

# **2018 North Idaho Douglas-fir Tussock Moth Monitoring Report**



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# **Report No. IDL 18-1 December 2018**

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## **2018 NORTH IDAHO DOUGLAS-FIR TUSSOCK MOTH MONITORING REPORT**

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### **Background and History**

Douglas-fir tussock moth (DFTM) is a native defoliator of true firs, Douglas-fir, and occasionally other conifers in western North America. Adult males are common-looking gray-brown moths with feathery antennae ([figure 1](#)). Females are heavy-bodied and flightless ([figure 2](#)), and release sex pheromones to attract males to mate. After mating, females lay egg masses ([figure 3](#)) on host tree branches in late summer or fall. Egg hatch coincides with bud burst the following spring, and developing larvae ([figure 4](#)) feed on host foliage ([figure 5](#)). Development timing can vary with temperature and elevation, but pupation typically occurs in late July or August, and new adult moths emerge in late summer or fall.

In most years, DFTM populations are low and do not cause visible defoliation, but populations can periodically erupt in cyclical outbreaks. In northern Idaho, there is a long history of periodic outbreaks causing widespread defoliation ([figure 6](#)). In southern Idaho, large outbreaks have also occurred, but on a more irregular basis. Since 1977, Idaho has participated in the DFTM Early Warning System (EWS), which uses a series of permanent pheromone trap sites to identify increasing populations prior to undesirable tree defoliation (system adapted from Daterman et al. (1979)). Pheromone lures that mimic female moths are placed in sticky traps before the DFTM flight period, and the number of captured adult males caught throughout the flight period is recorded each year. Sharp increases in trap catches provide land managers advance warning of an impending outbreak.

Although the DFTM EWS is currently implemented in both northern and southern Idaho, this report will primarily focus on DFTM monitoring in northern Idaho. Three periods of DFTM

outbreaks have been detected in northern Idaho since implementing the EWS. The first outbreak occurred in the 1980s in Latah County and McCroskey State Park ([figure 6](#)). According to records, outbreaks of DFTM have occurred in this general area approximately every 8-10 years since at least the 1940s. The 1980s outbreak was preceded by high numbers of moth captures, but defoliation was only recorded by aerial observers in 1986 (figures [7](#) & [8](#)).

The next northern Idaho outbreak occurred in the early 2000s, and resulted in three years of defoliation on State and private lands between Plummer and Moscow, and on adjacent Clearwater National Forest lands. Similar to the 1980s outbreak, trap captures averaged over 40 moths per trap prior to visible defoliation (figures [7](#) & [8](#)).

The most recent outbreak occurred between 2010 and 2012 and did not follow the same trends in location or moth captures. Defoliation was centered farther north than previous outbreaks, with limited defoliation near Moscow Mountain. Most of the defoliation was in Kootenai County near Signal Point, in Benewah County near Plummer, and in McCroskey State Park. The average number of moths/trap captured prior to observed defoliation was much lower relative to the two earlier periods of outbreaks. In 2010, the average number of moths/trap was 11.8, a slight decrease from 11.9 the previous year, but over 8,500 acres of defoliation were mapped in aerial surveys. Defoliation peaked in 2011 at over 106,000 acres, and an average of 43.8 moths/trap were captured that same year. Averages >40 moths/trap would normally be expected the year prior to observed defoliation. In 2012, only 6.3 moths/trap were captured and approximately 31,000 acres of defoliation were detected (figures [7](#) & [8](#)).

The disconnect between trap capture patterns and observed defoliation in the 2010-2012 outbreak confirms the need for additional population sampling of other life stages to improve outbreak forecasting. Egg mass and larval sampling are two additional methods for predicting local DFTM outbreak intensity, and can be used to supplement EWS monitoring of adult moth populations (Mason and Torgersen, 1983, Kegley et al., 2004). Observations of damage to ornamentals are another indicator that outbreaks of DFTM will soon develop in forested settings (Tunnock et al., 1985; Sturdevant, 2000). Prior to the 2010-2012 outbreaks, defoliation of spruce was first observed at the USFS Coeur d'Alene nursery in 2007 and 2008, and grand fir yard trees were defoliated at Twin Lakes and Mica Flats in 2009 and 2010.

## **Monitoring Methods**

### *Pheromone Traps*

The Idaho Department of Lands (IDL) and U.S. Forest Service Region 1 (USFS R1; northern Idaho) and Region 4 (USFS R4; southern Idaho) cooperatively manage EWS DFTM monitoring sites throughout the state. IDL maintains trap sites from Coeur d'Alene south to Moscow and east to Harvard ([figure 9](#)). Forest Health Protection, Coeur d'Alene Field Office (USFS-R1), maintains trap sites from Potlatch to Lucille ([figure 10](#)), while Forest Health Protection, Boise Field Office (USFS-R4), maintains trap sites in southern Idaho ([figure 11](#)).

Each year, five pheromone-baited sticky traps are installed along a transect at each trap site, with ~75 feet between traps. Traps are placed in young, open-grown host trees (grand fir or Douglas-fir) in late July to early August, to coincide with DFTM flight timing. Traps are collected in late September or October and the number of male moths captured in each trap is recorded. The common threshold used to predict defoliation the following years is an average of 25



moths/trap at a site. However, EWS pheromone trapping is not designed to predict the exact location of future defoliation.

### *Egg Mass Sampling*

When trap captures are high (near the 25 moths/trap threshold), fall egg mass sampling may be used to estimate the potential for defoliation in a specific area the following year. Two egg mass sampling methods are used in Idaho, the “timed plot technique” and methods described in Otvos & Chorney, 1985. The “timed plot technique” works well for smaller crews and is conducted by examining grand fir and Douglas-fir trees for a total of ten working minutes (i.e., 10 minutes for a single person, 5 minutes for two people working simultaneously), and counting the number of egg masses observed. The Otvos & Chorney method works well with larger crews, and involves sampling until either 40 egg masses are found or 60 trees are inspected; the mean number of egg masses per tree is then calculated. Areas where high numbers or densities of egg masses are observed during sampling are considered to be likely locations of defoliation the following year.

### *Larval Sampling*

At sites where the moths/trap threshold (25 moths/trap) is reached, larval sampling may be conducted the following spring to pinpoint injurious population densities (Daterman et al., 1979) and locate areas for treatment, if necessary. Larval sampling may also be useful at sites with a history of DFTM-caused defoliation occurring before trap counts reach the threshold. Sequential sampling for DFTM larvae in the lower crown is performed according to procedures outlined in Mason, 1979. Sequential surveys are most useful before widespread defoliation occurs, and are of limited use during an outbreak (Mason, 1979).

## **Results**

### *Trapping*

A total of 174 sites were monitored in northern Idaho (143 by IDL and 31 by USFS-R1), and 21 sites were monitored in southern Idaho (USFS-R4) during 2018 (figures [9](#), [10](#), & [11](#)). Four sites that were traditionally monitored by IDL were transferred to USFS R1 (209, 211, 212, and 821) and four sites that were traditionally monitored by USFS R1 were transferred to IDL (5021, 5033, 5034, and 5035) to reduce travel times and improve efficiency in trap monitoring efforts. Due to recent increases in trap catch numbers in southern Idaho, additional traps were installed by USFS R4 over the past four years in areas where defoliation was being observed or had been observed in the 1990s outbreaks ([figure 6](#)).

The overall mean trap capture for the IDL traps in 2018 was 1.51 moths/trap, compared with 0.17, 0.05, and 0.03 moths/trap in 2017, 2016, and 2015, respectively ([appendix 1](#)). An average of 1.15 moths/trap were caught in USFS-R1 traps in 2018, compared with 0.1, 0, and 0 moths/trap in 2017, 2016 and 2015, respectively ([appendix 2](#)). The 2018 USFS-R4 average for southern Idaho was 19.73 moths/trap compared to 12.92, 20.48, and 10.71 moths/trap in 2017, 2016 and 2015, respectively ([appendix 3](#)). Five sites in R4 had trap averages over 25 per trap ([figure 11](#)), compared to four in 2017. USFS R4 received reports of ‘tussockosis,’ a skin rash caused by DFTM larval hairs, from people recreating in the forest.

## *Larval Surveys*

Larval sampling was conducted at 20 IDL-monitored sites in northern Idaho in 2018 ([appendix 1](#)). These sites were selected for larval sampling because they had high numbers of moths/trap relative to other IDL-monitored sites in 2017. No larvae were observed at any of the IDL-sampled sites.

## *Egg Mass Sampling*

No egg mass sampling was conducted in northern Idaho in 2018, but 14 adult trap sites in USFS R4 were also sampled for egg masses ([appendix 3](#)). Sampling of all 14 trap sites yielded low densities of egg masses, resulting in 2019 defoliation predictions of “none to low” for these areas, despite high adult trap catches in some cases. IDL assisted USFS R4 in sampling additional locations near Smiths Ferry for egg masses using the Otvos & Chorney method ([figure 12](#)). Unfortunately, site-level data from the northern sites was lost, but high densities of egg masses were observed across the area. At many sites, high levels of natural enemies were also observed, and are expected (along with starvation due to depleted host resources from 2018 feeding) to cause DFTM populations at these sites to crash within the next one to two years.

## *Defoliation*

No Douglas-fir tussock moth defoliation was recorded in aerial detection surveys in northern Idaho in 2018. In southern Idaho, over 100,000 acres of DFTM-caused defoliation were mapped in 2018, as compared to only 130 acres of defoliation mapped in 2017 ([figures 6 & 13](#)). In 2017, defoliated areas included outbreaks near Craters of the Moon, an area in the Owyhee Mountains, an area near Deadwood Reservoir, and an area north of Challis. In 2018, widespread defoliation was observed on the Boise National Forest and adjacent state and private lands near the Smiths Ferry area ([figure 13](#)). Some of these areas were defoliated up to 90%.

## **Conclusions**

The DFTM-EWS has been generally effective at predicting outbreaks in Idaho. If DFTM populations behave according to past trends, populations can be expected to increase to damaging levels in northern Idaho again in approximately two years.

