



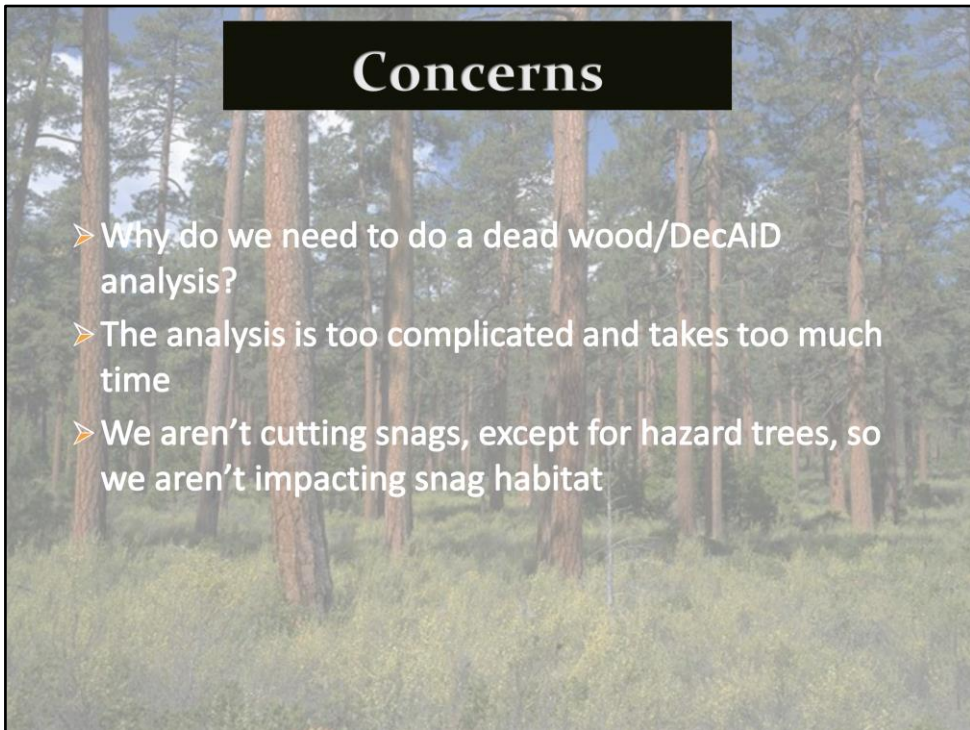
## **DecAID – a primer**

**Barbara Webb – Wildlife Biologist/DecAID Regional Center of Excellence**



# Objectives

- A better understanding of DecAID and the data in DecAID
- A better understanding of why assessment of dead wood habitat is needed



These are concerns we've heard from various folks around the Region. Will try to address in the presentation

A background image of a forest with tall, thin trees and dense green undergrowth. A black rectangular box is overlaid on the top left of the image, containing the title and list.

## Outline of presentation

- Why DecAID was developed?
- Why DecAID is relevant?
- What is DecAID?
- What a dead wood analysis needs to address
- Suggested analysis methods



# DecAID Developers

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## ➤ NFS:

- Kim Mellen-McLean – Regional Wildlife Ecologist
- Beth Willhite – Entomologist
- Bruce Hostetler – Entomologist – *Retired*
- Cay Ogden – Wildlife Ecologist - *Retired*

## ➤ PNW:

- Bruce Marcot – Research Wildlife Ecologist
- Janet Ohmann – Research Forest Ecologist - *Retired*
- Karen L. Waddell – Research Forester - *Retired*
- Tina Dreisbach – Mycologist - *Retired*

## ➤ USFWS:

- Sue Livingston – Wildlife Biologist

Began development in 1998  
First version was in 2002

# Why was DecAID developed?

Because LRMP S&Gs were based on “potential population levels” aka “biological potential” aka “maximum population potential” yet in 2001 it was published that this was a flawed technique:

“Calculations of numbers of snags required by woodpeckers based on assessing their “**biological potential**” [or **maximum population potential**] *is a flawed technique*...studies show numbers used and selected by some species *are far higher* than calculated with this technique.” (emphasis added)

(page 602 - “Lessons Learned During the Last 15 Years” Chapter 24 “Decaying Wood in PNW Forests: Concepts and Tools for Habitat Management” (Rose et al. 2001) in *Wildlife – Habitat Relationships in Oregon and Washington* (Johnson & O’Neil 2001; OSU Press)

Replaced Thomas “Wildlife Habitat in the Blue Mountains”

LRMP S&Gs were based on the BP model from the snag chapter in this publication

# A Paradigm Shift

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## We went from the past management strategies:

- Focused on providing snags only for primary cavity-nesting birds
- “One size fits all” – one magic number
- Stand level approach



## Ecosystem management strategies:

- Focus on all dead wood dependent species and ecosystem function
- A focus on using HRV for reference conditions results in attempts to mimic natural levels ***and distributions*** – one size does not fit all
- Landscape level approach



# Regulatory Framework

NFMA directs the Forest Service to provide habitat to maintain viable populations of existing native and desired non-native vertebrate species.

