**Wildlife Tree Creation Testimonials from Oregon and Washington**

**USFS and BLM Wildlife Biologists**

**February 12, 2019**

The following documents wildlife biologists’ experience creating wildlife trees in R6 USFS (OR/WA), Northwest Oregon BLM and Coos Bay BLM. The data was obtained through an email survey distributed in July 2018. A summary can be found in Table 1 (Page 21). For questions, contact Cheryl Ann Friesen, USFS Science Liaison [cfriesen@fs.fed.us](mailto:cfriesen@fs.fed.us)

**Bureau of Land Management**

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**Randy Miller, Siuslaw Field Office, NW Oregon District, BLM**

I have implemented deadwood creation to a few thousand trees in my career.  Early focus was preventing blowdown of wildlife trees retained in clearcuts.  Research, esp. the attached paper, (contact cfriesen for paper) changed my focus to include topping trees to promote fungal attacks that can cause heart-rot in live trees.  Heart rot seems to be a needed precursor to cavity creation and use by wildlife.

A major question I have is how long it takes for heart rot to create conditions that facilitate excavation.  Some limited research indicates it takes more than a decade.  Siuslaw NF did some limited sampling; see attached.

I've been doing some form of tree topping since about 1990.  In Gold Beach I used contracts to top very large trees retained in clearcuts.  Blasting and saw topping to prevent windthrow, so many of these should be alive.  Blasting is fun, but more hassle than necessary.  I did a few hundred trees in Gold Beach.   I also did some base girdling to kill large trees in meadows, and they were nearly all down within 5-10 years.  I think there has been very little monitoring of base girdling because it is clear to anyone that has done this work that it doesn't provide persistent snags.

I personally found about 30 spotted owl nest trees while in Gold Beach; all were in live very large broken topped trees or trees with side cavities.  Also, it seems like most were in a fire refugia location: low on slope, on gentle slopes, in wet areas, or at the back side of a rotational slump where fire intensity would be low.  Makes sense that big old trees in an area with fairly frequent fire regime would be where fires are less likely to get hot.  My recollection is these nest trees were usually larger than 4-5 foot dbh.

I worked on the eastside of the Siskiyou for over a decade (1995-2005), but we did not implement any timber sales.  I inoculated 20 trees while there.

I came across some literature around 2004 or 2005 that said maybe all nest cavities excavated by woodpeckers were in trees with heart rot, so I started paying more attention to heart rot.  See attachments; esp. 2004 Jackson and Jackson.

I worked for Central Coast RD from 2005 to 2010 where we created dead wood with thousands of trees; about 90% were in plantations where treated trees were 14-20" dbh, and 10% were in 36-48" dbh mature trees in older stands.  I had a generic Rx to clump treatments where we felled 1/3, live topped 1/3 (15 live branches and >10" topping diameter to try to prevent growth of a new top), and dead topped 1/3 (4-6 live branches).  I was using numbers from DecAID for roughly 30 and 50% tolerance levels and spreading groups across units with at least one clump each 5 acres of thinning.  We also did hundreds of inoculations because some monitoring of older work on Siuslaw NF (~ 10 years after inoculation - see attached 1\_2006... destructive sampling word doc)  showed heart rot in all inoculated trees although there was no evidence of wildlife use yet.  Plantation trees we treated were about 16-22" dbh, but we also did a few large trees 36-48" dbh in older stands next to thinned stands.  Most were Douglas-fir, but some were hemlock.

If I was going to do any serious monitoring I would look at the work on the Siuslaw NF.  We collected a lot of individual tree data about dbh, live limbs, estimated topping height, etc. in the hope that someone would monitor or study what we did.  WE have gps for each group.  Each tree had a numbered tag too.

I am now high girdling half of the trees to keep them alive because I realize now how important cavities are to energy conservation and defensible security.  I also think girdling creates a good place for fungi to grow.  Our latest project is releasing any tree with evidence of heart rot because for a tree with heart rot to get big enough for spotted owl nests, they need to have more light than merely ignoring them in marking guidelines.   Most marking guidelines of the past select against trees with evidence of heart rot; we need to select for heart rot.

What methodology are you using to create snags?  I've used saw and blasting to top as well as high girdle.  I like high girdle the best; safer for workers and trees die slower; retaining canopy cover for awhile.

What age of stands are you working in?  I have used contracts to top trees from 40 to over 400 years old.  Now, Siuslaw Field Office is in 40-80 year old stands now.

What average dbh of snags are you creating? 14-30" dbh

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?  i don't know recent costs, but topping topically was about $70 each for smaller trees and over $100 for taller trees.   Climbing height drives up costs, and clumping pulls costs down.  Clumping results in ability to swing from top to top, and it reduces time walking around with heavy gear.

Literature and/or observations to share?  The heart rot paper is a good primer for how fungi gain access to heart wood and other basic biology.  It's a timber paper, but has good information.

**Scott Hopkins, Mary’s Peak Field Office, NW Oregon District, BLM**

Are you creating snags as part of timber sale mitigation? Since 2006, the Marys Peak Field Office has had a snag/down log creation program that targets: (1) treatments in Timber Sale units (mostly in LSR and Riparian Reserve Thinnings within 5 years post-thin), and (2) treatments in LSR/RR and outside of planned harvest areas where the intent is focused on maintaining declining legacy trees within dense mid-seral stands and boosting the coarse woody debris component in stands that are not likely to receive a thinning harvest within the next decade.  In total, we have treated 930 acres with over 8500 trees cut, which includes 3200 snags created. About 1/3 of those acres and snags have occurred within Timber Sale units.

What methodology are you using to create snags? Treatments are most often accomplished with a service contract (usually by task order to the Service First Wildlife Tree Creation Contract), and involve climbing to create saw-top or high-girdle snags. To a lesser extent we use basal girdling.

What age of stands are you working in?  The focus has been on mid-seral (40-80 years old) conifer-dominated stands in LSR/RR. A few stands have been older (up to 100 years old).

