'48.62" N 123°01'45.28" W elev 1461 ft
Google

N

0 75 150 300 Feet

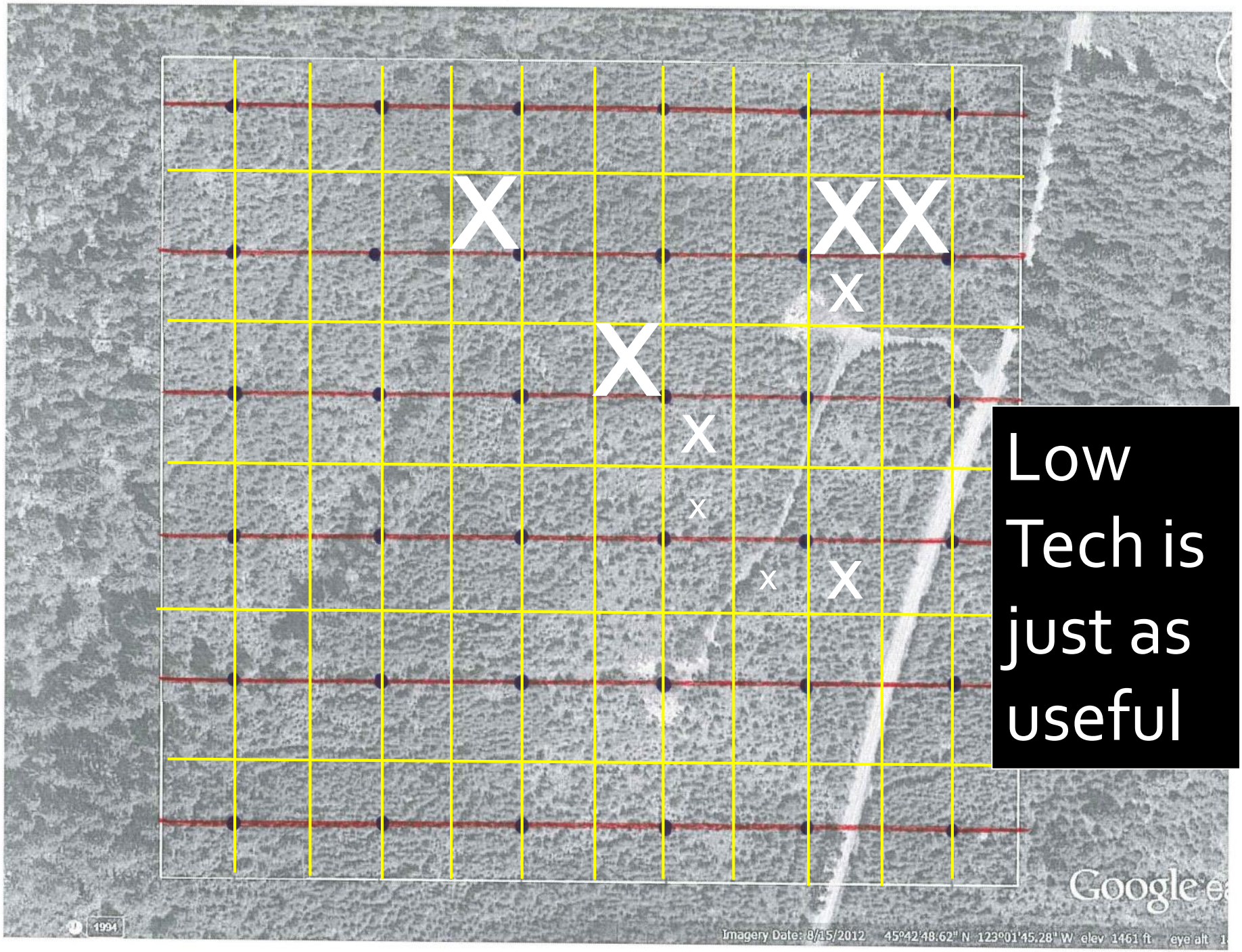
Figure K-1

Legend
Inventory Data

Invasive Vegetation

Scotch Broom

- Lots
- Some


Low Tech is just as useful
Google
Imagery Date: 8/15/2012 45°42'48.62" N 123°01'45.28" W elev 1461 ft
1994

What could you inventory with transects?