In southern Idaho, five sites exceeded the moth capture threshold of 25 moths per trap, and six others were between 12 and 25 per trap. Averages have increased relative to results from last year's sampling, and visible defoliation is widespread around the Smiths Ferry area. In 2017, the highest averages in adult moths/trap were in the Smiths Ferry area, and high densities of DFTM egg masses were also observed at several locations in this area. Defoliation is expected to continue in 2019, but due to host depletion from 2018 DFTM feeding along with observed natural enemies, DFTM populations are expected to crash within one to two years in southern Idaho.

The DFTM-EWS **is not designed nor is it intended** to predict the exact location of future defoliation. Follow-up sampling is conducted in areas that are selected based on historical experience and the potential impact of DFTM defoliation on management objectives. The defoliation observed in 2010 was not preceded by increasingly higher average trap captures as in the two previous outbreak periods; in fact, the trap averages did not reach the historic high levels until fall 2011 (the second year of defoliation). The unusual nature of the 2010-2012

outbreaks illustrates the importance of an integrated sampling plan utilizing pheromone traps, supplemental sampling (larval and egg mass), as well as aerial detection. Characterizing the full extent of outbreaks is difficult without an aerial survey, because defoliation may occur in areas that have not experienced outbreaks in the recent past.

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**Figure 1. Male Douglas-fir tussock moth**

*Photo by Ladd Livingston*



**Figure 2. Female Douglas-fir tussock moth constructing egg mass**





**Figure 3. Douglas-fir tussock moth egg masses**



**Figure 4. Late-instar Douglas-fir tussock moth larva**





**Figure 5. Douglas-fir tussock moth-caused defoliation**



Figure 6. Aerially-mapped defoliation by Douglas-fir tussock moth for 1970-2018.

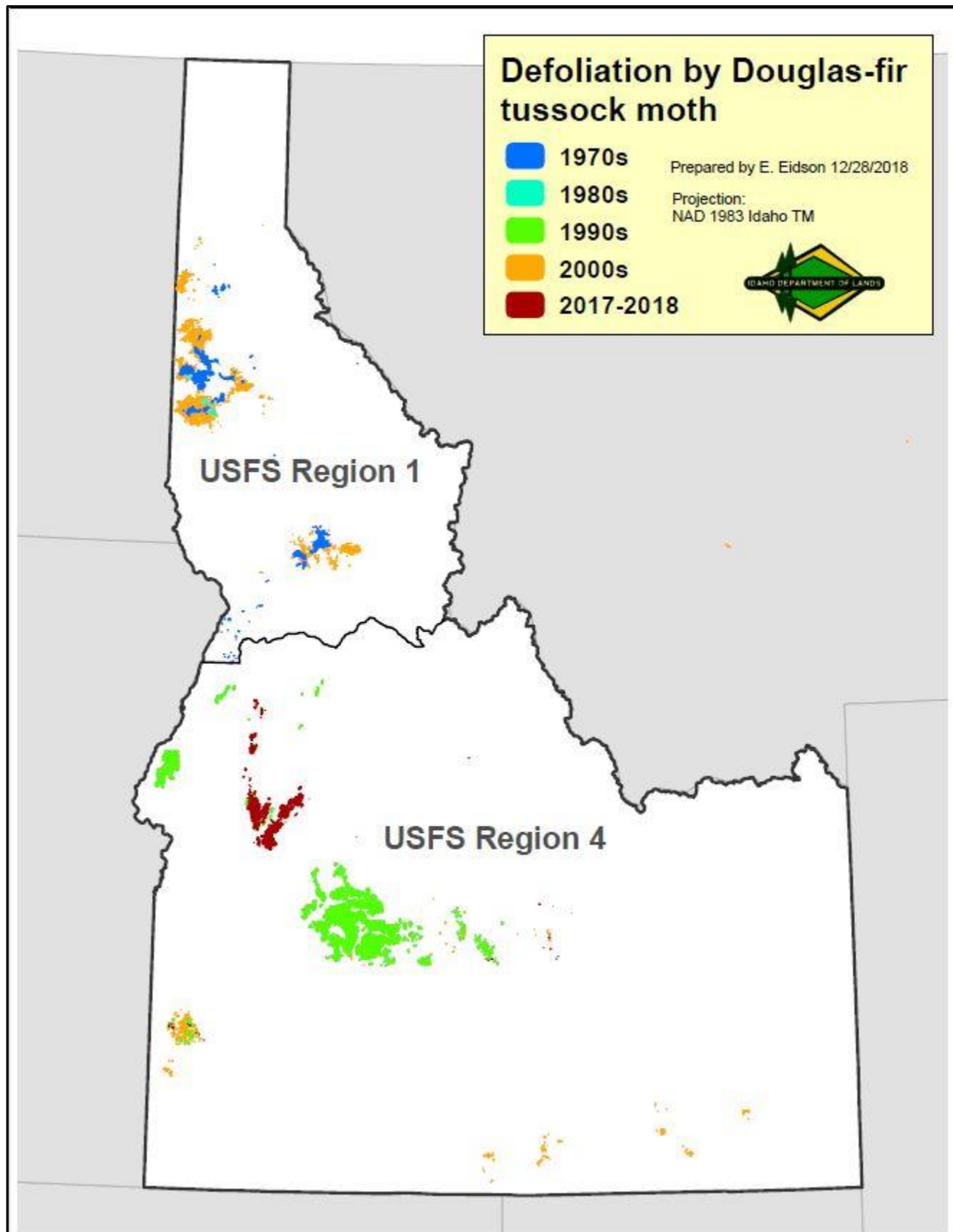


Figure 7. Mean trap catches of Douglas-fir tussock moth on plots monitored by IDL from 1977-2018.

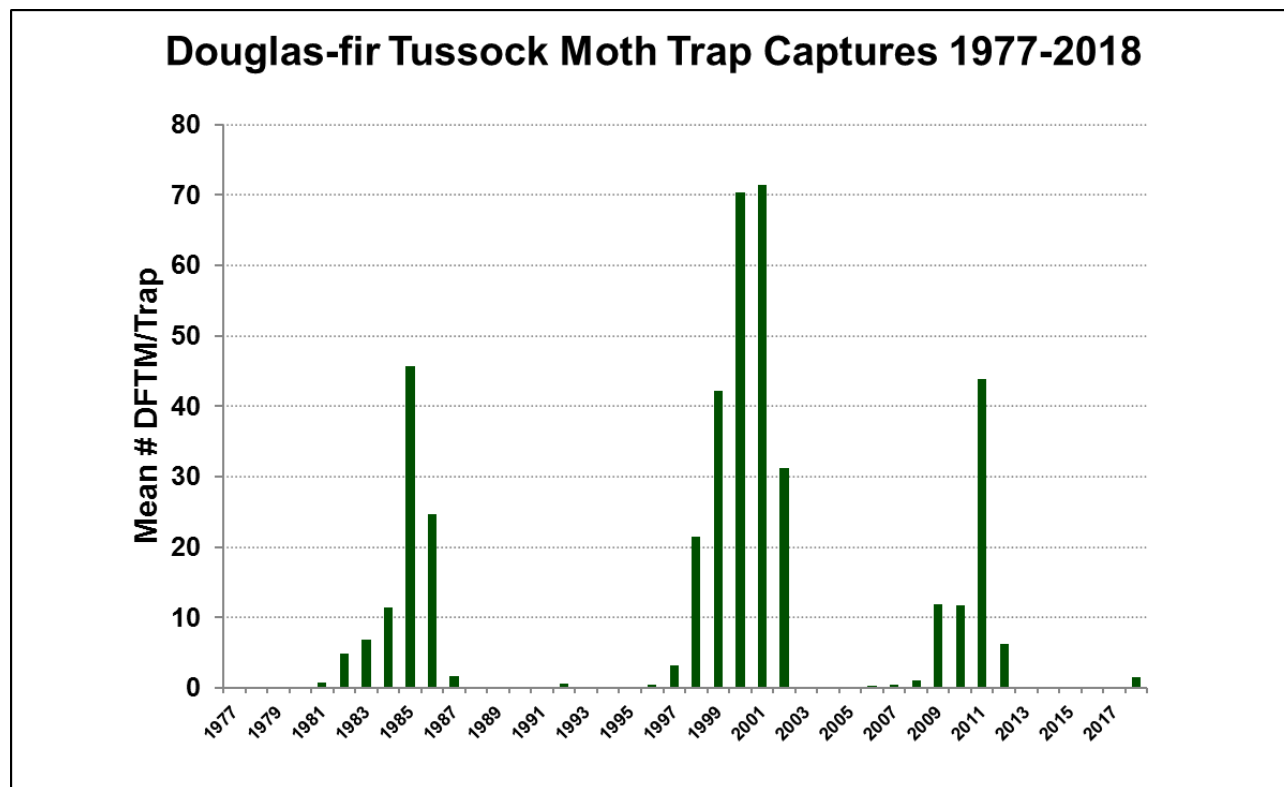


Figure 8. Aerially detected defoliation in northern Idaho from 1972-2018.

