



# DecAID

**DecAID: the Decayed Wood Advisor** for managing snags, partially dead trees, and down wood for biodiversity in the forests of Washington and Oregon

## What is dead wood?



Cavity in snag



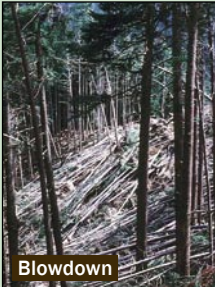
Woodpecker holes



Insect mortality



Hollow log



Blowdown



Decaying snag nurse tree



Root wad



Snags in clearcut

## What is DecAID Advisor?

- ▶ Online information and advice
- ▶ A synthesis of literature and statistics on:
  - wildlife use of snags and down wood
  - inventory of snags and down wood
  - information on insects, pathogens, fungi, and ecosystems related to wood decay
- ▶ A tool to help you manage dead wood for biodiversity

## What can DecAID Advisor do for you?

- ▶ Help you manage snags, down wood, partially dead trees, and other wood decay
- ▶ Answer these questions:
  - How much to leave?
  - What sizes to leave?
  - What is useful for wildlife?
  - What matches general “unharvested” conditions?
  - What insects and pathogens create significant dead wood, and how do they respond to management?
  - Other questions on process and function

## Why is dead wood important for forests?

- ▶ Provides critical habitat for many species of wildlife, plants, fungi, and invertebrates
- ▶ Stabilizes soil on slopes
- ▶ Is a source of organic matter for productive soils
- ▶ Is a source of time-release nutrients for growing trees
- ▶ Holds moisture
- ▶ Is a part of a natural forest setting
- ▶ Nursery logs

## Other considerations in dead wood management (not addressed by DecAID Advisor)

- ▶ Fire hazards
- ▶ Safety concerns (OSHA)
- ▶ Stand growth—maintaining future snags, down wood, and other wood decay elements for biodiversity over time
- ▶ Spatial arrangement of dead wood within stands or across a landscape or watershed

## Running DecAID Advisor

### 1 Select your wildlife habitat type and structural condition class

Example:

Choose query parameters from the following list boxes to query and view information from snags and down wood data:

Wildlife Habitat Type:  [Wildlife Habitat Type Descriptions](#)

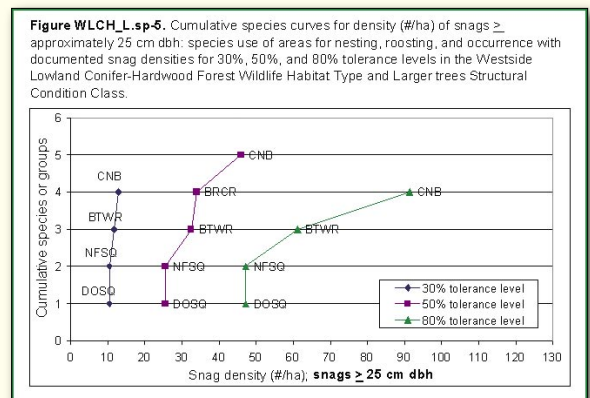
Structural Condition:  [Structural Condition Descriptions](#)

### 2 View a summary narrative on:

- ▶ Synthesis and management implications
- ▶ Introduction to vegetation condition
- ▶ Introduction to available data
- ▶ Integrated summary of wildlife data and inventory data from unharvested plots
- ▶ Ancillary information on wildlife species use of wood decay elements
- ▶ General wildlife-habitat relations with wood decay elements
- ▶ Landscape-level distribution of wood decay elements
- ▶ Relationships of fungi
- ▶ Considerations for stand dynamics
- ▶ Ecological functions and processes of wood decay elements

### 3 View graphs and charts on wildlife species' use of snag and down wood sizes and amounts

Example:



**DecAID Advisor presents wildlife and inventory data in “tolerance levels” (percentages of populations, calculated by combining data from multiple studies):**

- ▶ 30% tolerance level (might apply to timber-emphasis objectives, or low productivity or high fire risk sites)
- ▶ 50% tolerance level (might apply to multiuse objectives, or moderate productivity or moderate fire risk sites)
- ▶ 80% tolerance levels (might apply to biodiversity emphasis objectives, or high productivity or low fire risk sites)

*You decide which level to use!*

**4** *View underlying wildlife data—“drill down” to the source literature and view species information*

View synthesis of data from the literature...