- Weed presence
- Other plants of interest
  - Shrubs with wildlife food value
- Snags
- Root disease evidence
- Canopy structure

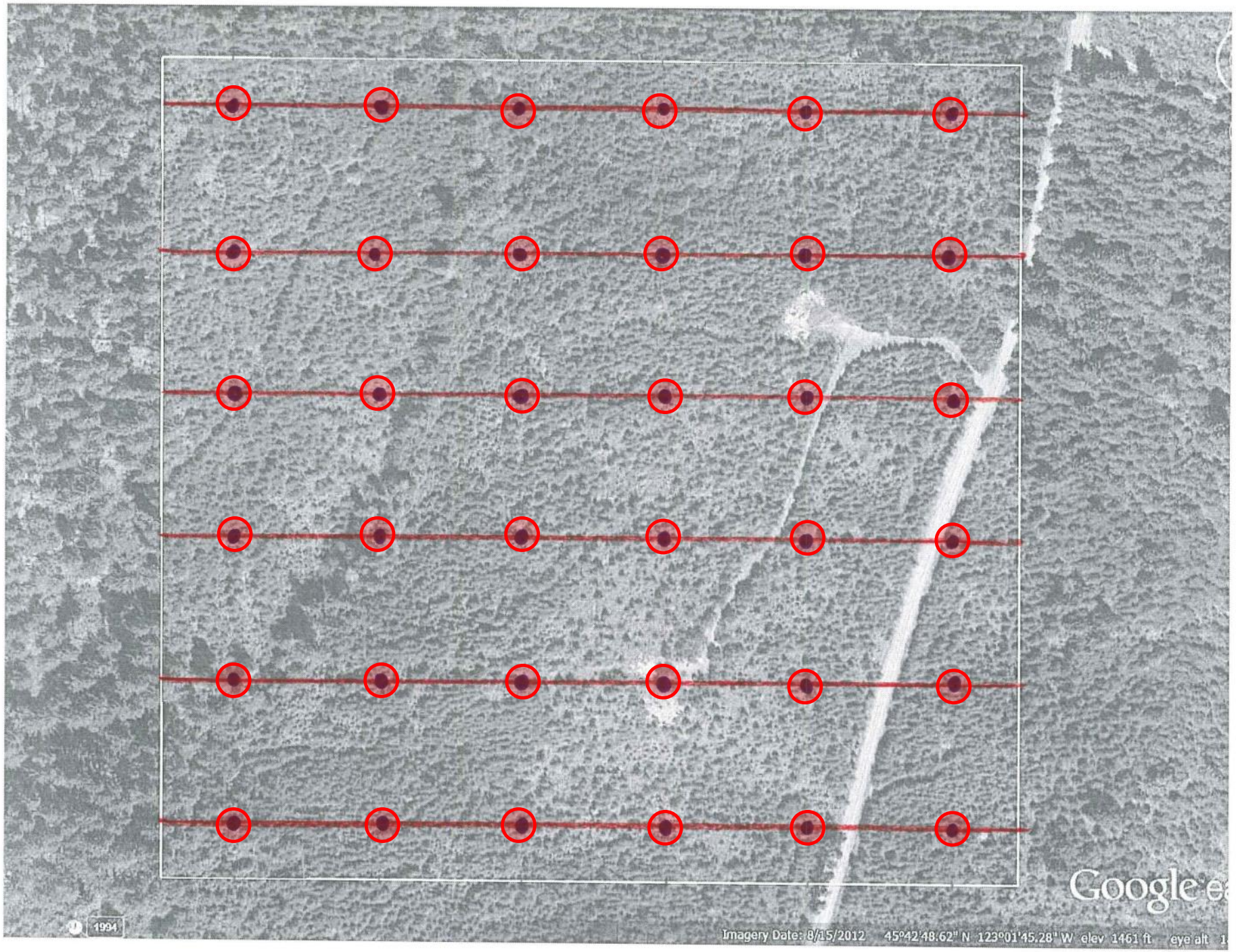
Essentially, **anything that you can inventory with a walk through**, BUT, want more detail on **quantity** or **location**