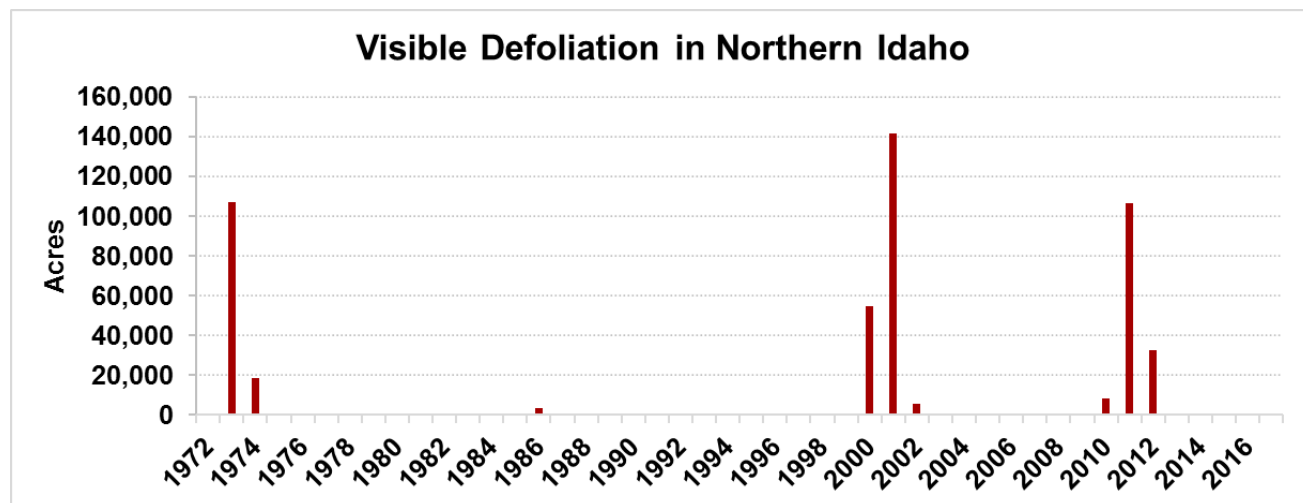
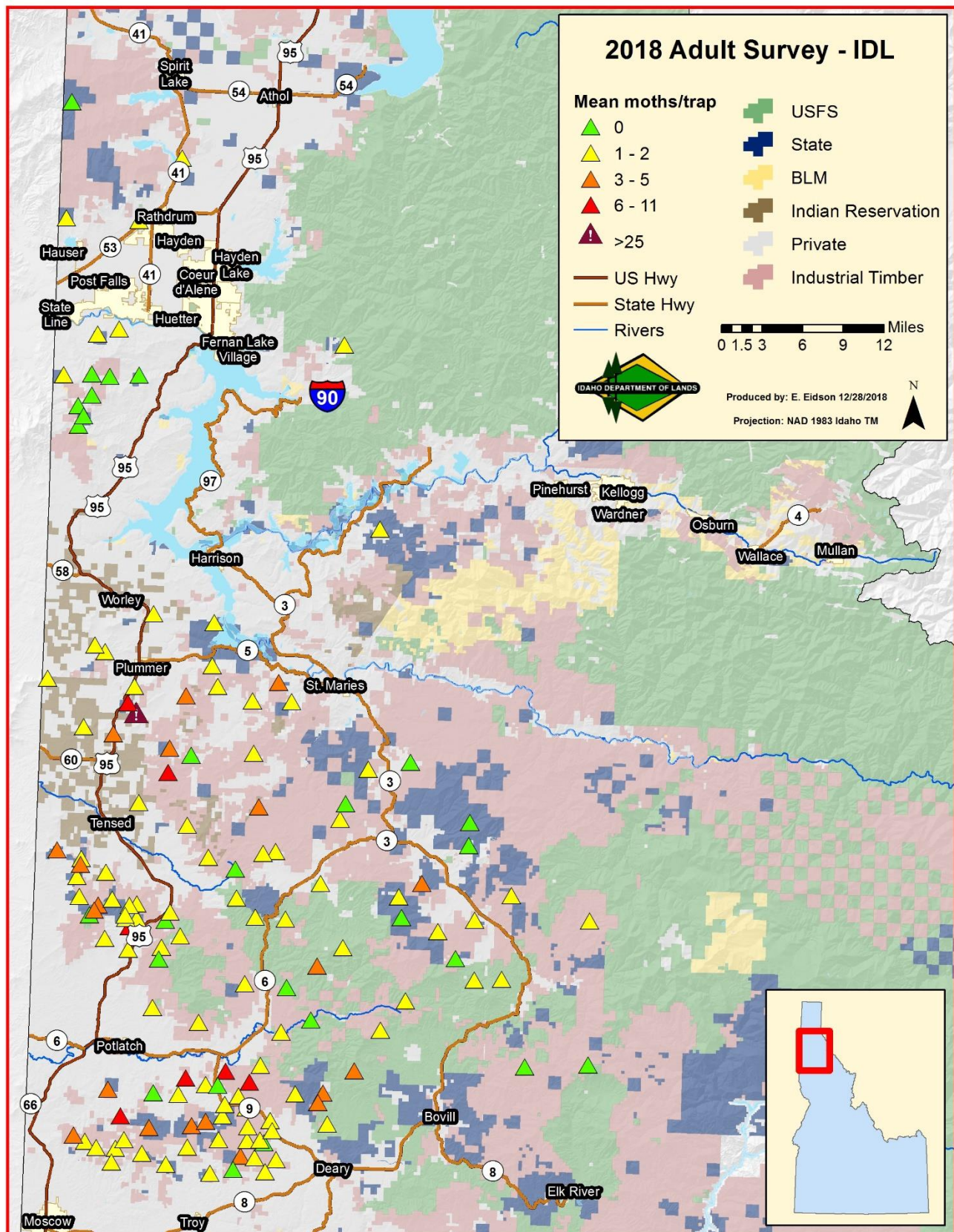




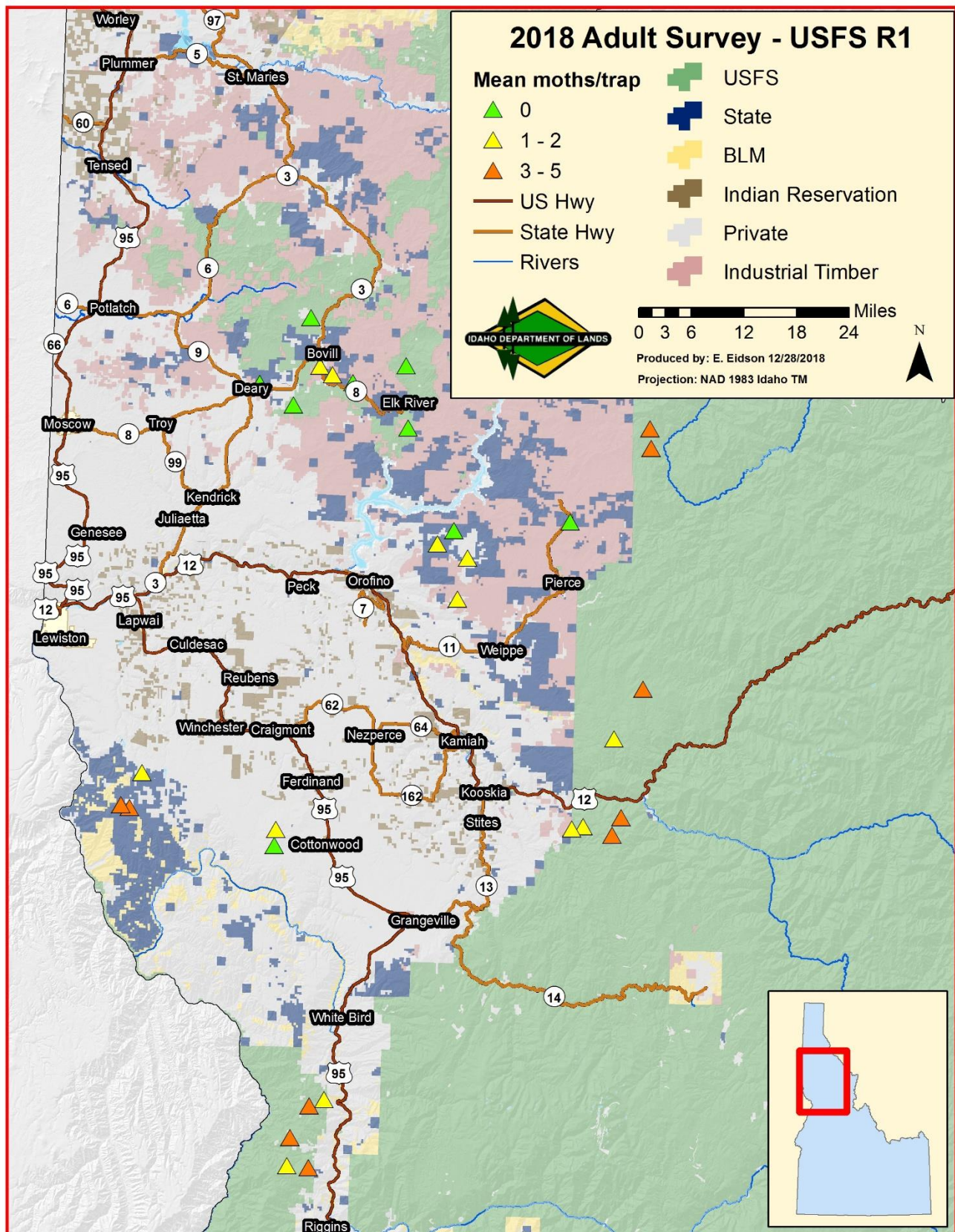
Figure 9. Map of sites trapped by IDL for Douglas-fir tussock moth in 2018.