What average dbh of snags are you creating?  Usually 24 to 30 inch DBH, but this is dependent on the stand conditions within selected treatment units. Typically, trees selected for snag creation represent the upper 1/3rd of the dbh size range within the mid-seral stands that are treated. Sometimes, with younger, denser, or low site class stands the dbh for snag treatment may be less than 24 inches but has not been less than 18 inches.

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? We have been using appropriated funds (BLM funds 6334 or 6320) and usually spending $20k to $40k annually. The size of annual expenditures are mostly dependent on the limitations of available staff needed for layout, contract prep, and project inspection.

Attached is the budget and price list for a 2017 snag and down log creation project in LSR/RR units that were outside but adjacent to a LSR density management thinning units. The price list for this project includes snag treatments: saw-topping ($67/tree), high-girdling ($62/tree), and basal girdling ($13/tree).

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**Carol Aaron, Coos Bay BLM**

Yes, we have been finding snags that were created in a study about 15 years ago by different treatment methods: catfacing, injecting with two different types of fungus, and  topping.  I'm not sure how many we have found to date exactly, but I'm guessing in the 200 +/- range.   I wish they had done girdling because while people all say that they just fall down right away, it would be really good to have some comparison data in our District.  For a variety of reasons (safety, ease of doing, etc.) management really prefers girdling, so to be able to say that in this area, with the size of trees we are generally doing, it is or is not effective at creating snags that remain standing and can support prey species.

Finding the trees is a bit of an Easter Egg hunt.  There are GIS points for all trees, but the projection has changed, or was off when they did it, and so they are often off by a hundred or so meters.  That said we (which is really our techs) have found all but a handfull of the ones they have looked for thus far.

As for what we have been finding, mostly the trees seem to be still quite healthy regardless the treatment.  There is often epicormic branching from where the trees were topped, and some conks on some trees, but most of them are still alive and apparently thriving.  We have been speculating about whether making some deep cuts after catfacting might actually kill the tree.  They did put some slashes in after cutting the catface, but not very deep.  Having trees die slowly is not necessarily a bad thing I guess, maybe they are rotting out on the inside, but hard to tell for the most part at this time.

This work - and probably really all of the snags we create - are not in NSO potential nest trees though.  They are much too small.  I think we are really aiming to provide forage opportunities for woodpeckers and maybe some habitat for prey if there were some heartrot and small mammals could live in there.

We're still working on this project, but one of our techs just got another position, and our other one is mostly working on work related to upcoming timber sales, so we don't have much time to devote to it

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**John DeLuca, NW Oregon District, BLM**

A major conclusion that I came to after reviewing Ray's paper was that since about 80% of NSO nests occur in broken-topped, live trees >50" DBH, it seems that creating "living snags" (i.e., topped trees with live branches below the breaking point) is the best method for creating snags that have much hope of being used by spotted owls in the future.  Living snags are probably more valuable to other species of concern such as fisher and marten, as they offer cavities and protective cover in the same tree.  Moriarty's data might confirm that, but I don't know?

David Kennedy of the Siuslaw FO and I went on an excursion a year or two ago to try and find old snags and came up empty-handed.  We found some snags but couldn't tell if they were created by humans or other forces.  The amount of bushwhacking involved was heavy, and it felt like a wild goose chase, so we abandoned that idea.  I understand Carol Aron of Coos Bay has had some success on a similar effort, but I don't know the details.  Kenny Ruzicka (silviculturist) and Corbin Murphy (wildlife bio.) of the Cascades Field Office were talking about working on a snag creation effectiveness monitoring project on the Cascades Field Office.  Do any of y'all have any information to share?

We really could benefit from more science on snag creation effectiveness monitoring.  Joan Hagar and her lab recently published a paper that shows that topped trees have a high amount of longevity, and that is good to know.  However, others on the NW OR District and I are especially interested in the effectiveness of base-girdling, especially as it relates to snag longevity.  There seems to be little to no peer-reviewed literature on the subject of base-girdled snag use or longevity.  I've searched Web of Science and found nothing, but maybe others have information to share?  All I know is that base-girdling pines is a bad idea, based on the experience of a colleague who created hundreds of base-girdled ponderosa pines that all fell within 5 years of treatment.

I agree that the snags that we create are not currently suitable NSO nesting trees (and provide benefits to the dozens of other species that rely on them), but I wonder if the live limbs that we leave in living snags could grow into a 50"+-DBH living snag ("declining" tree)?

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**Joshua M. Carnahan, NEPA Assistant/Writer/Editor, Siuslaw Field Office, NW Oregon District BLM**

I just have some circumstantial evidence about base girdling from looking at a few spots where it was done in the timber sale contracts. I was prepping for writing the Eugene District snag contract in 2013, I think it was. I found an old shape file showing points where base girdling was supposedly done at. I walked about 40 acres, something like 7 years after the treatment, and could not find any standing. I found some spots with a lot of wood on the ground but nothing standing. I also do know that we had very specific requirements in the snag contract for base girdling, we have GPS center points for each clump, and we created something like 3k (or more) base girdles in the coast range over the past 4 years. You have a really good start for monitoring what happens to these trees.

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**Ray Davis, NWFP Monitoring**

Early part of my career I’ve ran contracts and crews to create snags on both the Siuslaw (mostly topping large PSME with dynamite, but some with saw) and the Umpqua (mostly girdling larger trees, as the can stand longer than girdling small trees) also some inoculation of smaller trees in thinned plantations. No monitoring worth mentioning. My perspective on this that it is better to try to conserve/protect good snags that exist (e.g. get involved in hazard tree and salvage projects) as opposed to creating future snags. If you are going to do snag creation, I agree with John’s approach on “living snags”.