Transect sampling can be modified for linear features

- Roads
  - Erosion
  - Resurfacing
  - Other maintenance issues
- Trails
  - Wet areas
  - Water bars
  - Other maintenance issues
- Streams
  - Vegetation
  - Shade
  - Large wood

Sample Plots – the next step

- At designated sample points along a transect, establish area plots and record observations within them.
- This is the conventional inventory method for timber.
- Useful if you want more quantitative data, or when what you are observing is hard to measure from a distance.

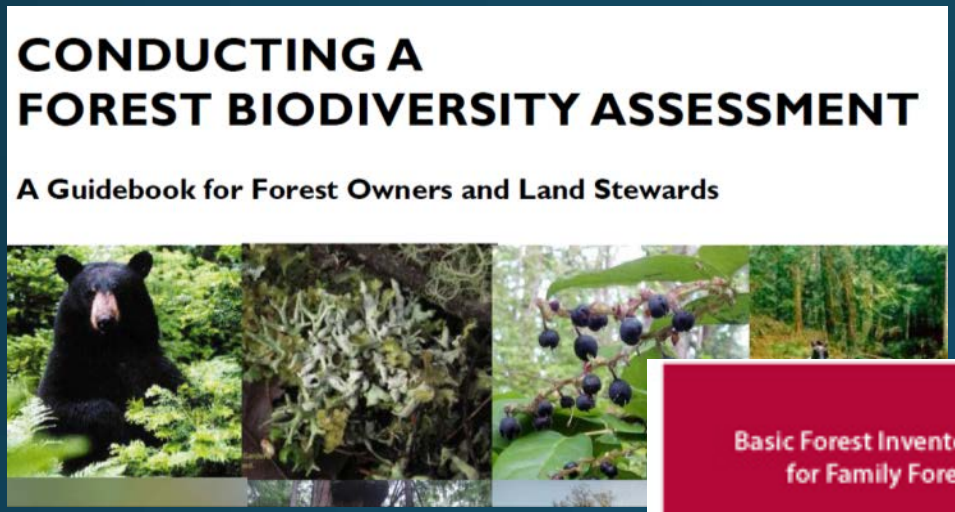

1994
Imagery Date: 8/15/2012 45°42'48.62" N 123°01'45.28" W elev 1461 ft
Google

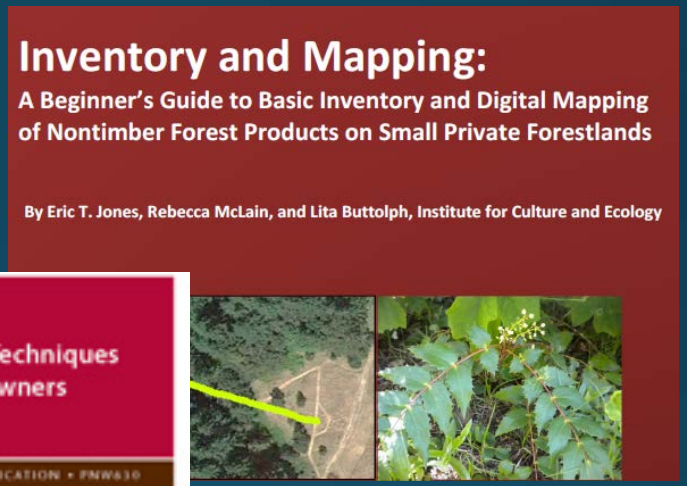
Summary

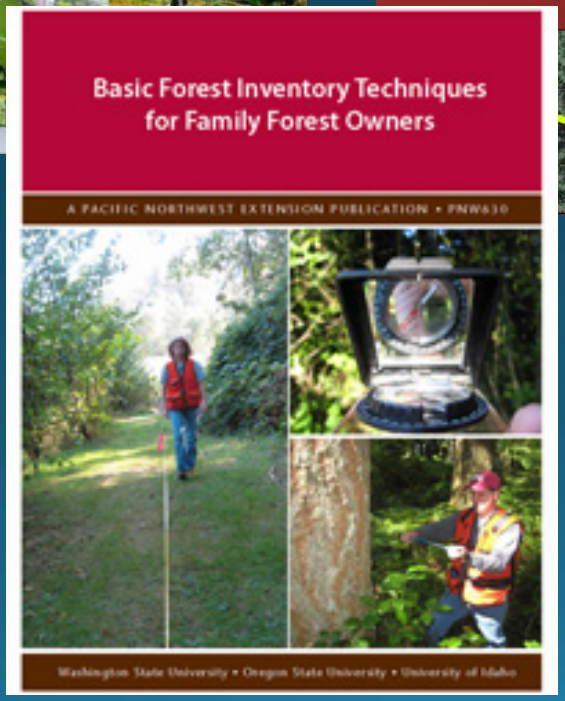
An inventory…

- can provide concrete data on your forest resources and their spatial context
- can be as simple or complex as you want it to be
- should be tailored to your management objectives – in scope and scale
- is a great way to explore your property but it is a lot of work – plan ahead!