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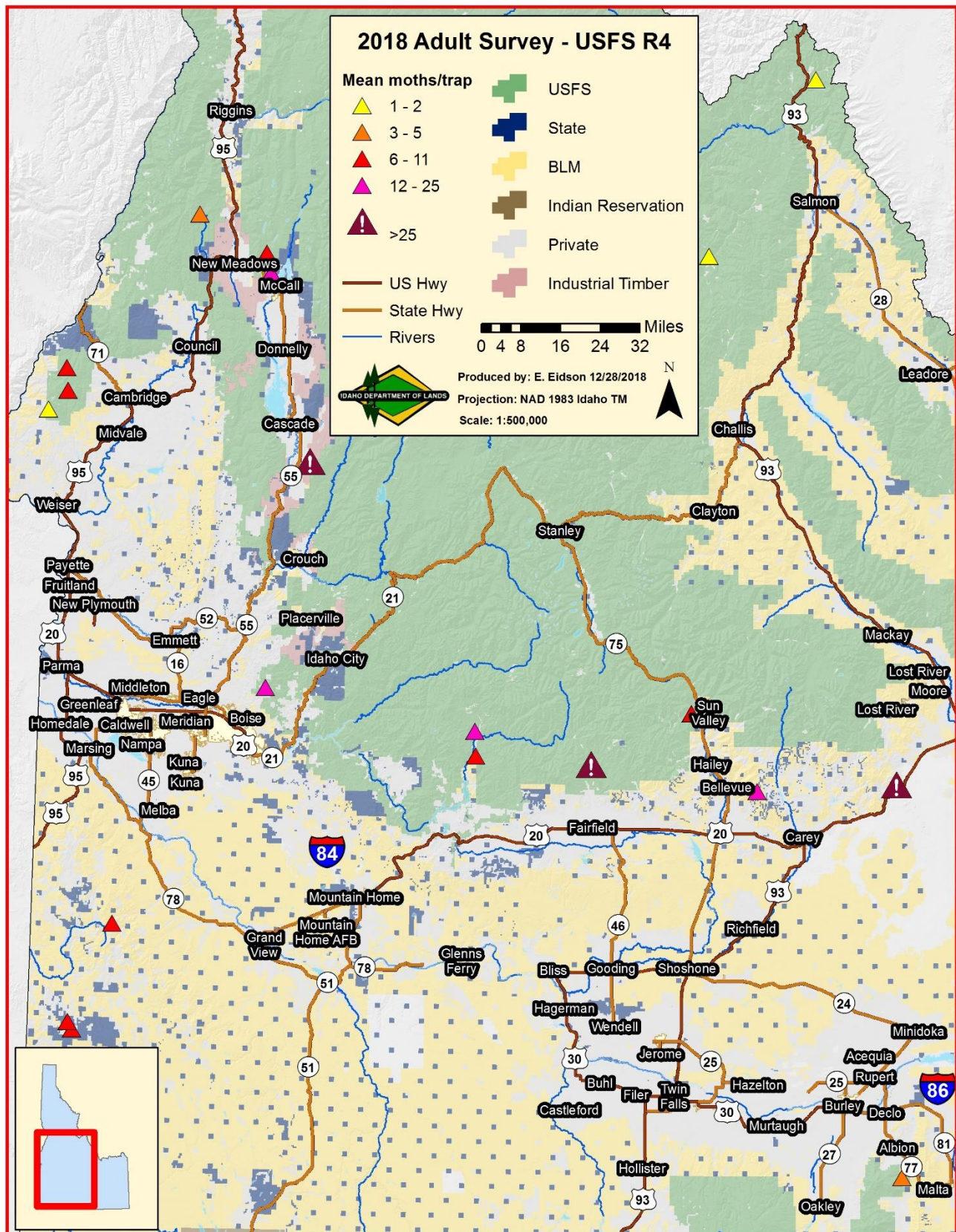
Figure 10. Map of sites trapped by USFS Region 1 for Douglas-fir tussock moth in 2018.



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Figure 11. Map of sites trapped by USFS Region 4 for Douglas-fir tussock moth in 2018.



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Figure 12. Map of sites surveyed for Douglas-fir tussock moth egg masses in 2018.

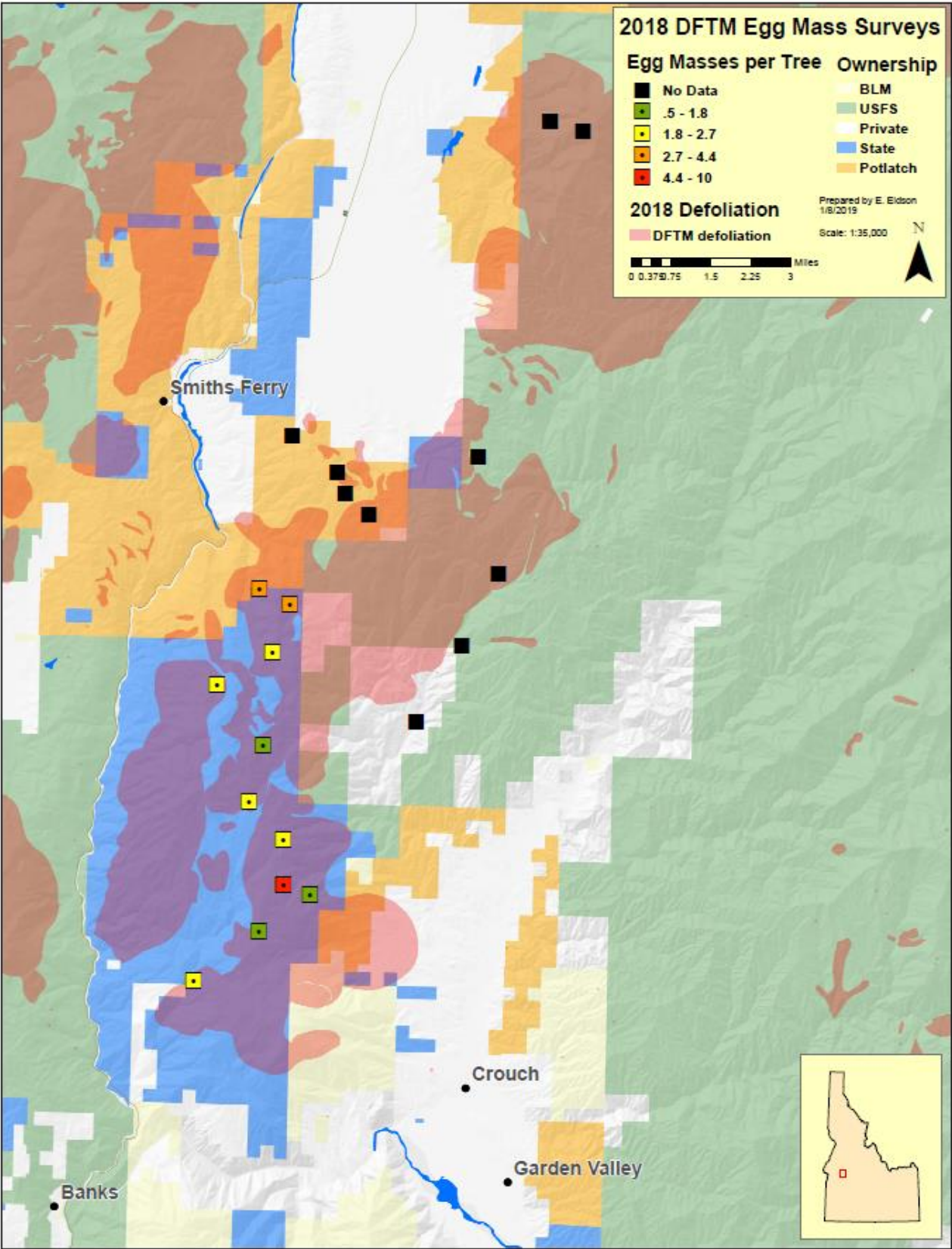
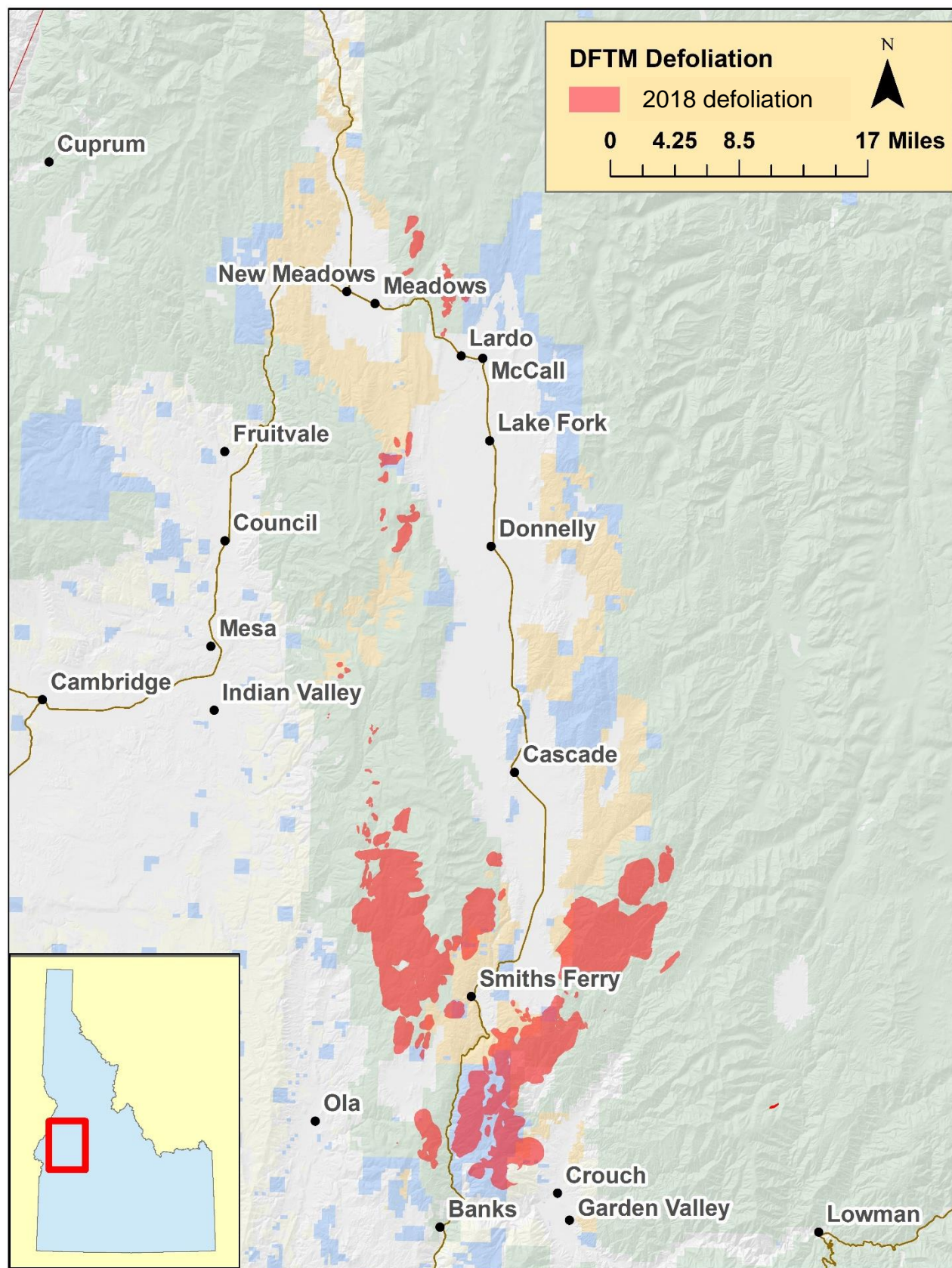




Figure 13. Douglas-fir tussock moth-caused defoliation in southern Idaho in 2018.



