

# Forest Health Protection



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## 2007 NORTH IDAHO DOUGLAS-FIR TUSSOCK MOTH TRAPPING SYSTEM REPORT

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### INTRODUCTION

Idaho's Douglas-fir tussock moth (DFTM) Early Warning System (EWS) uses a series of pheromone trap sites to identify increasing populations prior to undesirable tree defoliation, a system modified after Daterman et al. (1979). The Idaho Department of Lands (IDL) maintains a network of trap sites from Coeur d'Alene south to Moscow and east to Harvard. Region 1 of the US Forest Service (USFS-R1) maintains sites from Potlatch to Lucille. A portion of these sites is monitored annually.

At each site, five pheromone-baited sticky traps are installed to monitor the flight of male moths. An average trap catch of 25 moths is the threshold used to indicate where heavy defoliation may occur the following year. Follow up sampling is then conducted in these areas to pinpoint injurious population densities (Daterman et al. 1979) and to apply treatments, if necessary.

### METHODS

#### 2007 Trapping Results

A total of 151 sites were monitored in northern Idaho during 2007. The mean trap capture was 0.43 moths per trap, up from 0.39 and 0.06 moths per trap in 2006 and 2005 respectively. None of the sites had trap captures exceeding 25 moths per trap. Two trap sites monitored by IDL had mean captures exceeding 5 moths per trap. Mason Butte (plot ID 800) and Little Plummer Creek (plot ID 803), both within the Coeur d'Alene Indian Reservation, had trap catches of 7.25 and 5.80 moths per trap respectively (Figure 1, Appendix 1). None of the traps monitored by USFS exceeded 5 moths per trap, although one site, Bargamin Creek (plot ID 5-4), had a mean trap capture of 4.6 moths per trap (Figure 2, Appendix 2).



## Defoliation

The most recent outbreak in north Idaho began in 2000, resulting in three years of defoliation on state and private land between Plummer and Moscow, and in adjacent Clearwater National Forest lands (Fig. 4). Outbreaks of DFTM have typically occurred in this general area about every 8-10 years since the 1940's. Prior to the 2000 outbreak, visible defoliation occurred for one year during 1986. Both outbreaks were preceded by increasing numbers of trap captures (Randall 2002) (Fig. 3). This year's aerial detection survey showed very little DFTM-caused defoliation.

## Larval Surveys

Larval surveys were performed at 45 of the 120 plots trapped by IDL in 2007 (Appendix 1), and all plots had low populations. Larval population surveys were conducted using the sequential sampling methods described by Mason (1978).

## Conclusions

The DFTM, EWS has been effective at predicting outbreaks in northern Idaho. The two latest outbreaks were preceded by several years of increasing trap catches. However, the intensity of the outbreaks was not predicted by trapping alone. Trap catches preceding defoliation in 1986 were similar to trap captures prior to the 2000 outbreak; yet the intensity of the two outbreaks was very different. The outbreak in 1986 caused detectable

defoliation for one year, while defoliation in the 2000 outbreak was evident for three years. This confirms the need for additional population sampling, such as egg mass and larval sampling to help determine the intensity of outbreaks (Mason and Torgersen 1983, Kegley et al. 2004).

Cocoon and egg mass surveys are conducted in the fall of the same year that trap catches reach the threshold of 25 moths per trap. Larval surveys are performed in the spring and summer of the following year. All surveys are conducted in the vicinity of established plots or in other areas of concern. Cocoon and larval surveys provide estimates of population densities and give more accurate indications of outbreak potential and population trends. Pheromone trapping is designed to detect population changes over large geographic areas.

The DFTM, EWS **is not designed nor intended** to predict exactly where the defoliation will occur. Areas sampled on the ground are selected on the basis of the impact of potential DFTM defoliation on management objectives. Douglas-fir tussock moth EWS traps are **not** calibrated for use during an actual DFTM outbreak. As populations increase, a decline in trap catches will typically be noted. Once the traps have signaled a population increase, larval and cocoon/ egg mass surveys are used to determine population levels in that particular area (Sheehan and Ragenovich 2002).