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| **Laresa Kerstetter, Wildlife Biologist, Siuslaw National Forest, Central Coast Ranger District** |

* What methodology are you using to create snags? See attached document for specifications (this is a copy of the most recent specifications for a stewardship timber sale). New this year is placing cavity starts and bat flanges in all the snag trees (not live topped).
* What age of stands are you working in? Two categories of trees are being treated- 1)small tree topping within plantations (younger than 80 years old), and large trees in natural stands greater than 80 years old.
* What average dbh of snags are you creating?  1) for small tree topping average dbh is about 22 inches 2) for mature trees the average dhb is 38”
* What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?    1) small tree topping- $65,

2) mature high girdle- $145    This is paid for with KV funds, with an average of $100,000 a year. In addition the same treatments are being applied through stewardship timber sales.

The question about 6 snags per acre from Steve Acker I’m not quite sure where that number came from, for Indian Creek the number for small snags was 7 (But the number that got put in the final EA is 4 snags per acre). Past EA’s ranged from 11 snags per acre (Marys Peak LMP) to 3 snags per acre (E. Alsea). For mature trees the number ranges from 1 tree per 5 acres harvested to 1 tree per 10 acres harvested. All of these are based on interpretation of Decaid.

Hope this helps and I really look forward to pooling all of this information together to really use the science and knowledge in the best way possible.

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**Amy Markus, Fremont-Winema**

Cheryl – we are not creating snags for timber sale mitigation.  We used to do that years ago (1990s) but haven’t done any since then.  We’ve had so much insect and disease mortality that there’s ample snags in most areas.

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**Michael Borysewicz, Colville National Forest, Newport-Sullivan Lake Ranger Districts**

Are you creating snags as part of timber sale mitigation and if so, please answer the following: yes

What methodology are you using to create snags?  Attached are marking guidelines we’ve used in the past.  DecAid has modified the numbers of trees we consider for treatment.  We normally only top trees in regeneration harvest units.  We use 2 methods for snag creation.

1. KV funded - Chainsaw topping using smokejumpers from the North Cascades jumper base.  Trees are topped a minimum of 40 feet above ground.
2. Stewardship funded - Topping with a mechanical harvester as high up in the tree as the equipment can reach.  This method creates a snag that is typically only about 20 feet tall.

What age of stands are you working in?  60+ years

What average dbh of snags are you creating? At least 12 inches DBH, average perhaps 15 inches (we are an eastside forest)

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Smokejumper cost = $50-70 per tree.  Estimated stewardship cost = $50 per tree.  Annual cost is highly variable.  With smokejumper resource orders we shoot for at least 100 trees to top in a given year.

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**Chris Loggers, Wildlife Biologist, Colville National Forest, Three Rivers Ranger District**

Are you creating snags as part of timber sale mitigation? Not very much for mitigation…maybe 1 unit a year…and not nearly as many snags as the east side.  We do try to put a non-mitigation high-topping note in stewardship contracts: when a large snag is felled, hight-top nearby tree > 14”…mixed results getting it in project.  Nearly all harvests on west side of CNF consist of thinnings (CFLRP area), which theoretically allows operators to move arounds snags.  That’s the theory.  It’s expensive to quantify snags to a precision required to determine if pre/post levels are different, and whether the loss would then require mitigation.  We have done that only on the Kettle Face project…which then burned in a 2015 fire so we have lots of snags.

Logging community would like to be able to high-top as they’re working through a unit (they do this w/ other land management agencies), but we can’t do that under a normal timber sale contract.  It’s permissible under stewardship contracting, though.  Would like to have high-topping done as matter of practice and not solely for mitigation.

What methodology are you using to create snags? Same as Mike though have also just girdled top, scarred bole in several locations to see if rot pocket will develop.  Set up project and marked 6 trees in clumps, each randomly treated with 1 of 3 methods (girdle top, remove top, scar bole/remove limbs).  Trees are marked so can be reviewed in a few years. Still need better understanding of what makes a good snag for nesting, which seems to be more limiting than a snag used for foraging, and how to go about creating such a beast (a la Lorenz’ work).

What age of stands are you working in? Usually in medium-aged stands during thinning operations in warm/dry (CFLRP)

What average dbh of snags are you creating? Same as Mike

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Same as Mike

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**Jesse J Plumage, Mt Baker-Snoqualmie National Forest**

Cheryl, the MBS is not creating snags at this point.  It’s probably been over 20 years since we did that sort of thing.

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**Karen Holtrop, Olympic NF**

Yes we are creating snags as part of sale area improvements. Note this is not necessarily considered mitigation; but rather improvement/ enhancement. Is it done if snag levels are low in areas, as determined during NEPA.

Topping and girdling. The girdling is usually high girdling but in some areas we’ve done low girdling. Sometimes we do cavity starts. We’ve done fungi inoculation in the past.

Average ~21” dbh. The range is 15 to 29”.  Generally second growth thinning sale areas.

Approximately $100 per snag. (Except low girdling is cheaper.)

I looked at last six years’ spending. Averaged $27,000 per year CWKV. Range was 0 to 66K, so it varies.

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**Esmeralda Bracamonte, Sweet Home RD, Willamette NF**

Are you creating snags as part of timber sale mitigation? Yes

What methodology are you using to create snags? High girdle, base girdle, topping

                                                                                                                                                                            What age of stands are you working in? Under 80

What average dbh of snags are you creating?   15-18”

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?  Average estimate below based on the last 3 contracts. /Apprx25k/yr. Saw topping $72; high girdle $65; Base girdle $23; tree falling $32.

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| **Ed Buursma, Clackamas River Ranger District, Mt. Hood NF** |
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We’ve been creating snags on our district for years.

Yes, we have been creating snags for a long time.  We have had at least one contract per year as long as I can remember.

Currently we are using felling, girdling, and top girdling.  In the past we have also blasted tops, cut off tops, and inoculated tops.

The bulk of our work for quite a few years has been in 2nd growth stands, mostly plantations.  Stand age is probably running between 65-85 years old for the most part.

We try not to create snags in trees smaller than 20” dbh.  Our average is generally 20-25”.