## Appendix 1. 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
3	Lolo Pass	5.8	0	0	0.2	0 <sup>†</sup>	0.2 <sup>‡</sup>	26.8	30.2 <sup>‡</sup>	26.4 <sup>‡</sup>	5.2	0.4
4	Charles Butte	0	0	0	0 <sup>†</sup>	0.2	0	0.4	81.4 <sup>‡</sup>	32.2 <sup>‡</sup>	5.4	0
5	Peterson Point	1.2	0	0	0	0	0	2.4	52.8 <sup>‡</sup>	8.6	2.2	0
6	East Dennis	0.2	0	0	0	0	0	0.2	33.2	2.3 <sup>‡4</sup>	9	0.2
7	East Gold Hill	1.25 <sup>4</sup>	0	0	0	0	0	3.0 <sup>3</sup>	38	2.0 <sup>1</sup>	3.4 <sup>‡</sup>	0.8
8	Flat Creek	1.6 <sup>‡</sup>	0.6	0	0	0	0	0.2	48	8	1	0.2
9	Long Creek	3	0	0	0	0	0	5	56.2 <sup>‡</sup>	10.2 <sup>‡</sup>	20.6 <sup>‡</sup>	3.4 <sup>‡</sup>
10	Paradise Point	0.6 <sup>‡</sup>	0.6	0	0	0	0	0.2	44.6	9.8	2.0 <sup>‡</sup>	1.2
11	Mineral Mountain	1.8	0	0	0	0	0 <sup>†</sup>	22.2	11.6 <sup>‡</sup>	10.8 <sup>‡</sup>	25.0 <sup>‡2</sup>	4.2 <sup>‡</sup>
12	Mission Mountain	0	0	0	0	0	0	5	66.4 <sup>‡</sup>	8.0 <sup>‡</sup>	20.8	0.6
13	Spring Valley Creek	0.2	0	0	0	0	0	0	6.2	1	0.6	0
14	Vassar Meadows	0.2	0	0	0	0	0	1	53.6 <sup>‡</sup>	17.0 <sup>‡</sup>	12.8	0 <sup>†</sup>
15	Fairview Knob	1.8 <sup>‡</sup>	0.6	0	0	0	0 <sup>†</sup>	8.2	86.4	6.6 <sup>‡</sup>	9.2 <sup>‡</sup>	0.8 <sup>‡</sup>
21	West Twin	1.6 <sup>‡</sup>	1.8	0	0	0	0	0.4	55.0 <sup>‡</sup>	4.0 <sup>‡</sup>	5.3 <sup>‡4</sup>	1.2 <sup>‡</sup>
22	Moscow Mtn	0.8	0.2	0	0	0	0	0.2	17	0 <sup>4</sup>	3.6	0
101	Benewah	0	0	0	0	0	0	1	51.4 <sup>‡</sup>	16.4 <sup>‡</sup>	5	0
102	Windfall Pass	2.6	0	0	0 <sup>4</sup>	0	0 <sup>†</sup>	10.4	83.0 <sup>‡</sup>	29.4 <sup>‡</sup>	32.0 <sup>‡3</sup>	12.5 <sup>‡4</sup>
103	Squaw Creek	0.6	0.2	0	0	0 <sup>†</sup>	0 <sup>†</sup>	23.6	41	2.6	1.8	0
104	Moses Mountain	2	0.2	0	0 <sup>†</sup>	0	0 <sup>†</sup>	10.2	51.8 <sup>‡</sup>	7.5 <sup>4</sup>	3.4	0.2
105	Little John Creek	0.2 <sup>‡</sup>	0.4	0	0	0	0	1.6	51.2	0 <sup>2</sup>	2.2	0 <sup>†</sup>
106	Emida Peak	1	0	0	0	0	1.0 <sup>2</sup>	2.5	65.8	1.4	1.6	0 <sup>†</sup>
107	North-South Ski Area	0.2	0.2	0	0	0	0	1.4	74.8	2.3 <sup>4</sup>	m	0
108	Bald Mountain	1.6 <sup>‡</sup>	0.4	0	0	0	0 <sup>4</sup>	*	*	*	*	*
109	Laird Park	0.2	0	0	0	0	0	0.2	42	1.4	2.2	m
110	N Fk Palouse River	0 <sup>4</sup>	0	0	0	0	0	0	12	0	0.4	0
111	Mica Mountain	2.6	0	0	0	0	0	3.2	63.2	16.6 <sup>‡</sup>	20.8	0.2

\*Indicates Sites Not Trapped  
<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing  
<sup>2</sup>Indicates 2/5 traps collected

<sup>†</sup>Indicates larval survey  
<sup>3</sup>Indicates 3/5 traps collected

*Italics indicates egg mass sample*  
<sup>4</sup>Indicates 4/5 traps collected

**Appendix 1. (continued) 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.**

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
112	Schwartz Creek	4.8	0.2	0	0	0	0	2.6	59.4	16.2 <sup>‡</sup>	7	0.4
113	Big Bear Creek	0.6	0	0	0 <sup>‡</sup>	0.2	0	3	39.8 <sup>‡</sup>	15.2 <sup>‡</sup>	11.6 <sup>‡</sup>	1.8 <sup>‡</sup>
114	Big Meadow Creek	1.4	0	0	0	0	0	0.2	41.5 <sup>4</sup>	0.8 <sup>‡4</sup>	0.4	0
115	East Twin Mountain	2	0.2	0	0	0	0	0	66.8	6.8	5.4 <sup>‡</sup>	1.2 <sup>‡</sup>
116	Crane Point	0.6	0.2	0	0	0	0	3.8	43	6.8	0 <sup>4</sup>	0.2
117	Sheep Creek	3	0.2	0	0	0 <sup>‡</sup>	0.2	1.8	50.8 <sup>‡</sup>	21.0 <sup>‡</sup>	20.8 <sup>‡</sup>	2
118	W. Fork Mission Ck	1.6	0	0	0	0	0	1.8	64.2	7.0 <sup>‡3</sup>	6.8 <sup>‡</sup>	1.4
119	1 Mi N. Mineral Mt	1.8	0 <sup>‡</sup>	0.2	0	0	0	43.6	61.6 <sup>‡</sup>	24.6	2.2	0.2
200	2 mi W of Plummer	1.2	0	0	0	0	0	4.8	28.8 <sup>‡</sup>	7.0 <sup>‡</sup>	34.2 <sup>‡</sup>	2.2 <sup>‡</sup>
201	Coon Creek	0.4	0	0	0	0	0 <sup>‡</sup>	9.8	97.4 <sup>‡</sup>	18.0 <sup>‡</sup>	21.8 <sup>‡4</sup>	1.8 <sup>‡</sup>
202	3 mi E of Benewah	0.2	0	0	0 <sup>‡</sup>	0.2	0	*	*	*	*	*
203	Benewah Point	0.2	0	0	0	0	0	0.6	47	8.4	3.4	0 <sup>‡</sup>
204	John's Point	0	0.2	0 <sup>4</sup>	0	0 <sup>‡</sup>	0.2	*	*	*	*	*
205	3 m E Charles Butte	0.6	0 <sup>3</sup>	0	0 <sup>‡</sup>	0	0	2.2	52.4	6.5 <sup>4</sup>	2	0 <sup>‡</sup>
207	W Fork Emerald Ck	0	0	0	0	0	0	0.2	4.6	0	0.4	0.2
208	Cedar Butte	0.4	0	0	0	0 <sup>‡</sup>	0.2	0	41.4	1.4 <sup>4</sup>	0.4	0
209	Abes Knob	Now USFS R1	0	0	0	0	0	0.2	54.4	5.6	2.4	0.2
210	West Fork Deep Creek	1	0.2	0	0	0 <sup>‡</sup>	0 <sup>‡</sup>	37.8	83.2 <sup>‡</sup>	29.6	4.6	0
211	Cherry Butte	Now USFS R1	0	0	0	0	0	0.2	55.4	2.8	0.6	0
212	Jackson Mountain	Now USFS R1	0	0	0	0	0	0	15.4	1.6	1.0 <sup>‡</sup>	1
216	1 mi NW of Mineral Mtn	0.4	0.2 <sup>‡</sup>	0.2	0	0 <sup>‡</sup>	0.4 <sup>‡</sup>	47.4	70.6 <sup>‡</sup>	27.6 <sup>‡</sup>	32.4 <sup>‡</sup>	0.8
217	Head of Sheep Creek	2	0.2 <sup>‡</sup>	0.2	0	0	0 <sup>‡</sup>	33.4	38.4 <sup>‡</sup>	8.8 <sup>‡</sup>	36.8 <sup>‡</sup>	7.8
300	Mission Mountain (#2)	2.2	0.2	0	0	0	0	4	38.8 <sup>‡</sup>	13.8 <sup>‡</sup>	22.4 <sup>‡</sup>	2.2
301	1.5 mi S of Mineral Mtn	8.4	0	0	0.4	0 <sup>‡</sup>	0 <sup>‡</sup>	81	66.6 <sup>‡</sup>	62.8 <sup>‡</sup>	37.6 <sup>‡</sup>	2.4
302	Mid. Fork of Deep Ck 1	1.4	0.2 <sup>‡</sup>	0.2	0	0 <sup>‡</sup>	0 <sup>‡</sup>	75.8	61.6 <sup>‡</sup>	48.6 <sup>‡</sup>	38.0 <sup>‡3</sup>	3.6 <sup>‡</sup>

\*Indicates Sites Not Trapped  
<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing  
<sup>2</sup>Indicates 2/5 traps collected