## Literature Cited

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Kegley, S.J., D. Beckman, and D.S. Wulff. 2004. 2003 North Idaho Douglas-fir Tussock Moth Trapping System Report. USDA Forest Service, Northern Region, Forest Health Protection Rpt. 04-6. 7pp.

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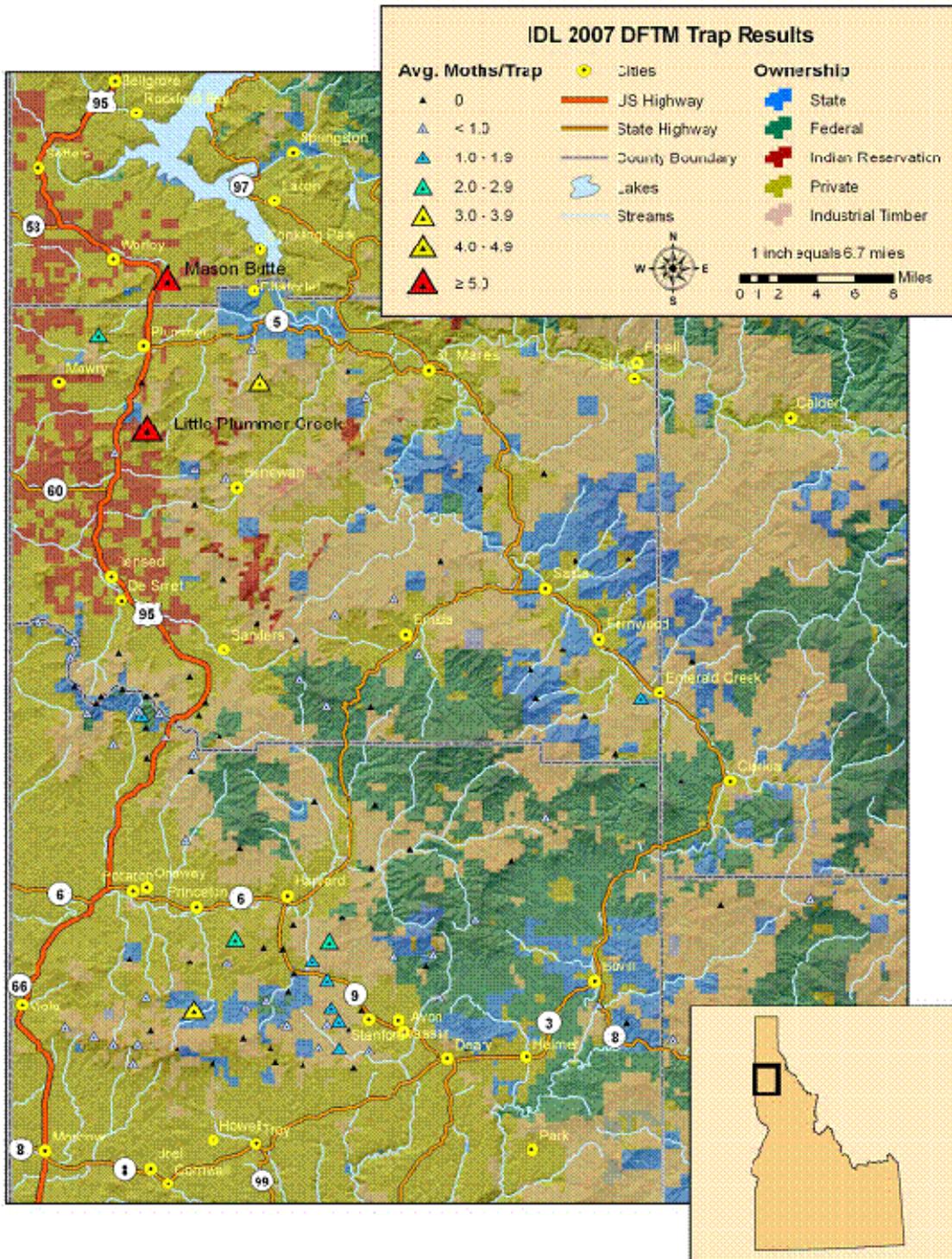


Figure 1. Map of plots trapped by IDL for DFTM in 2007 in northern Idaho.