Currently we are paying about $30 to girdle or fall a tree.  Top girdling is going for about $95 a tree.  We’ve been averaging $30-50,000/yr. for at least 20 years now.  In recent years we have been getting our down wood felled by our fire crews, who do it in the spring for training and certification.

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**Brett Carré, Columbia River Gorge National Scenic Area**

Are you creating snags as part of timber sale mitigation?  Yes.  We don’t have timber sales per se.  We usually do restoration projects and stewardship contracts.

What methodology are you using to create snags? Girding, thru-cutting, topping and then making chambered slits on top stumps for bat habitat.

What age of stands are you working in? Usually <80 years, some >80 yrs.

What average dbh of snags are you creating? 16-24

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? ($5000 NFWF base) + some fire code personnel climbing/ topping training time

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**Ana Cerro-Timpone, Okanogan-Wenatchee NF, Entiat RD**

Are you creating snags as part of timber sale mitigation? No. Indirectly through Rx burning

What methodology are you using to create snags? Rx burning

                                                                                                                                                                            What age of stands are you working in? The whole range

What average dbh of snags are you creating? 10-20”

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Not applicable

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**Sheila Colyer, Rogue River-Siskiyou National Forest, High Cascades RD**

Are you creating snags as part of timber sale mitigation? Yes.

What methodology are you using to create snags? Low girdling, High girdling, artificial cavity, bat crevice, top blasting. We don’t use inoculation (outdated method).

                                                                                                                                                                            What age of stands are you working in? In general, we have been creating snags in stands >80 years old. Also usually creating snags in SABs adjacent to units and some within units depending on resulting snag surveys and %CC (as Rachael pointed out).

What average dbh of snags are you creating? 20 inches

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Average is around $65 (top blasting is around $120). Annually – just the contract $25,000 and all of it is CWKV funds. We add another $5,000 for inventory/ marking.

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**Rachael Vaughn, Rogue River-Siskiyou NF, Gold Beach RD**

Last year Northwest Land Tree, Inc. low girdled 815 trees at $29.13/tree for a total of $23,740.95. This cost does not include time to mark the trees, time to administer contract and do inspection, or time to remove flagging post-contract.

The project was to create snags in recently (within 1-2 years) thinned, less than 80 year old, stands. However, the thinning prescription did not account for snag creation post-thinning and had already been thinned to around 40% canopy cover. In order to meet spotted owl dispersal requirements we had to create snags mostly in stands adjacent to the thinned stands. Most of these stands were still under 80 but some were above 80. We did not girdle any trees over 80.

I didn’t stay long enough to administer more snag creation contracts but knowing that there are multiple planned snag projects in future timber sales, I’d say that price was about probably on the low end.

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**Jeff Goldberg, Mt. Hood NF, Clackamas River and Zigzag Ranger Districts**

Are you creating snags as part of timber sale mitigation?  Yes

What methodology are you using to create snags? Currently, girdling and top girdling (climbing and girdling at appx. 12 -15” diameter). We are also currently experimenting with using Douglas fir beetles attractants with Beth Willhite, entomologist from the Forest Protection Group.

What age of stands are you working in? It varies, but anywhere from 60 to appx. 100

What average dbh of snags are you creating? Also varies, but never below 18” and ranges up to 30” or so.

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Approximately $40 for a standard girdle and currently $87 for a top girdle.  Annually, our contracts have ranged from $15,000 to as much as $60,000 depending on funds availability.  We utilize KV, Retained Receipts, and Stewardship for funding.

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**Justin Hadwen, Umpqua NF**

Jeff Bohler from the Diamond Lake (DL) Ranger District was able to provide information for snag creation below. The North Umpqua and Tiller Ranger districts are moving away from snag creation. As these districts have had substantial natural fires in recent years. Cottage Grove RD continues to create snags (girdling) in young plantations 16-20” DBH using K-V funds from timber sales. Recently the work has been done in-house by temporary personnel or youth crews. Cameron is currently on leave I can get the acre and cost when he returns.

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**Jeff Bohler, Umpqua NF, Diamond Lake RD**

Are you creating snags as part of timber sale mitigation?  *At DL-Included in KV plans but units are reviewed post project to assess need.  Generally not.*

What methodology are you using to create snags?  *Preferred methodology is creating snags with fuels treatment (consciously piling slash around target trees).*

What age of stands are you working in?  *Plantations through young mature*

What average dbh of snags are you creating?  *16-24ish*

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?  *Haven’t implemented any in past 5 years.  Planned in ’19 $3000.00 for 60 acres.*

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**Cameron Mitchell, Umpqua NF, Cottage Grove RD**

We’ve been creating snags on the Cottage Grove Ranger District for a long time. Generally around 1,500 snags a year.

We have primarily been using axes to girdle trees; my predecessor found that inoculation was more expensive and less effective.

Primarily snag creation has taken place after thinning plantation stands: 50-70 years old.

The general guidelines we use are to aim at creating snags of around 15 inches in diameter, but this is really based on the stand; We try to avoid girdling the biggest and healthiest of trees, as well as try to avoid girdling small diameter trees (less use by wildlife). So in the end we end up girdling what is more or less the average size tree in a given area. So more vigorous stands tend to have larger snags created, less vigorous stands tend to have smaller snags. We try to girdle in groups, as wildlife tend to use areas where snags exist in high-density. And we opportunistically girdle trees for other resource benefits, namely to release other tree species/vegetation.

We’ve been using KV funds for these projects. We primarily do this with seasonal FS crews, and one can expect a person to girdle 25-50 trees in a day depending on conditions and the particular employee. So I figure a GS4 @ $135/day at 25 snags comes to $5.40/snag and add overhead and equipment and expenses (time for leave, wellness, etc for the employee) to that. That’s if they’re straight making snags and not collecting data, which is generally how we conduct this work. Some years have been better than others, and it’s been good to use the fire crews when they were available. I’ve used the IDIQ, and it worked out fine, though it was more expensive.