<sup>‡</sup>Indicates larval survey  
<sup>3</sup>Indicates 3/5 traps collected

*Italics indicates egg mass sample*  
<sup>4</sup>Indicates 4/5 traps collected

**Appendix 1. (continued) 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.**

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
303	Mid. Fork of Deep Ck 2	0.2	0	0	0	0 <sup>‡</sup>	0.2 <sup>‡</sup>	33.8	71.6 <sup>‡</sup>	27.2 <sup>‡</sup>	33.0 <sup>‡3</sup>	1.6
400	3 mi S of Mineral Mt	0.6	0.2	0	0	0	0 <sup>‡</sup>	28	42.8 <sup>‡</sup>	23.8	1	0 <sup>‡</sup>
401	Flynn Butte	0	0	0	0	0	0	1.2	41.6	3.4	0.6	0
402	2 mi SE of Browns Mdw	0.8	0	0	0	0	0	2	43.2	3	4.8 <sup>4</sup>	0
500	3 mi SW of Harvard	0.2	0	0	0	0	0	1.4	45.0 <sup>‡</sup>	13.4	1	0
501	3 mi S of Moon Hill	0.6	0	0	0	0	0	0.2	48.6	1.4	1	0
502	3 mi W of Crane Point	0.2	0.2	0	0	0	0	1.4	71.8 <sup>‡</sup>	15.2 <sup>‡</sup>	6.2	0
503	3 mi N of Stanford Point	0.2	0	0	0	0	0 <sup>‡</sup>	13	50.0 <sup>‡</sup>	17.5 <sup>‡4</sup>	17.6 <sup>‡</sup>	1.0 <sup>‡</sup>
504	2 mi N of Stanford Point	1	0	0	0	0	0	1.4	49.6 <sup>‡</sup>	12.2 <sup>‡</sup>	10.2	0
505	1 mi SW of Stanford Pt	2.4 <sup>‡</sup>	0.6 <sup>‡</sup>	0.2	0	0	0	0.8	47.2	4.5 <sup>‡</sup>	9.2 <sup>‡</sup>	1.6
506	1 mi S of Stanford Pt	1	0.2	0	0	0	0	3	50.4	5.8 <sup>‡</sup>	44.4 <sup>‡</sup>	4.0 <sup>‡</sup>
507	1 mi NE of Stanford Pt	0	0	0	0	0	0	0	17.6	1.6	2	0.8
508	1 mi W of Stanford Pt	0.2	0 <sup>1</sup>	0	0	0	0	6.4	52.8 <sup>‡</sup>	23.4 <sup>‡</sup>	27	0 <sup>‡</sup>
509	2 mi NW of Stanford Pt	0.4	0	0	0	0	0	1.6	45.4 <sup>‡</sup>	13.8 <sup>‡</sup>	26.6 <sup>‡</sup>	0.8 <sup>‡</sup>
510	Moon Hill	6.8 <sup>‡</sup>	2.4 <sup>‡</sup>	0.6	0	0	0 <sup>‡</sup>	12.8	53.6 <sup>‡</sup>	36.0 <sup>‡4</sup>	18.2 <sup>‡</sup>	1.2
511	2 mi SE of Moon Hill	0	0	0	0	0	0 <sup>‡</sup>	12	47.8 <sup>‡</sup>	20.4 <sup>‡</sup>	21.0 <sup>‡</sup>	2.4
512	3 mi S of Mineral Mtn	1.8	0.2	0	0	0 <sup>‡</sup>	0.2 <sup>‡</sup>	17.2	70.8 <sup>‡</sup>	5.6 <sup>‡</sup>	9.4	0
513	2 mi SW of Moon Hill	0.2	0	0	0	0	0	3.4	55.4 <sup>‡</sup>	13	1.2	0 <sup>‡</sup>
514	1.5 mi NW of Avon	0.4 <sup>‡</sup>	0.4	0	0	0 <sup>3</sup>	0	2.8	42.8	6.2	3	0
600	3.4 mi NNW of Princeton	0.6	0.2	0	0	0	0	0	38.8	4.8	4	2
601	Macumber Meadows	0.2	0	0	0	0 <sup>‡</sup>	0.2	0.8	52.2	1.6	0.6	0
602	S of Shay Hill	0.2	0	0	0	0	0	0.4	1.4	0.2	4.4 <sup>‡</sup>	1.2
603	3 mi. S of Chatcolet	2.2	0	0	0	0	0	5	101.8 <sup>‡4</sup>	10.8 <sup>‡</sup>	29.2 <sup>‡</sup>	3.6
701	Four mile Creek	2.6 <sup>‡</sup>	1.6	0	0.2	0.4	0	0.2	53.0 <sup>‡</sup>	28.2 <sup>‡</sup>	12.2 <sup>‡</sup>	2.2 <sup>‡</sup>
702	North of Granite Point	1.4	0 <sup>‡</sup>	0.2	0	0	0	1.2	40.8 <sup>‡</sup>	10.2	3.4	0.6
703	Bergs Creek	*	*	0	0	0	0	0.2	12.4	3.2	2.4	0

\*Indicates Sites Not Trapped

<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing

<sup>2</sup>Indicates 2/5 traps collected

<sup>‡</sup>Indicates larval survey

<sup>3</sup>Indicates 3/5 traps collected

*Italics indicates egg mass sample*

<sup>4</sup>Indicates 4/5 traps collected



**Appendix 1. (continued) 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.**

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
704	West Fork Big Bear Ck	0.2	0	0	0 <sup>‡</sup>	0	0	0.6	49.6	8.8 <sup>‡</sup>	9.4 <sup>‡</sup>	0.8
705	2 Mi NW of Stanford PT	0.8	0	0	0	0	0 <sup>‡</sup>	18.2	53.2 <sup>‡</sup>	34.2 <sup>‡</sup>	43.0 <sup>‡</sup>	3.0 <sup>‡</sup>
706	1 Mi S. of Iron Mtn	0.4	0	0	0	0	0	0.4	77.2 <sup>‡</sup>	27.8	2	0.2 <sup>‡</sup>
707	Iron Mtn	3.4	0.2	0	0	0	0	*	*	*	*	*
708	Little Bear Creek	0.8	0	0	0	0	0	2.2	46.6 <sup>‡</sup>	12.4 <sup>‡</sup>	7.3 <sup>4</sup>	0 <sup>‡</sup>
709	Ruby Creek	0.6	0	0	0	0 <sup>‡</sup>	0.2 <sup>‡</sup>	10	47.2 <sup>‡</sup>	10.6	2.4 <sup>‡</sup>	4
710	Turnbow Creek	6.8 <sup>‡</sup>	0.4	0	0	0	0 <sup>‡</sup>	16.2	53.8 <sup>‡</sup>	33.0 <sup>‡</sup>	15.8	0 <sup>‡</sup>
711	East Fork Flat Creek	10.8 <sup>‡</sup>	2	0	0	0 <sup>‡</sup>	0.4 <sup>‡</sup>	12.2	55.4 <sup>‡</sup>	20.8 <sup>‡4</sup>	17.6	0 <sup>‡</sup>
712	Turnbow Point	0.6	0	0	0	0	0	0.2	37.4 <sup>‡</sup>	1.2	0.2	0.4
713	3 Mi S. of Potlatch	4.2 <sup>‡</sup>	0.8 <sup>‡</sup>	0.4	0.2 <sup>‡</sup>	0.2	0	0.6	47.8	13.0 <sup>‡</sup>	8.8 <sup>‡</sup>	5.8
714	Rocky Point	5.2 <sup>‡</sup>	0.8 <sup>‡</sup>	0.2	0 <sup>‡</sup>	0 <sup>‡</sup>	0.4 <sup>‡</sup>	23.4	20.6 <sup>‡</sup>	25.6 <sup>‡</sup>	46.6	0 <sup>‡</sup>
715	Hatter Creek	0	0	0	0	0	0	0	11.6	0	0.2	0
716	Head of Hatter Creek	0.4	0.2	0	0	0	0	0	48.2	0.4	0 <sup>4</sup>	0
717	Nora Creek	0	0	0	0	0	0	0.2	14.2	0.2	0.2 <sup>‡</sup>	1.4
718	Crummaring Creek	2	0	0	0	0	0	0	49.0 <sup>‡</sup>	13.6 <sup>‡</sup>	6.4	0.4
719	Basalt Hill	2.4	0	0	0 <sup>‡</sup>	0.2	0	3.4	47.2 <sup>‡</sup>	10.4 <sup>‡</sup>	7.3 <sup>4</sup>	1.2
720	Browns Meadow	2.8 <sup>‡</sup>	0.6	0	0 <sup>‡</sup>	0	0	3.4	55.8 <sup>‡</sup>	30.0 <sup>‡</sup>	18.2	0 <sup>‡</sup>
721	Smith Creek	0	0	0	0	0 <sup>‡</sup>	0.2	2.2	46.6	2.6	0	0.4
722	Prospect Peak	0	0	0	0	0	0	3.6	47.4 <sup>‡</sup>	14.4	2.8	0.4
723	W Fork Mission Creek	0.8	0 <sup>‡</sup>	0.2	0	0 <sup>‡</sup>	0.4 <sup>‡</sup>	15.4	50.4 <sup>‡</sup>	15.8 <sup>‡4</sup>	38.4	0
724	Huckleberry Mtn	1.4 <sup>‡</sup>	0.4	0	0	0	0	1.4	75.0 <sup>‡</sup>	30.2 <sup>‡</sup>	14.8	0.2
725	North Fork Pine Creek	2.2	0	0	0	0	0	1.4	62.4 <sup>‡</sup>	43.6 <sup>‡</sup>	13.6 <sup>‡</sup>	1.2 <sup>‡</sup>
726	Mineral Creek	*	0.2	0	0	0 <sup>‡</sup>	0.3 <sup>3</sup>	25.6	65.4	5.4 <sup>‡</sup>	10.4	0
727	South of Sanders	0.2	0	0	0	0	0 <sup>‡</sup>	29.2	59.8	3.6	0.8	0
800	Mason Butte	0.2	0	0	0	0 <sup>4</sup>	0 <sup>‡</sup>	8.8 <sup>4</sup>	5.4	13.2 <sup>‡</sup>	38.2 <sup>‡</sup>	9.0 <sup>‡</sup>
801	1 m SW Moctelme Butte	2.6	0 <sup>‡</sup>	0.4	0.4 <sup>‡</sup>	0.2	0	5.5	21.4 <sup>‡</sup>	6.8 <sup>‡</sup>	9.8 <sup>‡</sup>	2.8

\*Indicates Sites Not Trapped  
<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing  
<sup>2</sup>Indicates 2/5 traps collected