Management Indicator Species (MIS) were selected for emphasis in planning, and are assessed during forest plan implementation in order to determine the effects of management activities on their populations and the populations of other species with similar habitat needs.

Primary cavity-excavating birds are MIS for dead and defective wood habitat on **all** forests in Region 6. Some plans identify individual species as MIS and others identify the group of primary cavity-excavators.



# Regulatory Framework

## *Remember....*

Even though S&Gs from the Forest Plan used outdated techniques, the snag levels in the Plan are still your minimums and analyses need to show (that is - document!) how the project is meeting the S&G's for snags and downed wood. Otherwise may need a project-specific Forest Plan Amendment

**What does your LRMP say?**

# Why is DecAID relevant?

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**New information & direction was challenging the current plans:**

- NWFP ROD (1994)
- Eastside Screens (1995)
- Increased public interest in dead wood habitat– **about 75% of appeals on vegetation management/fuels projects list snags as one of the issues**
- White-headed and Lewis' woodpeckers added to the Regional Sensitive species list; petition to list black-backed woodpecker

Appeals data from last 3 years

# Why is DecAID relevant?

## Eastside Screens:

### ➤ Direction to use “best available data”:

*“All sale activities (including regeneration, select cutting, thinning, or salvage) will maintain snags and green replacement/roost trees of ~ 15 inches dbh at 100% potential population levels of primary cavity excavators. (This should be determined using the **best available data** on species requirements as applied through current snag models or other documented procedures.) (Appendix A, pages 8 and 9)*

### ➤ Specifically mentions use of DecAID:

*“It is critical that silvicultural prescriptions provide for large snags in adequate numbers (as indicated by DecAID and other tools) through time to provide habitat for these species.” (RF memo of June 11, 2003)*

The Eastside Screen implementation memo specifically mentions DecAID ... though doesn't require its use.

- *existing credible scientific evidence 40 CFR 1502.22*
- *scientific integrity 40 CFR 1502.24*
- *Data quality act - section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106–554; H.R. 5658). Section 515 directs the Office of Management and Budget (OMB) to issue government-wide guidelines that “provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies.*

# DecAID in Brief

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- It is an interactive Web Site compiling the best available science on dead wood dependent species
- DecAID is not a model
- Needs to be applied at the landscape scale – 12,800 acres or larger



# DecAID the Website

<http://www.fs.fed.us/r6/nr/wildlife/decadid/>

The screenshot shows a web browser window titled "DecAID - Decayed Wood Advisor". The address bar displays the URL <http://www.fs.fed.us/r6/nr/wildlife/decadid/>. The browser's menu bar includes "Page", "Safety", and "Tools".

The website content is organized as follows:

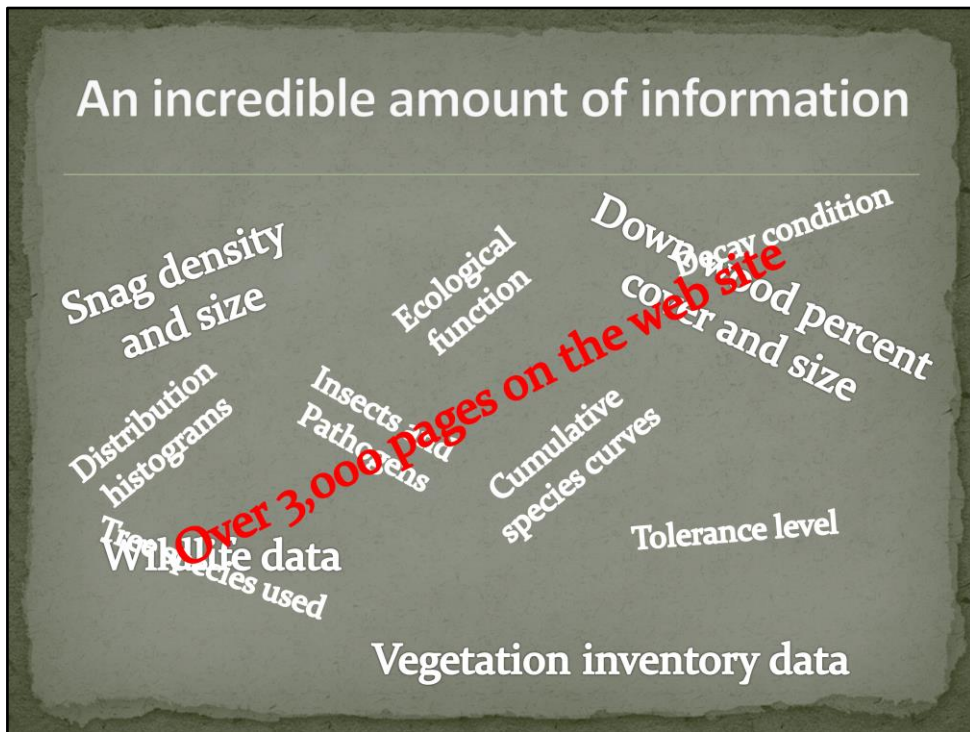
- Logos:** The U.S. Forest Service logo is in the top left, and the Pacific Northwest Forest & Rangeland Experiment Station logo is in the top right.
- Central Banner:** A wooden-textured box contains the word "DecAID" in large, yellow, 3D block letters.
- DecAID Links (Left Column):**
  - [What is DecAID?](#)
  - [TUTORIAL: How to Use DecAID](#)
  - [Caveats and Cautions](#)
  - [Available Data in Version 2.20](#)
  - [What is a Tolerance Level?](#)
  - [Statistical Basis for DecAID](#)
  - [Ecosystem Processes](#)
  - [Snag Dynamics](#)
  - [Insects and Diseases](#)
  - [Creating & Retaining Dead Wood](#)
  - [Why Down Wood Percent Cover?](#)
  - [Fungi](#)
  - [DecAID Flowchart](#)
  - [Acknowledgments](#)
- DecAID, the Decayed Wood Advisor for Managing Snags, Partially Dead Trees, and Down Wood for Biodiversity in Forests of Washington and Oregon** (Center)
- version 2.20** (Center)
- Run DecAID** (Green button, Center)
- DecAID Science Team:**
  - Kim Mellen-McLean, Bruce G. Marcot, Janet L. Ohmann, Karen Waddell, Susan A. Livingston, Elizabeth A. Willhite, Bruce B. Hostetler, Catherine Ogden, Tina Dreisbach
- [Disclaimers and Legal Statements](#) (Center)
- External Links (Right Column):**
  - [Animal Inn](#)
  - [Habitat Use by Snag-Associated Species: A Bibliography](#)
  - [SnagPRO: Snag and tree sampling and analysis methods for wildlife](#)
  - [Log sampling methods and software](#)
  - [Dead Tree Web Site - B.C. Ministry of Forests](#)
  - [Dead Wood in Streams](#)
  - [Dead wood research in riparian areas](#)
  - [Guide to the use and interpretation of DecAID](#)

The status bar at the bottom of the browser window shows the URL <http://www.fs.fed.us/r6/nr/wildlife/decadid/run-decadid.shtml>, "Local intranet | Protected Mode: Off", and a zoom level of "125%".

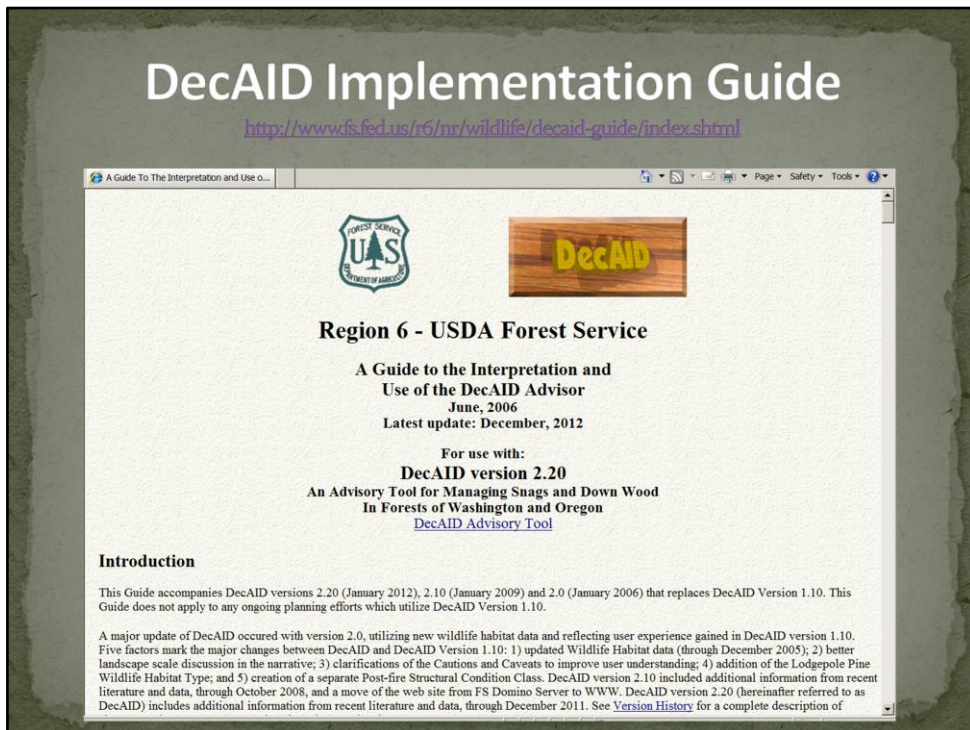
# What is DecAID?