I hope this helps, I have attached a monitoring report that my predecessor, Rob Cox, put together. It indicated some fairly promising results for foraging activities, but of course, smaller snags aren’t the best opportunities for building a nest.

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**Holly Harris, Umatilla NF, Walla Walla RD**

Are you creating snags as part of timber sale mitigation?

Yes and no.  No- Have not on the Umatilla in the past 15 years as far as I know.

                     Yes, hoping to do some with KV – but

                        No - It is not required mitigation, we covered it for wildlife enhancement.

What methodology are you using to create snags?  My preference is explosives but barring that (safety etc) we were thinking girdling.

                                                                                                                                                                            What age of stands are you working in?  40 year old clear-cuts densely grown in with 9-16” dbh trees that contain close to zero snags currently.

What average dbh of snags are you creating?  14”

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?

Annually, zero.  No idea what it might cost.

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**Penny Harris, McKenzie River RD, Willamette NF**

Are you creating snags as part of timber sale mitigation? Mitigation and Enhancement

What methodology are you using to create snags?

2018 Wildlife tree break down: Forage tree creation – Sawtop (S) 4% , high girdle (G) 6%, Base girdle(BG) 4%; Short term nest trees: Cavity creation (CC/I) with stem decay Inoculated dowels 5%; Platforms (P) 2%; Longer term Nest trees: stem decay Inoculated dowels (I) 34%; high girdle and stem decay Inoculated dowels (GI) 25%; Sawtop (live trees) and stem decay Inoculated dowels (SI) 20%.

Each year is different, depending on how much KV was collected per sale, size of remaining trees, type and size of existing snags and Fire killed snags.

2019 we are planning on 1587 wildlife trees, this is before snag counts after harvest and burning.  Treatment breakdown will be determine after pre-treatment survey this fall.

                                                                                                                                                                            What age of stands are you working in? 50-100 years

What average dbh of snags are you creating? 14-25” mostly around 19” average

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?

Pretty much exclusively KV

Contract Cost/treatment

S – $75/tree; G – $72/tree; BG – $26/tree; I – $70; GI –$76; SI –$80; CC/I - $84;

P –          GGO Nest Boxes - $200/tree

               Bald Eagle - $1000/tree

                Osprey - $850/tree

These include owl nest boxes, 2 Bald Eagle nest structures and 2 Osprey platforms (little more expensive than normal platform or nest boxes)

2018 Contract costs are $74844

2019 estimate may be around $126,950

Beyond 2019 will be close to the number in 2019

I collect between $90/tree on older sales to $120/tree on newer sales.  This helps cover Supplies, inoculated dowels (at $3-4/dowel 3 dowels/tree) pre-treatment surveys, inspections, contract preparation and hopefully eventually the cost of getting the trees into our database.

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**Karen K Holtrop, Olympic National Forest**

Yes we are creating snags as part of sale area improvements. Note this is not necessarily considered mitigation; but rather improvement/ enhancement. Is it done if snag levels are low in areas, as determined during NEPA.

Topping and girdling. The girdling is usually high girdling but in some areas we’ve done low girdling. Sometimes we do cavity starts. We’ve done fungi inoculation in the past.

Average ~21” dbh. The range is 15 to 29”.  Generally second growth thinning sale areas.

Approximately $100 per snag. (Except low girdling is cheaper.)

I looked at last six years’ spending. Averaged $27,000 per year CWKV. Range was 0 to 66K, so it varies.

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**Patricia Johnson, Wallowa-Whitman National Forest**

Are you creating snags as part of timber sale mitigation? NO

What methodology are you using to create snags? I have created snags in a spring restoration. We just cut a band around the trunk.

What age of stands are you working in?  MSYF

What average dbh of snags are you creating?  6 inch

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?  It was with volunteer help.

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**Kevin Keown, Ochoco National Forest & Crooked River National Grassland**

We just have a simple “NO” to the question about whether we’re creating snags as part of timber sale mitigation.  We don’t deserve chocolate! L

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**Laresa Kerstetter, Siuslaw National Forest, Central Coast Ranger District**

I will answer the questions as best I can for the Central Coast snag creation:

* What methodology are you using to create snags? See attached document for specifications (this is a copy of the most recent specifications for a stewardship timber sale). New this year is placing cavity starts and bat flanges in all the snag trees (not live topped). NOTE contact [lkerstetter@fs.fed.us](mailto:lkerstetter@fs.fed.us) for this document
* What age of stands are you working in? Two categories of trees are being treated- small tree topping within plantations (younger than 80 years old), and large trees in natural stands greater than 80 years old.
* What average dbh of snags are you creating?  1) for small tree topping average dbh is about 22 inches 2) for mature trees the average dhb is 38”
* What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?    1) small tree topping- $65, 2) mature high girdle- $145.  This is paid for with KV funds, with an average of $100,000 a year. In addition the same treatments are being applied through stewardship timber sales.

The question about 6 snags per acre from Steve Acker I’m not quite sure where that number came from, for Indian Creek the number for small snags was 7 (But the number that got put in the final EA is 4 snags per acre). Past EA’s ranged from 11 snags per acre (Marys Peak LMP) to 3 snags per acre (E. Alsea). For mature trees the number ranges from 1 tree per 5 acres harvested to 1 tree per 10 acres harvested. All of these are based on interpretation of Decaid.

Hope this helps and I really look forward to pooling all of this information together to really use the science and knowledge in the best way possible.

We do chainsaw topping on the Siuslaw. In the past there was blasting but that was quite a long time ago.

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**Monte Kuk, Okanogan-Wenatchee NF**

We have not created snags on the forest since I have been here as part of timber sale mitigation as we have had so many fires up here snags aren’t typically limited with the exception of some of the real moist habitats near the crest on Cle Elum.

I think Patty Garvey Darda gets the award for most creative though – for the I 90 project she planted snags.  This effort was associated with the road corridor impacts on habitats not a vegetation project.  She can chime in on the costs and sizes.   The majority of the snags I saw that she planted were in the flood zone of the reservoir.