**Underlying Data**

**Table WLCH\_Lsp.22.** Synthesized data used to create the cumulative species curves for wildlife use of snag densities from various studies for the Westside Lowland Conifer-Hardwood Forest Wildlife Habitat Type and Larger trees Structural Condition Class. Where data are reported for the same species or species group for more than 1 study, weighted means and tolerance levels are given. Note densities of snags > 15 or 10 cm were not incorporated in the cumulative species curves.

Snag size: >15 and >10 cm

Species	30% T.L.	30% T.L.	30% T.L.	30% T.L.	30% T.L.	Species	50% T.L.	50% T.L.	50% T.L.	50% T.L.	50% T.L.	Species	80% T.L.	80% T.L.	80% T.L.	80% T.L.	80% T.L.	
	Snag Density (#/ha)	Snag Density (#/acre)	Sample size	# of studies		Snag Density (#/ha)	Snag Density (#/acre)	Sample size	# of studies		Snag Density (#/ha)	Snag Density (#/acre)	Sample size	# of studies		Snag Density (#/ha)	Snag Density (#/acre)	
BRCR			0	0		BRCR	83.5	33.4	143	1	BRCR			0	0			
LEMV	43.9	16.4	29	1	LEMV	96.0	36.4	29	1	LEMV	175.4	70.1	29	1				
LLMF	14.6	5.8	33	1	LLMF	47.6	19.0	33	1	LLMF	95.4	38.2	33	1				
PRWO	8.5	3.4	15	1	PRWO	37.2	14.9	15	1	PRWO	77.5	31.0	15	1				

...study-specific data...

**Underlying Data**

**Table WLCH\_Lsp.30.** Study-specific data and information used to create the cumulative species curves for snag density in the Westside Lowland Conifer-Hardwood Forest Wildlife Habitat Type and Larger trees Structural Condition Class. Note densities of snags > 15 or 10 cm were not incorporated in the cumulative species curves.

Species	Mean snags/ha	Mean snags/acre	sd (#/ha)	n	Min dbh (cm)	Decay stage	p-value	Type data	Plot size	Structural Condition Class	Geographic location	Part of state	Citation
BRCR	83.5	33.4	N/A	143	>10	all	stand	0.0001	not given	S/M & L	Oregon Coast Range	Garman and Cole 1999	
BRCR	34.0	13.6	N/A	143	>30	all	stand	0.0001	not given	S/M & L	Oregon Coast Range	Garman and Cole 1999	
BTWR	32.5	13.0	19.5	10	>25	all	stand	NS >0.05	0.08 ha	S/M & L	Oregon SW Cascades	Maguire, unpubl. data	
CHB	46.0	18.4	26.6	8	>24	all	stand	0.012	30.5 mc	O, S/M, & L	Washington Olympic Peninsula	Zarnowitz 1982	
CHB	19.0	7.6	16.6	276	>50	all	nest site	0.001	0.2 ha	S/M & L	Oregon Coast Range	Nelson 1988	
CANB*	24.2	9.7	29.9	276	20-49	all	nest site	0.001	0.2 ha	S/M & L	Oregon Coast Range	Nelson 1988	

...species data from each study...

**Details on species use of Snags from studies pertinent to Westside Lowland Conifer-Hardwood Forest, Larger Trees**

This table displays further details of the structural condition class, habitat, and geographic area of each set of data for each species. This table may include data not included in the cumulative species curves. Clicking on the species code will give a table with more information from that particular study, including a comments block with details on statistical analyses performed. PRINT TABLES IN LANDSCAPE.