- **Compilation of best available data/science**
  - “**Wildlife**” data from research and publications
  - **Vegetation** inventory data from CVS, FIA, NRI
- **Statistical analysis of metadata**
  - Tolerance levels
  - Cumulative species curves, bar graphs
  - Distribution histograms
  - Types and amounts of forest insects and diseases
- **Interpretation of data**
  - Comparison of “**wildlife**” to **vegetation** inventory data and insect and disease information





There is an incredible amount of information on the DecAID web site



Because there is so much information on the web site, an implementation team was put together to develop guidance in using the information in DecAID  
Team members included **regional, forest, and district-level folks**; also included USFWS



# DecAID Implementation Guide

<http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/index.shtml>

A Guide To The Interpretation and Use of...

Determine which analysis methods are appropriate for the project. Table 3 below summarizes three types of analysis. The user may want to pick and choose one or all depending on the project. Most projects (beyond the Qualitative Assessment) will use more than one method and should include use of both inventory data and wildlife data from DecAID (where available).

**Table 3.** Analysis methods for sales in green tree dominated stands.

Analysis Method	Scale	Application	Data intensity	Project Risk	Example(s)
<a href="#">Qualitative Assessment</a>	Project/stand scale or larger	<ul style="list-style-type: none"> <li>Simplest method</li> <li>Determine snag habitat objectives using DecAID wildlife data and other guidelines</li> <li>Discuss how project mitigation will help meet objectives now and in the future</li> </ul>	Low	Low	<a href="#">Merit</a> <a href="#">Docket Junction WUI</a>
<a href="#">Distribution Analysis</a>	Watershed or larger	<ul style="list-style-type: none"> <li>Use vegetation inventory distribution histograms to determine reference conditions</li> <li>Compares current condition of dead wood distribution to reference conditions</li> </ul>	Moderate to High	Moderate to High	<a href="#">Silver Lake</a> <a href="#">2007 MTH Thin</a> <a href="#">Curran Junetta Thin</a> <a href="#">Westside Project</a>
<a href="#">Wildlife Tolerance Level Analysis</a>	Watershed or larger	<ul style="list-style-type: none"> <li>Compare current amount of habitat to tolerance levels based on wildlife use data</li> <li>Use to compare impact of harvest alternatives on availability of wildlife habitat using wildlife tolerance levels and intervals</li> </ul>	Moderate to High	Moderate to High	<a href="#">Westside Project</a>

**Salvage Sales After Stand-Replacing Disturbances**

Salvage sales usually warrant a relatively complex analysis for several reasons:

- Salvage has the potential to impact very important but rare (temporally and spatially) habitat.

Click on each analysis method for a step by step guide showing how to do it. There is a similar table for salvage/stand-replacing events

After years of using DecAID to assess dead wood habitat, the Implementation Team recommends using a Distribution Analysis as a basis for the effects analysis.

## Landscape Distribution Analysis

- Each habitat type should be at least 12,800 acres in size.
  - A planning area may be made up of more than one habitat type; but only habitat types with proposed treatments need to be analyzed.
- Data from unharvested plots can be used as a **reference condition** to approximate HRV of the amount and distribution dead wood.
  - By managing habitat within HRV it is assumed that adequate habitat will be provided because species survived those levels of habitat in the past to be present today.
  - The further current conditions deviate from HRV the less likely adequate habitat is being provided to sustain those species using the habitat.

When you finish your distribution analysis you will key in on those densities with large differences between reference and current

# Landscape Distribution Analysis

## Reference Conditions

A Guide To The Interpretation and Use o...

Page Safety Tools

### Using Distribution Histograms as Reference Conditions

The terms *Historic Range of Variability (HRV)*, *Natural Conditions*, and *Historical Conditions* are sometimes used interchangeably to indicate conditions which occurred on the landscape prior to the influence of humans (particularly Europeans). Because it is difficult to determine what snag and down wood levels were prior to influence of humans, the term reference condition is used in this document in reference to the use of inventory data from DecAID. While the data may not accurately reflect pre-European levels, the data do provide a reference condition for managers. See the [HRV Dead Wood Comparison](#) document for more information.

Data from unharvested plots can be used as a **reference condition** to approximate HRV of dead wood. By managing habitat within HRV it is assumed that adequate habitat will be provided because species survived those levels of habitat in the past to be present today. The further current conditions deviate from HRV the less likely adequate habitat is being provided to sustain those species using the habitat.