Not sure it’s what you were looking for but might make for an interesting comparison at some point relative to the amount of use and longevity.  Pretty sure it’s too impactful and cost prohibitive to do on a large scale, but a cool comparison.

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**Corbin Murphy, NW Oregon BLM**

What methodology are you using to create snags?

In order of amount: 1) top girdling, 2) topping and 3) base girdling

 What age of stands are you working in?  We have project ares in 40-50 year old stands, and post harvest timber sales snag creation (50-130 years)

What average dbh of snags are you creating? Project areas  40-50 around 20" dbh, in timber sales a range from 20-30"dbh.  I could get you a average with some digging through the data.

 What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Wildlife projects - 72$ high girdle, 12$ base girdle.  Timber sales - included in the purchaser package.

My thoughts...

We use top girdling because I feel this is the best way to slowly wound trees and have a future broken top that can introduce heart rot.  even if the tree doesn't die it is now producing complex branching structure with dead wood on top.  It has been looked down on in areas of thinning because could create future hazards for loggers, monitoring has found this to not be an issue (Airstrip Timber Sale).

We use base girdling in clumps to create down wood pockets.  They are not intended to act as snags for very long (foraging for a few species if anything).  These small gaps in canopy create heterogeneity in young managed stands in the LSR.  Hopefully providing foraging/ hiding cover for NSO prey species. Its a cheep way to kill trees with out a huge fire hazard in year 1-10, by that time the fine fuels are gone leaving mostly large branches and bowls.

We have some monitoring reports we could send your way, may take some time to dig them out.

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**Mark Penninger, Wallowa-Whitman National Forest**

Are you creating snags as part of timber sale mitigation?  No.  There is not a need in the majority of the stands we have worked in over the past 15 years.

What methodology are you using to create snags? When we did some of this, we used fungal inoculation.  This introduced decay, but didn’t kill the tree.  We figured that a slowly decaying tree over time would provide better nesting/feeding substrate for more wildlife species than any snag that is immediately killed through other means.  This is supported pretty well in the literature.  In a couple very specific areas we created snags by topping and limbing trees.  The objectives there was more about reducing the shade, cone production, water/nutrient competition than a need for snag habitat.

What age of stands are you working in? Most of our stands are mature, understory re-initiation structural stage.  These have a dominant overstory of 80-150 years, sub-dominants between 40-80 years, and seed/sap/poles coming into openings created by small scale disturbances.  They are generally multi-storied stands of mixed conifer.  Some stands we work in are nearly pure ponderosa pine with minor amounts of Douglas-fir and western larch.  These tend to be much less structurally diverse, but similar age structure to the mixed conifer stands.

What average dbh of snags are you creating?  When we did some snag creation, we focused on trees between 14-24” dbh (or larger).  Never any smaller than about 12” dbh.  Those are just too small to justify the investment.

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Tree topping cost us about $100/tree, but that was twenty years ago.  We have not done this recently.  Not specific to snags, but we used a service contract to re-distribute large woody material back into thinned stands. The down wood component was missing over large acreages due to firewood gathering and frequent prescribed fires.  The operator used an excavator to distribute large logs in groups of 2-4 across the logging units.  This was flat, tractor ground, and open ponderosa pine stands.  I do not recall the cost of this work.

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**Howard Richburg, Malheur NF, Emigrant Creek RD**

Are you creating snags as part of timber sale mitigation?    For the last 4 veg management projects( 8- 12 Timber sales), since 2011, we have not created snags.  We are currently experiencing some active large tree mortality due to pine beetles.  Prior to that we did  it on a regular basis and if we work in an area with little mortality an low snag numbers we will likely create some snags.

What methodology are you using to create snags?  Most were created by girdling with an axe or chainsaw at ground level. They don’t last as long.  We have used FS tree climbers and contractors to girdle trees up at the 2nd live whorl.  This is a preferred method.  Blasting is fun but we have not done any on the Malheur for decades.

                                                                                                                                                                            What age of stands are you working in?  Mostly mid to late

What average dbh of snags are you creating?  Ranges from 14” DBH to over 36” DBH.  Average would be around 17” DBH.  The trees climbed tend to be larger 18” to 36” DBH

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?

Depends on how it was done.  Using our OYCC crew or FS employee girdling at ground level with axes/chainsaw is quite cheap, $20/ tree.   Tree climbing contract we had in 2000 cost $50/tree to top girdle.  FS tree climbers are expensive due to production rate and extra safety measures we are require to do.  Cost would be somewhere around $60 – 80/tree.

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**Errin Trujillo, North Umpqua Ranger District, Umpqua National Forest**

Are you creating snags as part of timber sale mitigation? YES

What methodology are you using to create snags?  Girdling

                                                                                                                                                                             What age of stands are you working in? 50-60

What average dbh of snags are you creating? 14-18DBH

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? Approximately  $15,000 KV

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**Lauri Turner, Deschutes NF**

Crescent RD is creating snags as part of the mitigation.

They are using the smokejumpers and folks who are qualified to climb to create bat habitat in trees with chainsaws.

Average dbh is between 15-20”dbh in stands that are generally 100-150 years old (I think)

We’re still figuring out the costs as they haven’t done the first round of yet.

We haven’t created snags on the other districts for quite some time.  Sisters doesn’t need any more snags and Bend Ft. Rock usually works within black-bark ponderosa pine stands and snags may be created with prescribed fire.  In other areas where stand age is greater, we tend to thin from below and leave all existing snags

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**Patty Walcott, Mt Hood National Forest, Barlow RD**

Are you creating snags as part of timber sale mitigation?  YES

What methodology are you using to create snags? Topping

                                                                                                                                                                            What age of stands are you working in? Over 80

What average dbh of snags are you creating? 24”

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)?  I don’t know!  My Silv deals with that.