Species Code	Species Name	Structural Condition Class	Wildlife Habitat Type	Geographic Area	Citation
AMMA	American marten	Larger Trees, Small/medium Trees	Moisture Moderated Conifer Forest, Westside Lowland Conifer-Hardwood Forest	Washington Cascades	Jones and Raphael 1991
BRCB	Brown creeper	Larger Trees, Small/medium Trees	Westside Lowland Conifer-Hardwood Forest	southern Washington Cascades	Landquist and Matias 1991
BRCR	Brown creeper	Larger Trees	Westside Lowland Conifer-Hardwood Forest	Olympic Peninsula	Zarnowitz 1982, Zarnowitz and Mazzavali 1985
BRCB	Brown creeper	Larger Trees, Small/medium Trees	Westside Lowland Conifer-Hardwood Forest	Oregon Coast Range	Nelson 1988
BRCB	Brown creeper	Larger Trees, Small/medium Trees	Westside Lowland Conifer-Hardwood Forest	western Oregon Cascades	McComb et al. 1992
BRCR	Brown creeper	Larger Trees, Small/medium Trees	Westside Lowland Conifer-Hardwood Forest	Oregon Coast Range	Garman and Cole 1999

...details of study-specific data...

**Literature and Studies for Snags**

Here are further details on the data for the selected species and citation. Blank cells mean that no information was given. See Literature Cited for the full reference of the citation listed here.

Species Code:	AMMA	Species Name:	American marten
Decay Class:	resting: 65% live; 35% dead	Stand Age Or Structure:	managed mosaic
Geographic Area:	Washington Cascades	Comments:	resting sites, n=120; natal dens n=5 (4 live, 1 dead); majority of nest sites and all natal dens in cavities in live or dead trees; dbh natal dens all > 80 cm;
Citation:	Jones and Raphael 1991	Structural Detail (Specific Structure):	
Specified Name in Citation:	American marten	Habitat Type Details(Specific):	primarily Pacific silver fir zone, with some western hemlock zone at lower elevations and mountain hemlock zone at higher elevations
Snag/Partially Dead tree level:		Snag/Tree DBH:	mean 91 cm (snags), 100 cm (live)
Snag/Tree Height:		Snag/Tree Species:	

...and literature cited.

Johnson, D.H. and T.A. O'Neil, ed. 2001. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis OR. 736 pp.

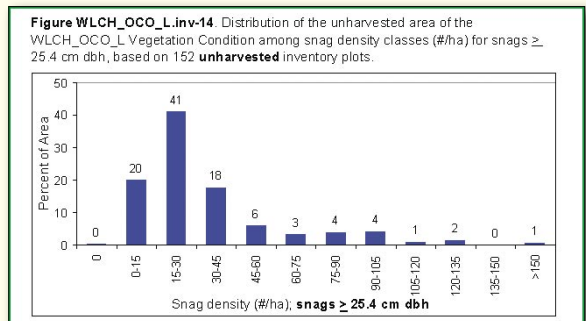
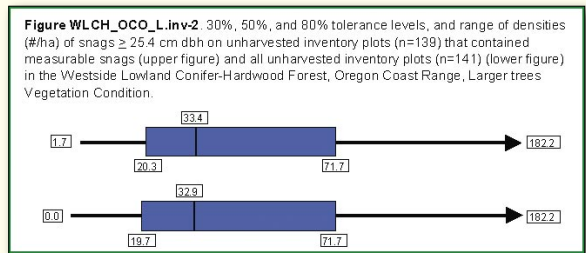
Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, Univ. of Idaho, Moscow. 147 pp.

Jones, L.C. 1989. *Plethodon vandykei* (Van Dyke's salamander): reproduction. Herpetological Review 20:48.