However, there is a caveat to using this approach in eastside dry forests:

"On the eastside in particular, current levels of dead wood may be elevated above historical conditions due to fire exclusion and increased mortality, and may be depleted below historical levels in local areas burned by intense fire or subjected to repeated salvage and firewood cutting. Plot data from unharvested forests on the westside, where fire return intervals are longer, may provide a reasonable approximation of historical conditions." ([Mellen-McLean et al. 2012](#)).

There is debate among professionals on the impact fire exclusion has on stands relative to HRV. Thus, DecAID also presents information in the summary narratives from research studies and inventories about HRV where available. This additional information can be used to assess appropriateness of using data from unharvested plots to determine reference conditions, and to help identify knowledge gaps and areas of needed research.

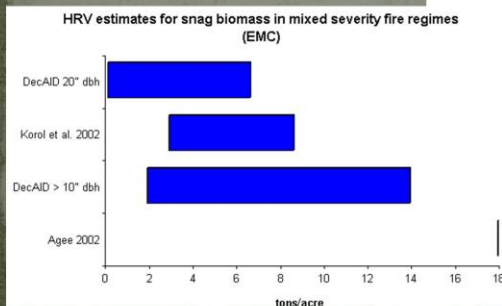
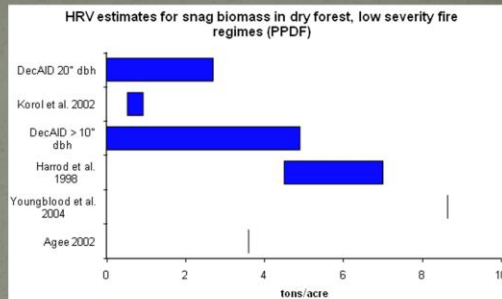
Even with the caveats associated with applying inventory data to eastside forests to represent HRV, this guide still recommends using the data because:

- They are still some of the best data available to assess HRV of dead wood, even in eastside dry forests.
- They are the only available data showing distribution and variation in snag and down wood amounts across the landscape.
- The data from unharvested stands are in the range of other published data on HRV of dead wood even in the drier vegetation types. For a full discussion see [HRV Dead Wood Comparison](#).

Many folks are concerned about using “unharvested plots” as reference conditions, so explored other published estimates of historical dead wood – link to paper in green box

# Landscape Distribution Analysis

## Comparison of Historical Range of Variability for Dead Wood: DecAID vs. Other Published Estimates



### Author:

Kim Mellen-McLean

### Reviewed by:

Richey Harrod

Miles Hemstrom

DecAID is similar or below other estimates (and a distribution range rather than one point)

Agee 2002- 30 inches

Harrod et al. 1998 - 6"

Korol et al. 2002 - 20 inches

Youngblood et al. 2004 - 24 inches



## Landscape Distribution Analysis

### Using DecAID data from unharvested inventory plots as Reference Conditions

- They are still some of the best data available to assess HRV of dead wood, even in eastside dry forests.
- They are the only available data showing distribution and variation in snag and down wood amounts across the landscape
- The data from unharvested stands are in the range of other published data on HRV of dead wood even in the drier vegetation types.

This analysis justifies using the unharvested plot information as references conditions

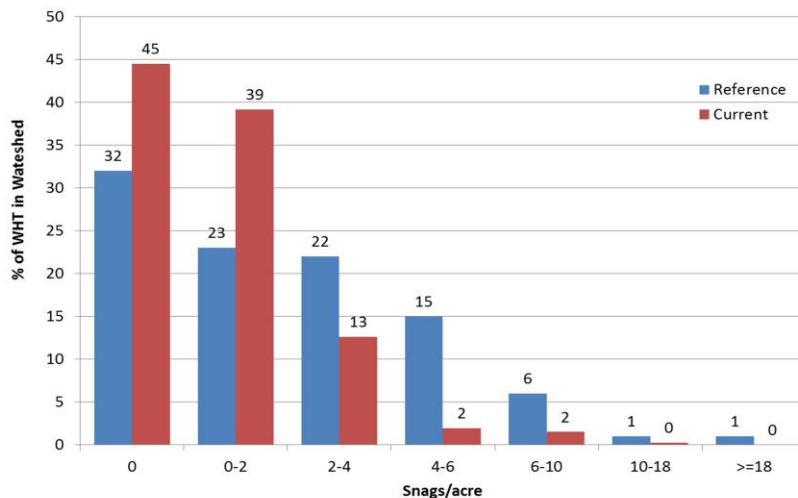
## Landscape Distribution Analysis

- **Step 1:** Data Collection: Determine current snag and down wood distribution across the landscape (DONE *using the region-wide distribution analysis using the 2012 GNN vegetation data*)
- **Step 2:** Determine Wildlife Habitat Type(s) in the Analysis Area
- **Step 3:** Determine Historical Structural Condition(s) Within Each Wildlife Habitat Type in the Analysis Area
- **Step 4:** Build “Current Condition” Distribution Histograms for Each Wildlife Habitat Type and Compare to Vegetation Inventory Histograms ( *Excel templates available to assist with this step*)

The inventory data uses FIA and CVS data that was designed to be statistically reliable at the Forest scale therefore a landscape approach (12,800 ac or greater per habitat type) is necessary when using these data.