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**Barbara Webb, Deschutes National Forest, Bend-Fort Rock Ranger District**

Are you creating snags as part of timber sale mitigation? Not really.  Not using it as mitigation – more like best practice (see next answer)

What methodology are you using to create snags? Purchaser “snips” off top of tree at landing instead of falling for safety.  Will do that for other trees in stand that are hazard trees

                                                                                                                                                                            What age of stands are you working in? 80-100 yrs

What average dbh of snags are you creating? Part of sale operations so I don’t think anything.

What is the average cost to create a snag, and how much annually are you spending on snag creation (via KV or other funds)? 0 for projects I work on. Historically have not received KV because it all went to Essential KV

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**Aja Woodrow, Okanogan Wenatchee National Forest, Cle Elum Ranger District**

We have been paralyzed by an amorphous LSR working group process, Timber Sale Review going back to decisions signed in ~2008, and fire emergency consultation backlogged to 2012.

We are not getting restoration work and associated timber contracts completed though the tide is turning.

If I were to create snags with KV I would do so in dry forest restoration treatment swales using single rope technique tree climbing equipment to girdle trees > 15” DBH, >10’ above the lowest live limbs.

An electric chainsaw and hatchet would be used to girdle.

These stands lack meaningful snag structure and are 80-100 years in age.

Efficiency with this technique would probably be 1 tree / 20 minutes.

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**Carol Chandler, Gifford Pinchot National Forest**

We do create snags as part of veg management. The trees are girdled. The stands vary in age from 40 -79 years. The average size is 16-19.  Most of the stands are small less than 20” DBH. FY 18 KV costs are 244 snags -$26,496;  approx.  $108 per snag. The north end creates snags with veg projects.  Most of the stands are small-med size.  The south end hasn’t done much snag creation due to the stand tree size. My question is - what is the min size of a snag or down woody debris that is value added to the landscape and snag/DWD dependent species.  I think we need to consider when to create snags based on science rather than create snags and downed wood from the existing stands.   Creating snags once the stands have reached a larger size could prove to be more valuable.   I have the same questions for down wood.

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**John Jakubowski, Gifford Pinchot National Forest, Cowlitz Valley RD**

Yes we are creating snags in commercially thinned timber sale units.  They are generally in stands 40 to 60 years old, average diameters 14 to 18 inches.  They are found across the district.  The average cost per snag is about $45, and funding is either KV or retained receipts.  The method is either tree topping or girdling.

**Jennifer DeShong, Gifford Pinchot National Forest, Mt. Adams Ranger District**

Usually the snags need to be 15 inch diameter or bigger, in clumps of three to five. Tree climbers climb 50 to 80 feet up the tree and either cut the top off or girdle the top with a 6” or better girdle. Have not done any for a couple years but two years ago my contract went for $45.00/snag. Annual expense depends on what’s been logged and if they need snags made.

**Table 1: Wildlife Tree Creation – Practitioner Survey Response At-A-Glance --**

**BLM and National Forest System Lands in Oregon and Washington**

The following is a summary of testimonials of wildlife tree creation by wildlife biologists in the R6 Forest Service and the NW Oregon BLM. This was in response to a survey distributed in July 2018.