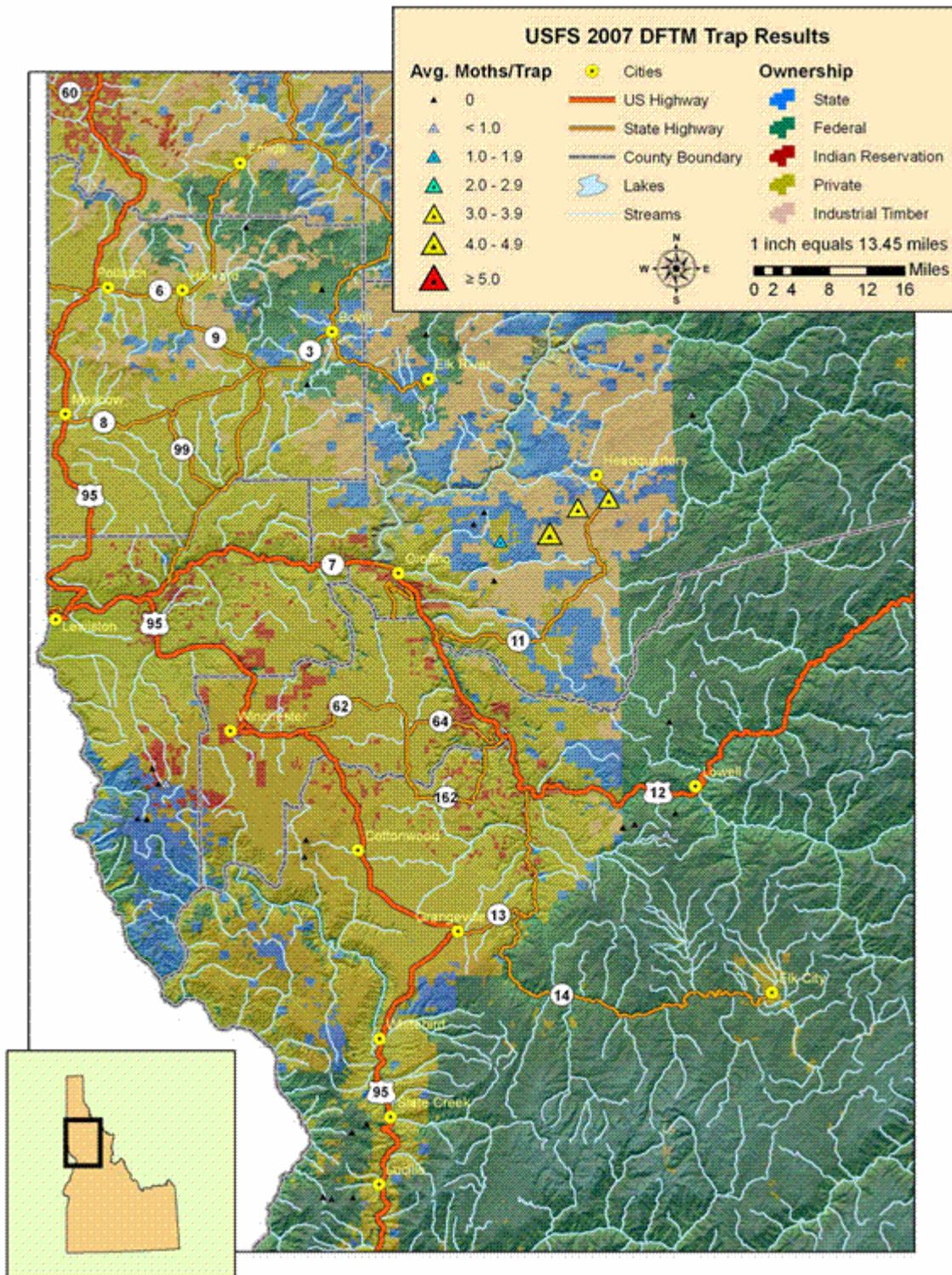


Figure 2. Map of plots trapped by USFS for DFTM in 2007 in northern Idaho.