Jones, L.L.C., and Martin G. Raphael. 1991. Ecology and management of marten in fragmented habitats of the Pacific Northwest. USDA Forest Service, PNW Research Station, Progress Report. Fiscal year 1991. Olympia, WA. 26 pp.

**5** *View graphs and charts of inventory data—on size and amounts of snags and down wood, in unharvested forests, and in the entire landscape*

Examples:



## 6 View underlying inventory data— “drill down” to component data layers

Example:

**Descriptive statistics for snag density**

**Unharvested Plots**

Click here to see data for - [All Plots](#)

**Tables included on this screen:** [Inv-3a](#), [inv-3b](#), [inv-4a](#), [inv-4b](#)

**Table inv-3a.** Distribution-free tolerance limits (trees per hectare) for snags > 25.4 cm (10.0 in) dbh and > 2.0 m (6.6 ft) tall on **unharvested plots, with measurable snags, by vegetation condition.** The summaries are based on all BLM and CVS plots (all grids), and no FIA plots. If the number of plots with measurable snags in a vegetation condition fell below 10, the cells are left blank.

Vegetation condition	n	Min.	30% tolerance limit	50% tolerance limit	80% tolerance limit	Max.
WLCH_WCO_O						
WLCH_WCO_S	27	6.6	15.7	50.9	70.1	134.6
WLCH_WCO_L	22	5.0	24.6	34.0	118.1	122.2
WLCH_OCO_O						
WLCH_OCO_S	46	2.0	11.9	24.7	46.6	185.7
WLCH_OCO_L	139	1.7	20.3	33.4	71.7	182.2
WLCH_WCA_O	18	2.6	13.1	27.6	81.2	94.2
WLCH_WCA_S	137	2.6	28.1	42.9	76.0	166.1
WLCH_WCA_L	88	2.6	26.2	40.7	77.8	185.0
WLCH_OCA_O	30	2.6	13.1	23.6	64.5	143.3

## 7 View information on insects and pathogens

Examples:

Root Disease(s)	Number of Unharvested Plots	Percent Unharvested Plots with Root Disease Present	Number of Harvested Plots	Percent of Harvested Plots with Root Disease Present
annosus root and butt rot	5	3.2	2	0.7
armillaria root disease	32	12.8	43	15.6
laminated root rot	24	11.8	27	10.0
black stain root disease	2	1.2	5	1.7
Port-Orford-cedar root disease	3	1.3	5	1.7
unidentified root disease	11	4.6	9	4.1
At least one including those unidentified	61	29.2	71	27.0
At least one of the four (HEAN, AROS, PHWE, LEWA) primary ones <sup>1</sup>	56	26.6	65	23.9

### Western Spruce Budworm

#### *Choristoneura occidentalis*

**Key Wildlife Value:**

The western spruce budworm contributes to the creation of snags and down wood by severely defoliating true fir and Douglas-fir trees and by interacting with other disturbance agents to cause the death of all sizes of host trees. By causing topkill in all sizes of trees, *C. occidentalis* contributes to the formation of unique limb structures and facilitates the colonization of living tree boles by stem decay fungi. During outbreaks, high numbers of larvae, pupae, and moths provide abundant forage for many species of birds, bats, rodents, and invertebrates. Some of the mortality associated with western spruce budworm defoliation contributes to the formation of canopy gaps, increasing structural diversity.

**Distribution in Oregon and Washington:**

Found throughout both states. (See also [Important Habitats and Outbreak Dynamics](#).)

**Hosts:**

Primarily grand fir, white fir, and Douglas-fir, but also other true firs, Engelmann spruce and western larch. During outbreaks, larvae also may feed on understory non-host tree species, such as pines or hemlocks.

**Diagnosis:**

During the summer, current year foliage on host trees is [chewed and webbed together](#), often containing [hickies \(see \*Castro\*\)](#). Affected foliage turns [reddish in July and August](#) as it

## Run DecAID Advisor

<http://www.notes.fs.fed.us:81/pnw/DecAID/DecAID.nsf>



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