**Western Oregon and Washington Units**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **COLUMBIA GORGE NSA** | **Brett Carré** | **Girding, thru-cutting, topping and then making chambered slits on top stumps for bat habitat** | **Usually <80 yrs some >80 yrs /**  **16-24” dbh** | **$5000 NFWF base + some fire code personnel climbing/topping training time** |
| **GIFFORD PINCHOT NF –**  **Cowlitz Valley RD** | **John Jakubowski** |  | **40-60 yrs 2nd growth /**  **14-18” dbh** | **$45/tree KV or retained receipts. Topping or girdling.** |
| **GIFFORD PINCHOT NF** | **Carol Chandler** | **Girdling. The north end creates snags with veg projects.  Most of the stands are small-med size.  The south end hasn’t done much snag creation due to the stand tree size.** | **40-79yrs /**  **16-19” dbh** | **$108/snag KV** |
| **MT HOOD NF - Clackamas River RD** | **Ed Buursma** | **Currently felling, girdling, and top girdling.  In the past we have also blasted tops, cut off tops, and inoculated tops** | **65-85 yrs**  **20-25” dbh** | **$30 to girdle or fall; $95 top girdling**  **Averaging $30-50,000/yr.** |
| **MT HOOD NF –**  **Barlow RD** | **Patty Walcott** | **Topping** | **>80 yrs /**  **24” dbh** | **Don’t know!  My Silv deals with that.** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **MT HOOD NF -**  **Clackamas River & Zigzag RDs** | **Jeff Goldberg** | **Girdling and top girdling (climbing and girdling at appx. 12 -15” diameter). Experimenting with using Douglas fir beetles attractants with Beth Willhite,** | **65-100 yrs**  **12-15” dbh** | **$40 girdle; $87 for a top girdle.**  **Contracts $15,000 - $60,000 depending on funds availability.  KV, Retained Receipts, and Stewardship for funding.** |
| **OLYMPIC NF** | **Karen K Holtrop** | **Topping and girdling (usually high). Some cavity starts. Some fungi inoculation in past.** | **2nd growth /**  **15-29” dbh** | **$100/tree. Averaged $27,000 per year CWKV. Range was 0 to 66K, so it varies.** |
| **MT. BAKER SNOQUALMIE NF** | **Jesse J Plumage** | **None.** | **None** | **None** |
| **ROGUE-SISKIYOU NF - High Cascades RD** | **Sheila Colyer** | **Low girdling, High girdling, artificial cavity, bat crevice, top blasting. We don’t use inoculation (outdated method).** | **>80 yrs.** | **Average $65 (top blasting $120).**  **Annually –$25,000 CWKV. $5,000 inventory/marking.** |
| **ROGUE SISKIYOU NF - Gold Beach RD** | **Rachael Vaughn** | **Low girdle** | **80 yrs.** | **Low girdled $29.13/tree for a total of $23,740.95.** |
| **SIUSLAW NF – Central Coast** | **Laresa Kerstetter** | **Chainsaw topping, also creating cavities and bat crevices** | **< 80 yrs.**  **avg 22” dbh**  **> 80 yrs**  **Avg 38” dbh** | **small tree topping- $65,**  **mature high girdle- $145**  **KV (~$100k/year) and Stewardship** |
| **UMPQUA NF - Diamond Lake RD** | **Jeff Bohler** | **Moving away from snag creation: substantial natural fires in recent years. Prefer creating snags with fuels treatment (consciously piling slash around target trees).** | **Plantations through young mature /**  **16-24” dbh** | **Haven’t implemented any snag creation in past 5 years.  Planned in ’19 $3000.00 for 60 acres.** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **UMPQUA NF – Cottage Grove RD** | **Cameron Mitchell** | **Axes to girdle trees; my predecessor found that inoculation was more expensive and less effective.** | **50-70 yrs /**  **15” dbh** | **~ 1,500 snags a year.**  **KV funds, seasonal FS crews, girdle 25-50 trees/day per person. ~$5.40/snag + add overhead and equipment and expenses. Use fire crews when available. IDIQ more expensive.** |
| **UMPQUA NF - North Umpqua RD** | **Errin Trujillo** | **Girdling** | **50-60 yrs**  **14-18” dbh** | **~  $15,000 KV/year** |
| **WILLAMETTE NF - Sweet Home RD** | **Esmerelda Bracamonte** | **High girdle, base girdle, topping** | **< 80 yrs**  **5-18” dbh** | **Saw Topping $72.50**  **High Girdle $65.00**  **Base Girdle $23.50**  **Tree Falling $32.00**  **Apprx 25k/yr** |
| **WILLAMETTE NF – McKenzie River RD** | **Penny Harris** | **Sawtop +- inoculated dowels, high girdle, Base girdle, Cavity creation with stem decay Inoculated dowels, Platforms, stem decay Inoculated dowels +- stem decay Inoculated dowels** | **50-100 yrs**  **14-25” avg 19” dbh** | **KV**  **Sawtop– $75/tree**  **Girdle – $72/tree**  **Base girdle – $26/tree**  **Inoculation – $70**  **GI –$76**  **SI –$80**  **CC/I - $84**  **2019 KV ~ $126,950**  **I collect between $90/tree on older sales to $120/tree on newer sales.** |
| **NW OR BLM – Siuslaw RA** | **Randy Miller** | **saw and blasting to top as well as high girdle.** | **40-80 yrs**  **14-30" dbh** | **topping $70 each for smaller trees and over $100 for taller trees** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **NW OR BLM – Salem RA** | **Corbin Murphy** | **Top girdling, Base girdling** | **40-50 yrs /**  **20” dbh**  **50-130 years /**  **20-30“ dbh** | **High girdle $72, Base girdle $12** |
| **NW OR BLM Mary’s Peak** | **Scott Hopkins** | **Saw-top or high-girdle snags. To a lesser extent we use basal girdling.** | **40-80 yrs, few up to 100 yrs /**  **18- 30” DBH,** | **service contract (usually by task order to the Service First Wildlife Tree Creation Contract)**  **saw-topping ($67/tree), high-girdling ($62/tree), and basal girdling ($13/tree).** |

**Eastside Oregon and Washington Units**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **COLVILLE NF** | **Michael Borysewicz** | **In Regen only . KV/Chainsaw topping 40’;**  **Stewardship mechanical harvester 20’** | **60+ yrs /**  **12”-15” dbh** | **Highly variable.**  **Smokejumper cost = $50-70 per tree.**  **stewardship cost = $50 per tree** |
| **COLVILLE NF** | **Chris Loggers** | **1 unit/year. Chainsaw topping 40’;**  **Stewardship mechanical harvester 20’;**  **girdled top, scarred bole in several locations to see if rot pocket will develop** | **60+ yrs /**  **12”-15 dbh** | **Highly variable. KV**  **Smokejumper cost = $50-70 per tree.**  **stewardship cost = $50 per tree** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **DESCHUTES NF -** | **Lauri Turner** | **Sisters doesn’t need any more snags & Bend Ft. Rock usually works within black-bark PP stands & snags may be created with prescribed fire.  In other areas where stand age is greater, we tend to thin from below and leave all existing snags. Using smokejumpers & folks qualified to climb to create bat habitat in trees with chainsaws.** | **100-150 yrs /**  **15-20”dbh** | **Still figuring out the costs as they haven’t done the first round of yet.** |
| **DESCHUTES NF - Bend-Fort Rock RD** | **Barbara Webb** | **Purchaser “snips” off top of tree at landing instead of falling for safety.  Will do that for other trees in stand that are hazard trees** | **80-100 yrs** | **$0** |
| **FREMONT-WINEMA NF** | **Amy Markus** | **Relying on insect & disease mortality** |  |  |
| **MALHEUR NF** | **Mark Penninger** | **There is not a need in the majority of the stands we have worked in over the past 15 years** |  |  |
| **MALHEUR NF – Emigrant Creek** | **Howard Richburg** | **No. We are currently experiencing some active large tree mortality due to pine beetles.** |  |  |
| **OCHOCO NF** | **Kevin Keown** | **None** | **None** | **None** |
| **OKENOGAN /**  **WENATCHEE NF** | **Ana Cerro-Timpone** | **Rx burning** | **The whole range of ages /**  **10-20”** | **No funding needed** |
| **OKENOGAN /**  **WENATCHEE NF** | **Monte Kuk** | **So many fires up here snags aren’t typically limited with the exception of some of the real moist habitats near the crest on Cle Elum**. | **None** | **None** |
| **UMATILLA - Walla Walla RD** | **Holly Harris** | **None** | **None** | **None** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Respondent** | **Activity/Funding/Methods** | **Age/**  **DBH** | **cost** |
| **WALLOWA WHITMAN NF** | **Patricia Johnson** | **Cut a band around the trunk.** | **MSYF /**  **6”** | **Done with volunteers. No funding.** |