## Landscape Distribution Analysis

XXXX Watershed  
Montane Mixed Conifer Wildlife Habitat Type; Large Snags >20"  
Comparison of reference and current conditions



We can interpret from this chart:

1. much of our current landscape (>20" snags in MMC habitat) is either not providing snag habitat or snag habitat at the <2/ac density than what we could expect historically.
2. that the highest snag densities (>10/ac) are relatively rare on the landscape currently and historically.
3. The 2-10 snags/ac densities is noticeably below what would be expected historically

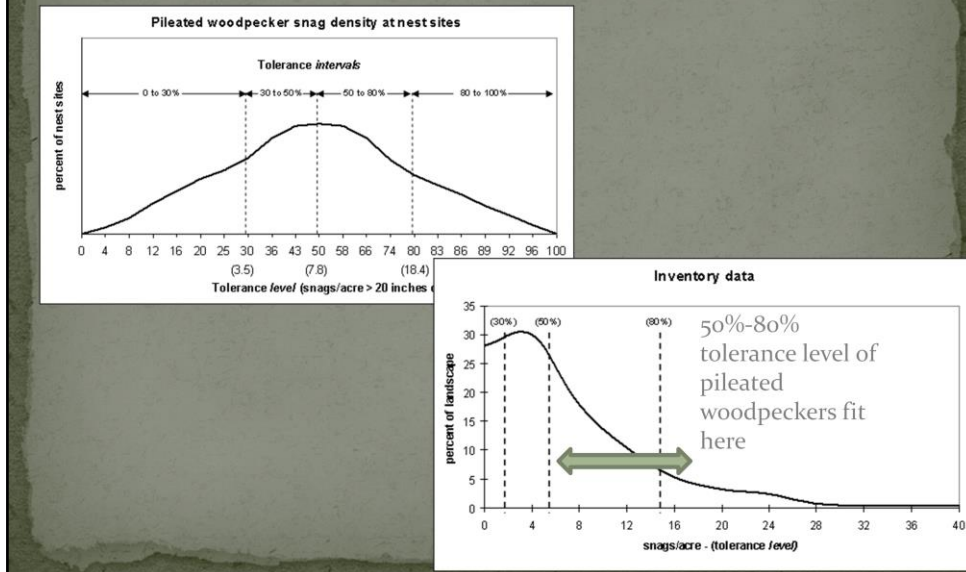
# Dead Wood Prescriptions – how do you decide?

Prescriptions need to be logically tied to current conditions and effects analysis

- What density or percent cover classes are you deficit in at the forest- and at the project-scales? *Landscape Distribution Analysis informs you*
  - Are there specific dead wood associated species that are a concern in the area? *TES or MIS species*
  - What are the objectives of the project and treatments? *Fuels reduction, restoration, etc*
  - Do you want to manage below the LRMP S&Gs and do a project-specific plan amendment?
- You don't need the same prescription on every acre ...



# Relating Vegetation Inventory Data to Wildlife Tolerance Levels

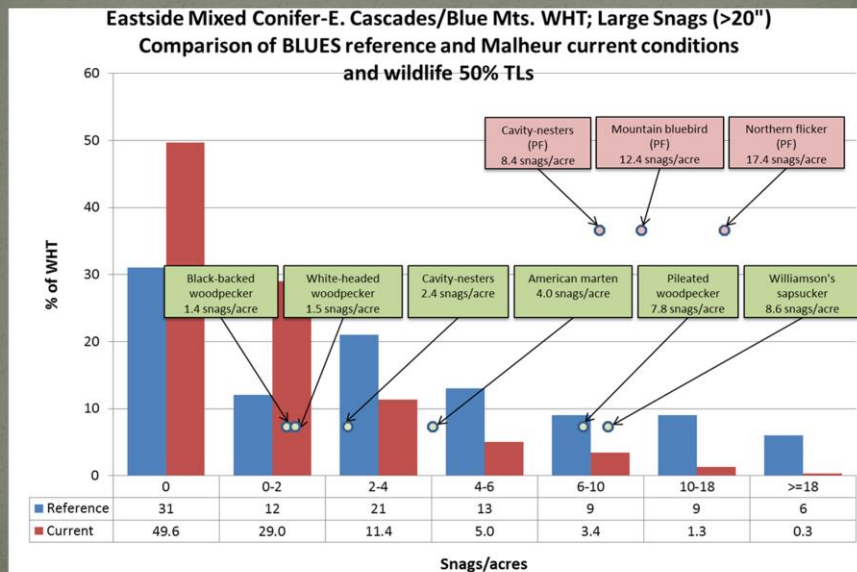


A brief explanation of what a tolerance level is: the wildlife ones are normally distributed where the 50% level represents the AVERAGE; the inventory ones are skewed and the 50% level represents the MEDIAN.