<sup>‡</sup>Indicates larval survey  
<sup>3</sup>Indicates 3/5 traps collected

*Italics indicates egg mass sample*  
<sup>4</sup>Indicates 4/5 traps collected

**Appendix 1. (continued) 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.**

Mean Number of Moths per Trap												
Plot #	Site Name	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
802	1.9 mi S of Plummer	0.4	0	0	0	0 <sup>‡</sup>	0.2	2.4	<i>80.0<sup>‡</sup></i>	<i>40.0<sup>‡</sup></i>	<i>39.6<sup>‡</sup></i>	1.6
803	Little Plummer Creek	33.6 <sup>‡</sup>	3 <sup>‡</sup>	0.8	0.2 <sup>‡</sup>	0 <sup>4</sup>	0 <sup>‡</sup>	10.6	<i>115.4<sup>‡</sup></i>	<i>14.2<sup>‡</sup></i>	<i>57.0<sup>‡</sup></i>	17.6 <sup>‡</sup>
804	Syringa Creek	0.2	0	0	0	0	0	0.4	11	1.3 <sup>4</sup>	0.4	0
805	John Point	2.2 <sup>‡</sup>	0.4	0	0	0	0 <sup>4</sup>	*	*	*	*	*
806	2 mi W of Pettis Point	0	0	0	0	0	0	0.8	36.6	3.6 <sup>4</sup>	0.4	0.2
807	Davis Creek	*	0	0	0	0 <sup>‡</sup>	0.4	0.2	<i>26.4</i>	3	m <sup>‡</sup>	1
808	Renfro Creek	0	0 <sup>‡</sup>	0.2	0	0	0	0	<i>37.8</i>	3	0.4	0
809	Crystal Creek	0	0	0	0	0	0	0.4	9.8	0.6	0.4	0
810	Child Creek	0.6	0	0	0 <sup>‡</sup>	0	0	0.8	<i>25.2</i>	0.6	0.6	0.2
811	Hobo Pass	0.2	0.2	0	0	0 <sup>‡</sup>	0.4	2.2	<i>13.6</i>	2.5	m <sup>‡</sup>	2.4 <sup>‡</sup>
812	Hemlock Butte	0	0	0	0.2	0	0	0.2	<i>37</i>	1.8 <sup>4</sup>	0.5	0.2 <sup>‡</sup>
813	Carpenter Peak	0	0	0	0	0	0	0	<i>12.6</i>	3.6	1.6	0
814	Tyson Creek	0.2	0	0	0	0	0	0.6	<i>1.4</i>	1	2.8	0
815	Heinaman Creek	0.6	0	0	0	0	0	0	<i>2.4</i>	0.6	m	0.6
816	Green Mtn	3 <sup>‡</sup>	0.6 <sup>‡</sup>	1.4	0.6	0 <sup>‡</sup>	0.4	2.2	<i>38.4</i>	<i>4.8<sup>‡</sup></i>	5.2	0.4
817	Willow Creek	1	0	0	0 <sup>‡</sup>	0.4 <sup>‡</sup>	0.2	2.8	<i>32</i>	<i>1.4<sup>‡</sup></i>	<i>6.2<sup>‡</sup></i>	2.6 <sup>‡</sup>
818	Head of Emerald Ck	0.8	0.2	0	0	0	0	2	<i>46.4</i>	5.8	3.6	0
819	East Fork Emerald Ck	0.4	0.2	0	0	0	0	0.4	<i>2.6</i>	1	0.2	0
820	Head of Bobs Creek	0	0	0	0	0	0	0.4	9.8	2	0.6	0
821	E Fk of Potlatch River	Now USFS R1	0	0	0	0	0	0.4	<i>50.8</i>	5.0 <sup>3</sup>	3.8	0.2
822	Head of Moose Creek	2.6	0.2	0	0	0 <sup>‡</sup>	0.2 <sup>‡</sup>	9.2	<i>45.6<sup>‡</sup></i>	14.8	2.2	0
823	Beals Butte	2	0	m	0	0	0	0.4	<i>58.2</i>	1.2	2.2	0
900	Hauser	0.8	0	0	0	0	0	0.8	6	1.8 <sup>4</sup>	2.4 <sup>‡</sup>	1.4
901	Cougar Bay	0	0	0	0	0	0	0	<i>29.4</i>	<i>6.4<sup>‡</sup></i>	5.2 <sup>‡</sup>	1.4
902	Marie Creek	0.2	0	0	0.2	0	0	0.3 <sup>4</sup>	2.3 <sup>4</sup>	2	1.2 <sup>‡</sup>	0.8
903	Canary Creek	0.2	0	0	0	0	0	0	12.8	3.8	2.8	0

\*Indicates Sites Not Trapped  
<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing  
<sup>2</sup>Indicates 2/5 traps collected

<sup>‡</sup>Indicates larval survey  
<sup>3</sup>Indicates 3/5 traps collected

*Italics indicates egg mass sample*  
<sup>4</sup>Indicates 4/5 traps collected

**Appendix 1. (continued) 2008 to 2018 Douglas-fir tussock moth trap results at IDL monitored sites.**

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
904	Rathdrum	1.4	0	0	0	0	0	0	23.2 <sup>‡</sup>	17.2	2.6	*
905	State Line (Post Falls) <sup>‡</sup>	0.6	0.2	0	0	0.2 <sup>‡</sup>	0.2	0	6.6	0.6	2.0 <sup>4</sup>	*
906	Sig. Point (Post Falls)	0.6	0	0	0	0	0	0.4	3.2 <sup>‡</sup>	9.4 <sup>‡</sup>	41.8	*
907	Blake Draw Creek	1.2	0	0	0.4	0	0 <sup>‡</sup>	11.8	27.4 <sup>‡</sup>	6.6 <sup>‡</sup>	7	*
908	Coon Creek	4.2	0	0	0	0	0 <sup>‡3</sup>	11	47.4 <sup>‡</sup>	33.2 <sup>‡</sup>	71.6	*
909	Heyburn Park	0.4	0.2	0	0	0	0	1.6	56.4 <sup>‡</sup>	11.4 <sup>‡</sup>	9.6	*
910	Coyote Lane PF	1.8	0	0	0	0 <sup>‡</sup>	0.2	0.2	54.0 <sup>‡</sup>	18.6 <sup>‡</sup>	67.6	*
911	State Line (Meredith)	0.4	0	0	0	0	0	0.4	58.8 <sup>‡</sup>	14.4 <sup>‡</sup>	23.2	*
912	Lovell Valley	9.2 <sup>‡</sup>	1 <sup>‡</sup>	1	0.8 <sup>‡</sup>	0	0	5.6	65.8 <sup>‡</sup>	55.2 <sup>‡</sup>	69.6	*
913	Twin Lakes	0.6	0.2 <sup>‡</sup>	0.2	0.4	0	0	0.2	66.8 <sup>‡</sup>	35.6	*	*
914	McGovern Tree Farm	0	0	0	0	0	0	0.2	4.6	*	*	*
915	Signal Point #1	0	0	0	0 <sup>‡</sup>	0	0	0	39.4 <sup>‡</sup>	*	*	*
916	Signal Point #2	0	0	0	0	0	0	0	54.2 <sup>‡</sup>	*	*	*
917	Signal Point #3	0	0	0	0	0	0	0	22.8 <sup>‡</sup>	*	*	*
918	Signal Point #4	0	0	0	0	0	0 <sup>1</sup>	0	60.0 <sup>‡</sup>	*	*	*
919	Signal Point #5	0	0	0	0	0	0	0	35.4 <sup>‡</sup>	*	*	*
920	Spirit Lake	0	0	0	0	0	0	0	10.8	*	*	*
5021	Little Bald Mtn.	3	Took over from USFS R1									
5033	Sinkler RD/Rose Creek	1.4	Took over from USFS R1									
5034	Wise Lane	2	Took over from USFS R1									
5035	E. of Old Tensed Rd	1.2	Took over from USFS R1									
<b>Number of Sites Trapped:</b>		<b>143</b>	<b>145</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>141</b>	<b>141</b>	<b>134</b>	<b>133</b>	<b>124</b>
<b>Mean # of Moths per Trap:</b>		<b>1.51</b>	<b>.17</b>	<b>0.05</b>	<b>0.03</b>	<b>0.02</b>	<b>0.05</b>	<b>6.3</b>	<b>43.8</b>	<b>11.8</b>	<b>11.9</b>	<b>1.1</b>

\*Indicates Sites Not Trapped      m indicates traps missing      <sup>‡</sup>Indicates larval survey      *Italics indicates egg mass sample*  
<sup>1</sup>Indicates 1/5 traps collected      <sup>2</sup>Indicates 2/5 traps collected      <sup>3</sup>Indicates 3/5 traps collected      <sup>4</sup>Indicates 4/5 traps collected

## Appendix 2. 2008 to 2018 Douglas-fir tussock moth trap results for USFS-R1 monitored sites.

Mean Number of Moths per Trap													
ID	Plot #	Site Name	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
	209	Abes Knob	0.4	Took over from IDL									
	211	Cherry Butte	0	Took over from IDL									
	212	Jackson Mountain	0	Took over from IDL									
	821	E Fk of Potlatch River	0.2	Took over from IDL									
1-1	5001	Lodge Pt	3.2	0	0	0	0	0	0	2.2	0.2	3.0	0.0 <sup>4†</sup>
1-3	5002	Pine Knob	2.6	0	0 <sup>4</sup>	0	0	0	0	41.8	8.6	16.4	0.0 <sup>4†</sup>
1-4	5003	Potato Hill	0.2	0	0	0	0	0	0	18.6	0.4	1.4	0.0 <sup>4†</sup>
1-5	5004	Big Tinker	0.2	0	0	0	0	0	0	4.6	0.2	0.0	0.0 <sup>4†</sup>
2-1	5005	Rhett Cr	0.2	0 <sup>4</sup>	0	0	0	0	0	0.2	0.0	0.0	0.3 <sup>3§</sup>
2-2	5006	Center Ridge	2.2	0	0	0	0	0	0	4.6	1.6	1.4	0.7 <sup>3§</sup>
2-5	5007	S. Cow Cr	4.4	0	0	0	0	0	0	0.2	0.8	1.4	0.0 <sup>3§</sup>
3-1	5008	Keuterville	0	0	0	0 <sup>3</sup>	0 <sup>3</sup>	0	0	3.8	1.2	0.4	0.0 <sup>3§</sup>
3-2	5009	Cottonwood Butte	1	0	0	0	0	0	0	0.4	0.2	0.4	0.0 <sup>4†</sup>
4-1	5010	Lake Waha	*	0	0	0	0	0	0	1.6	0.0	0.0	0.0 <sup>3§</sup>
4-7	5011	No Name	*	*	*	*	0	0	0	4.6	1.2 <sup>4</sup>	9.4	0.0 <sup>3§</sup>
4-3	5012	Junction	2.6	0	0	*	*	0	0	1	0.8	0.8	0.0 <sup>3§</sup>
4-4	5013	Captain John	2.8	0	0	*	*	0	0	0.8	0.0	1.0	0.3 <sup>3§</sup>
5-2	5014	Angel Butte	0	0	0	0	0	0	0	0.6	0.2	0.6	0.0
5-3	5015	Grangemont	1.4	0	0	0	0	0.2	0	9.6	1.2	1.0	0.8
5-4	5016	Bargamin Ck.	*	0.2	0	0	0	0	0.2	14	*	2.0	0.6
5-5	5017	Bald Mtn	*	0.4	0	0	0	0	0	10.4	1.2	1.6	0.2
5-6	5018	Summit Landing	0	0.2	0 <sup>4</sup>	0	0	0	0	0.6	1.2	1.8	1.0