Resources for more help



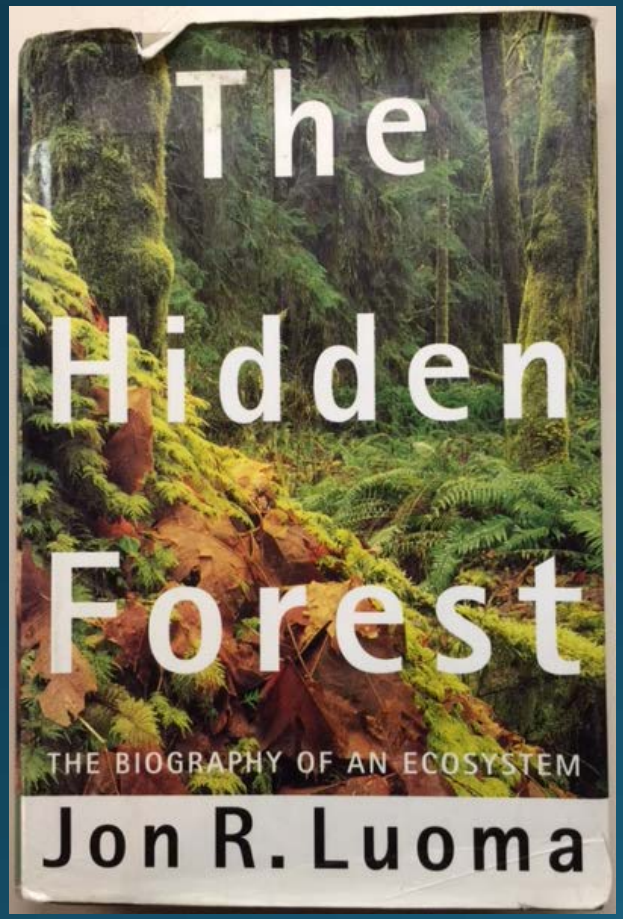


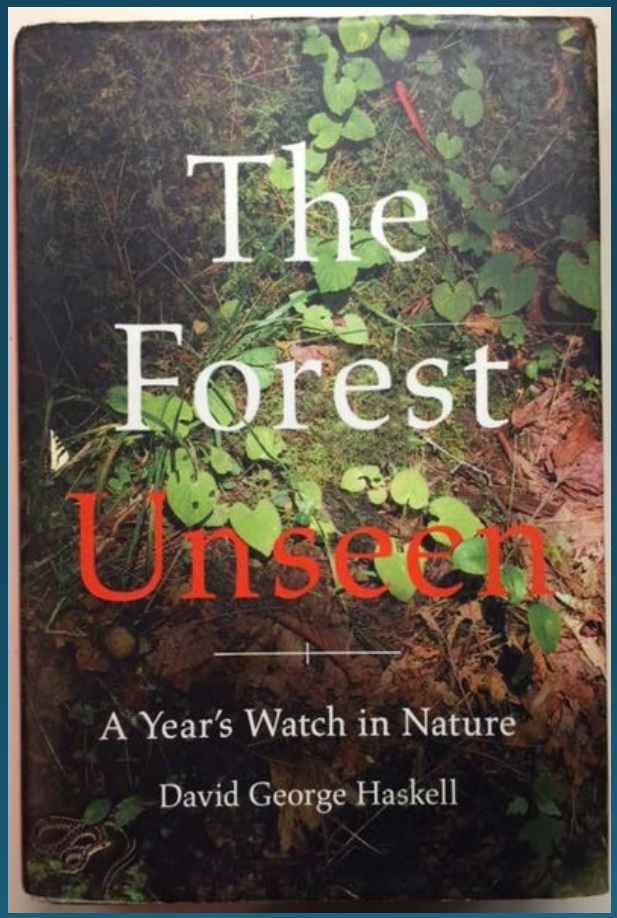


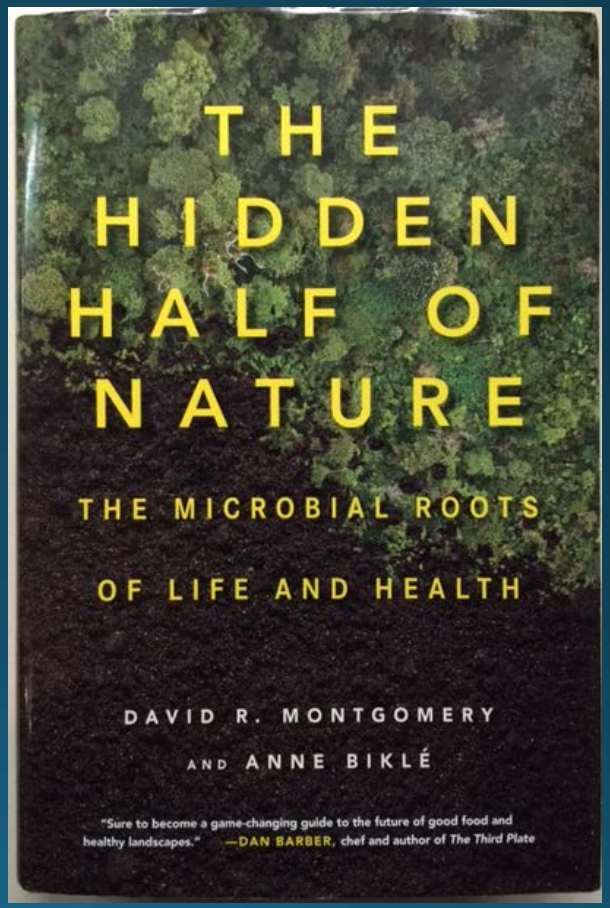
Lots of related Tree School classes

- Basic Forest Measurement Tools
- Forest Management Plan Writing
- Enhancing Wildlife Habitat
- Keys to Knowing Shrubs and Trees

Some good reads!







"Every day the forests have something new to teach us – if we are paying attention."


Let's go practice!