What these graphs are saying: that although high density of snags are rare (curve at bottom) they are important to pileated woodpecker populations (upper graph).

segue nicely into next slide that expands on this.

## Relating Vegetation Inventory Data to Wildlife Tolerance Levels



EXAMPLE: Wildlife tolerance levels compared to distribution analysis from vegetation inventory data ... 50% TL represents the average but some species will need some areas at 80% (pileated woodpecker MIS) depending on other project objectives. The right hand side of the graph represents densities attained through stand-replacing event (also indicated in the pink "post-fire" boxes)

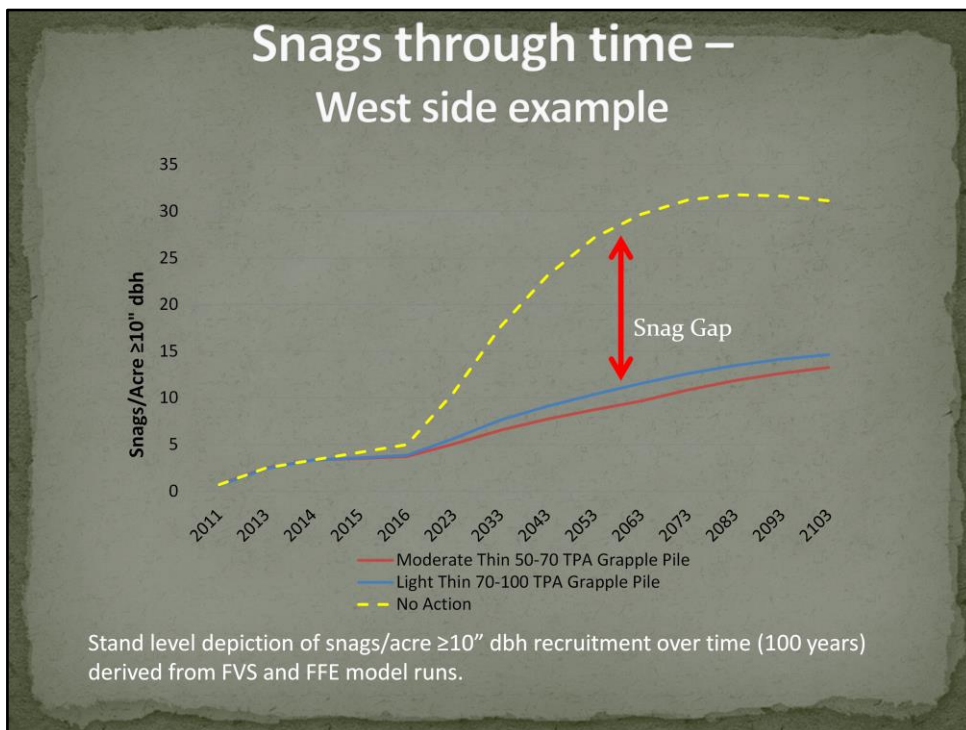
# Effects Analysis

Describe Direct and Indirect Effects of the Alternatives and the difference between action and no-action alternatives

- Through time— **suggest use of FVS-FFE**
  - Short Term – snag gaps and pulses
  - Long Term – future stand produces snags/down wood
- Spatially (Stand/Landscape)

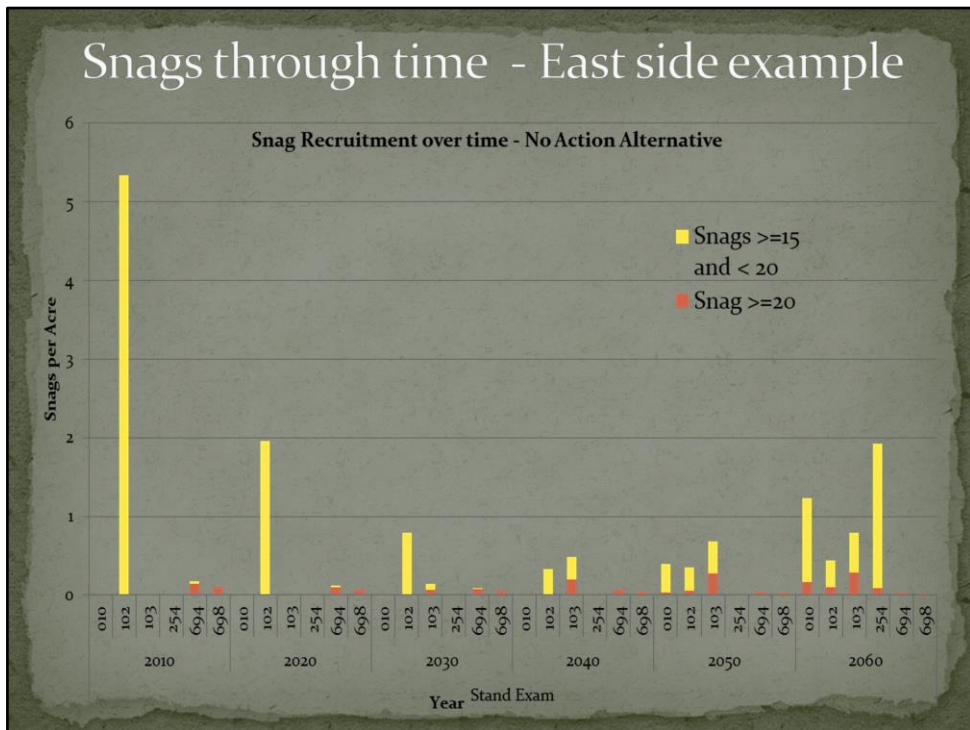
*Failure to adequately address the effects of a project on recruitment of dead wood over time is a common oversight in effects analyses.*