\*Indicates Sites Not Trapped  
<sup>1</sup>Indicates 1/5 traps collected

m indicates traps missing  
<sup>2</sup>Indicates 2/5 traps collected  
<sup>‡</sup> Indicates only 4 traps put out

<sup>†</sup>Indicates larval survey  
<sup>3</sup>Indicates 3/5 traps collected  
<sup>§</sup>Indicates only 3 traps put out  
*Italics indicates egg mass sample*  
<sup>4</sup>Indicates 4/5 traps collected



**Appendix 2. (continued) 2008 to 2018 Douglas-fir tussock moth trap results for USFS-R1 monitored sites.**

ID	Plot #	Site Name	Mean Number of Moths per Trap										
			2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
5-7	5019	Shin Pt	2.2	*	0	0	0	0	0	3	1.0	0.2	0.3 <sup>4</sup>
6-1	5020	Canyon Jct	2.6	0	0 <sup>4</sup>	0 <sup>4</sup>	0 <sup>4</sup>	0	0	13.2	0.4	1.2	0.3 <sup>4†</sup>
7-2	5021	Little Bald Mt	Now IDL	.2	03	0	0	0	0.2	61.6	1.4	3.6	*
7-3	5022	Little Boulder Cr.	0	0	0	0	0	0	0.2 <sup>3</sup>	7.8	2.2	1.0	0.2
7-4	5023	W. Fk Potlatch	0	.4	0	0	0	1.0 <sup>4</sup>	0.2	8.6	2.0	1.2	0.8
7-5	5024	Elk Cr Falls	0	0	0	0 <sup>3</sup>	0	0	0.2	0	1.8	2.0	0.8
7-6	5025	Morris Cr.	0	0	0	0	0	0.8	2.0	16.8	*	1.4	0.8 <sup>4</sup>
4-2	5026	Black Pine	0.8	0	0	0	0	0	0	3.4	0.6	4.0	1.3 <sup>4†</sup>
5-11	5027	Cooper Rd./Cook Ck.	0.4	0	0	*	*	0	0	2.8	2 <sup>4</sup>	3.6	*
5-12	5028	Whiskey Ck.	0.2	0	0	*	*	0	0	3	0.0	1.0	*
5-8	5029	Swanson Ck.	2.84	1.6	0	0	0	0	0	2.4	0.8	0.8 <sup>4</sup>	0.4
2-6	5030	Spring Mtns	0.8	0	0	0	0	0	0	0	0 <sup>3</sup>	1.4	0.0 <sup>3§</sup>
2-7	5031	Crook's Corral	4.4	0 <sup>3</sup>	0.3 <sup>4</sup>	0 <sup>3</sup>	0 <sup>3</sup>	0	0	0.2	0.4	*	*
6-3	5032	Mud Cr.	0.4	0 <sup>3</sup>	0	0	0	0	0	1	0.8	0 <sup>4</sup>	0.0
8-1	5033	Sinkler Rd./Rose Cr.	Now IDL	0	0	0	0	0	2.3 <sup>3</sup>	*	*	*	*
8-2	5034	Wise Lane	Now IDL	0	0	0	0.2	0	1.6	*	*	*	*
8-3	5035	E. of Old Tensed Ln	Now IDL	0	0	0	0	0	1.4	*	*	*	*
<b>Number of Sites Trapped:</b>			<b>31</b>	<b>33</b>	<b>35</b>	<b>30</b>	<b>31</b>	<b>35</b>	<b>35</b>	<b>32</b>	<b>32</b>	<b>31</b>	<b>29</b>
<b>Mean # of Moths per Trap:</b>			<b>1.15</b>	<b>0.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.03</b>	<b>0.24</b>	<b>7.61</b>	<b>1.08</b>	<b>2.06</b>	<b>0.30</b>

\*Indicates Sites Not Trapped      m indicates traps missing      †Indicates larval survey      *Italics indicates egg mass sample*  
<sup>1</sup>Indicates 1/5 traps collected      <sup>2</sup>Indicates 2/5 traps collected      <sup>3</sup>Indicates 3/5 traps collected      <sup>4</sup>Indicates 4/5 traps collected  
    † Indicates only 4 traps put out      § Indicates only 3 traps put out

### Appendix 3. 2008 to 2018 Douglas-fir tussock moth trap results for USFS-R4 monitored sites

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
4001	South Fork Boulder Creek	5.4	5.4	0.2	0	0	0.6	0.5 <sup>4</sup>	0.4	0	0.2	0.2
4002	Mill Creek	6	1.4	0.4	0.4	0	1.6	1	0	0.2	0.2	0.2
4003	New York Summit	8.4	*	2	2	0.4	3.2	1.2	0.6	0	1.6	1.2
4004	Upper Wolftone Creek	*	*	39	15.4	5	*	*	1.2	0	0.8	1.4
4005	Brundage Mt Resort	6	0.8	0.4	0	0.2	*	0	5.4	0.2	1.6 <sup>4</sup>	1 <sup>4</sup>
4006	Bogus Basin Resort	*	3.4	10.4	2.8	1	*	0.6	0.4	0.2	15.2	15.4
4007	Sharps Canyon	24.6	3.8	58	49.2	27.4	*	2.2	1.8	*	*	*
4008	Lower Scriber Cr	96.6	37.2	26.8	5.2	0	*	1.4	5.8	*	*	*
4009	Paradise Springs	8.4	5.8	5.8	0.84	0.2	*	0.2	0.4	*	*	*
4010	Lost Man	*	*	*	*	*	*	*	2.4	*	*	*
4011	Couch Summit	47.4	13.2	48	30.4	9	*	0	0	*	*	*
4012	Baldy Mt.	5.6	2.2	*	*	*	*	*	0	0.2	0.8	1
4013	Tamarack Flat	*	60.8	31.2	11.2	0.2	*	*	*	*	*	*
4014	Antelope Trail	*	*	65.2	*	0.6	*	*	*	*	*	*
4015	Little Sage Hen	*	6.8	25.8	26.2	0.2	*	*	*	*	*	*
4016	Cottonwood	*	42.8	27.4	8.2	1	*	*	*	*	*	*
4017	Skunk Creek	53.4	15.8	11	4	0.4	*	*	*	*	*	*
4018	Cow Creek	20	17	29.2	15.2	2.3 <sup>4</sup>	*	*	*	*	*	*
4019	Howell Canyon	2.4	0	0.2	0.74	*	*	*	*	*	*	*
4020	Porphyry Ck.	1.2	1.2	4.8 <sup>4</sup>	*	*	*	*	*	*	*	*

\*Indicates Sites Not Trapped      m indicates traps missing      † Indicates larval survey      *Italics indicates egg mass sample*  
<sup>1</sup>Indicates 1/5 traps collected      <sup>2</sup>Indicates 2/5 traps collected      <sup>3</sup>Indicates 3/5 traps collected      <sup>4</sup>Indicates 4/5 traps collected  
<sup>‡</sup> Indicates only 4 traps put out      <sup>§</sup> Indicates only 3 traps put out      **Red font indicates new trap locations since 2013**

### Appendix 3. (continued) 2008 to 2018 Douglas-fir tussock moth trap results for USFS-R4 monitored sites

Plot #	Site Name	Mean Number of Moths per Trap										
		2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
4021	Lick Ck.	1	15.4	8	*	*	*	*	*	*	*	*
4022	Adams Ck.	1.4	0	0.2	*	*	*	*	*	*	*	*
4023	Antelope Flat	*	22.4	*	*	*	*	*	*	*	*	*
4024	Bear Basin	12.4	1.8	*	*	*	*	*	*	*	*	*
4025	Barrinaga Co	*	0	*	*	*	*	*	*	*	*	*
4026	Ant Basin	5	11.6	*	*	*	*	*	*	*	*	*
4027	Bear Saddle	*	31.2	*	*	*	*	*	*	*	*	*
4028	Mann Creek	9.4	10	*	*	*	*	*	*	*	*	*
4030	Cottonwood Spring	10.4	*	*	*	*	*	*	*	*	*	*
4031	Craters of the Moon	67.2	*	*	*	*	*	*	*	*	*	*
4032	Deer Point	22.2	*	*	*	*	*	*	*	*	*	*
<b>Number of Sites Trapped:</b>		<b>21</b>	<b>24</b>	<b>19</b>	<b>16</b>	<b>16</b>	<b>3</b>	<b>9</b>	<b>12</b>	<b>7</b>	<b>7</b>	<b>7</b>
<b>Mean # of Moths per Trap:</b>		<b>19.73</b>	<b>12.92</b>	<b>20.48</b>	<b>10.71</b>	<b>3.04</b>	<b>1.80</b>	<b>0.79</b>	<b>1.75</b>	<b>0.11</b>	<b>2.95</b>	<b>2.97</b>

\*Indicates Sites Not Trapped      m indicates traps missing      † Indicates larval survey      *Italics indicates egg mass sample*  
<sup>1</sup>Indicates 1/5 traps collected      <sup>2</sup>Indicates 2/5 traps collected      <sup>3</sup>Indicates 3/5 traps collected      <sup>4</sup>Indicates 4/5 traps collected  
<sup>‡</sup> Indicates only 4 traps put out      <sup>§</sup> Indicates only 3 traps put out      **Red font indicates new trap locations since 2013**