FVS-FFE = Forest Vegetation Simulator – Fire and Fuels Extension



Don't need to run for every project – do some representative runs for similar treatments in similar vegetation types

Any treatment you use in the stand, whether you remove snags or not, influences its ability to produce new snags. “Capturing mortality” and creating a healthier stand (e.g. by managing below the upper mgmt zones). Need to provide snags throughout the “rotation” as per forest plan (i.e. green tree replacements).

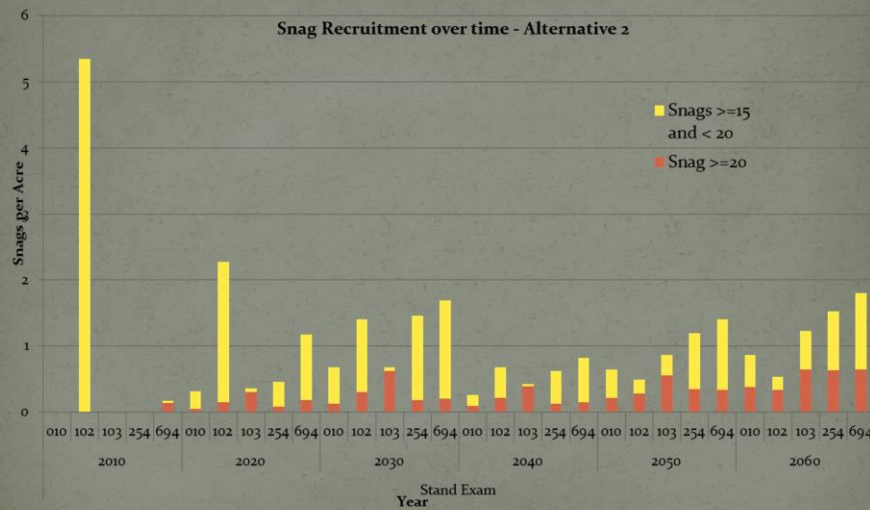


This is a treatment within ponderosa pine/lodgepole pine stand. Thinning and then an underburn.

6 stands were used as examples to model with FVS over 5 decades



# Snags through time - East side example



# Effects Analysis

## Environmental Effects on Dead and Defective Habitat

Snag habitat is currently \_\_\_\_ [adequate/deficit in the project area/watershed/forest].

This project will add to/improve the situation in the short-term.

In the long term .... [really should refer to modeling in FVS fire and fuels extension].

How does this relate to the wildlife species specific habitat needs (e.g. tolerance levels) ? Are you providing adequate habitat for your MIS species?

Snag prescription – select appropriate snag density prescription and provide rationale for the prescription related to the analysis. Clearly state the number of snags to be managed for and if that number meets LRMP S&Gs.

Mitigation measures – add mitigation measures to compensate for any negative impacts of project, for example:

- Creating snags
- Limiting firewood cutting
- Closing roads

These are the types of discussions you should have in your analysis after going through the steps in the Implementation Guide.

# DecAID Implementation Team

## ➤ NFS:

- ✓ Barbara Webb – DecAID Center of Excellence
- ✓ Steve Acker – NW Oregon Ecology Program
- ✓ Joan Kittrell – Crescent RD, Deschutes NF
- ✓ Cameron Mitchell – Umpqua NF
- ✓ Kim Mellen-McLean – Regional Wildlife Ecologist

## ➤ USFWS:

- ✓ Sue Livingston – Wildlife Biologist

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For questions on Vegetation data and local modifications of Regional veg data: contact  
Steve Acker [stevenaacker@fs.fed.us](mailto:stevenaacker@fs.fed.us)