### Mean Moths per Trap by IDL north of Moscow, 1977-2007

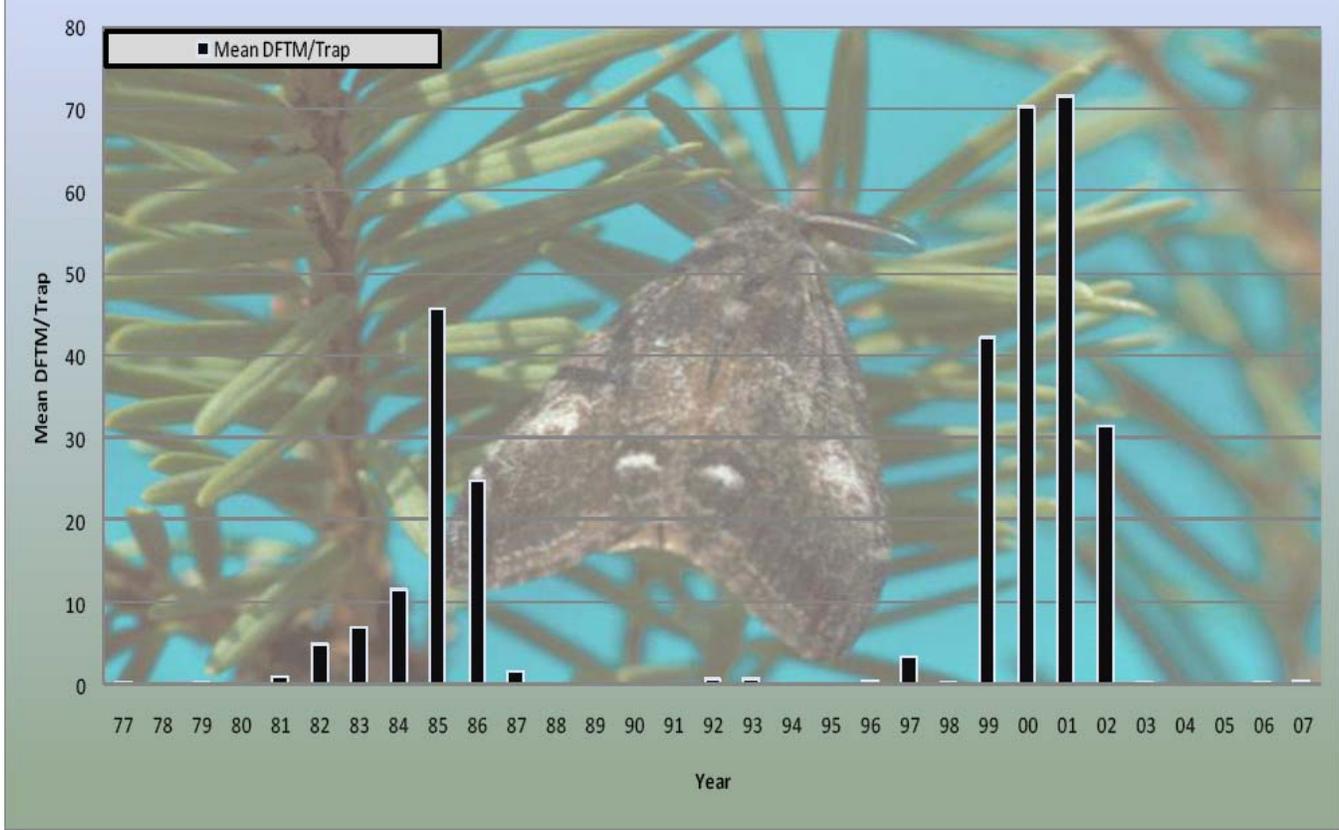


Figure 3. Mean trap catches of DFTM by IDL for plots north of Moscow, ID, from 1977 through 2007.

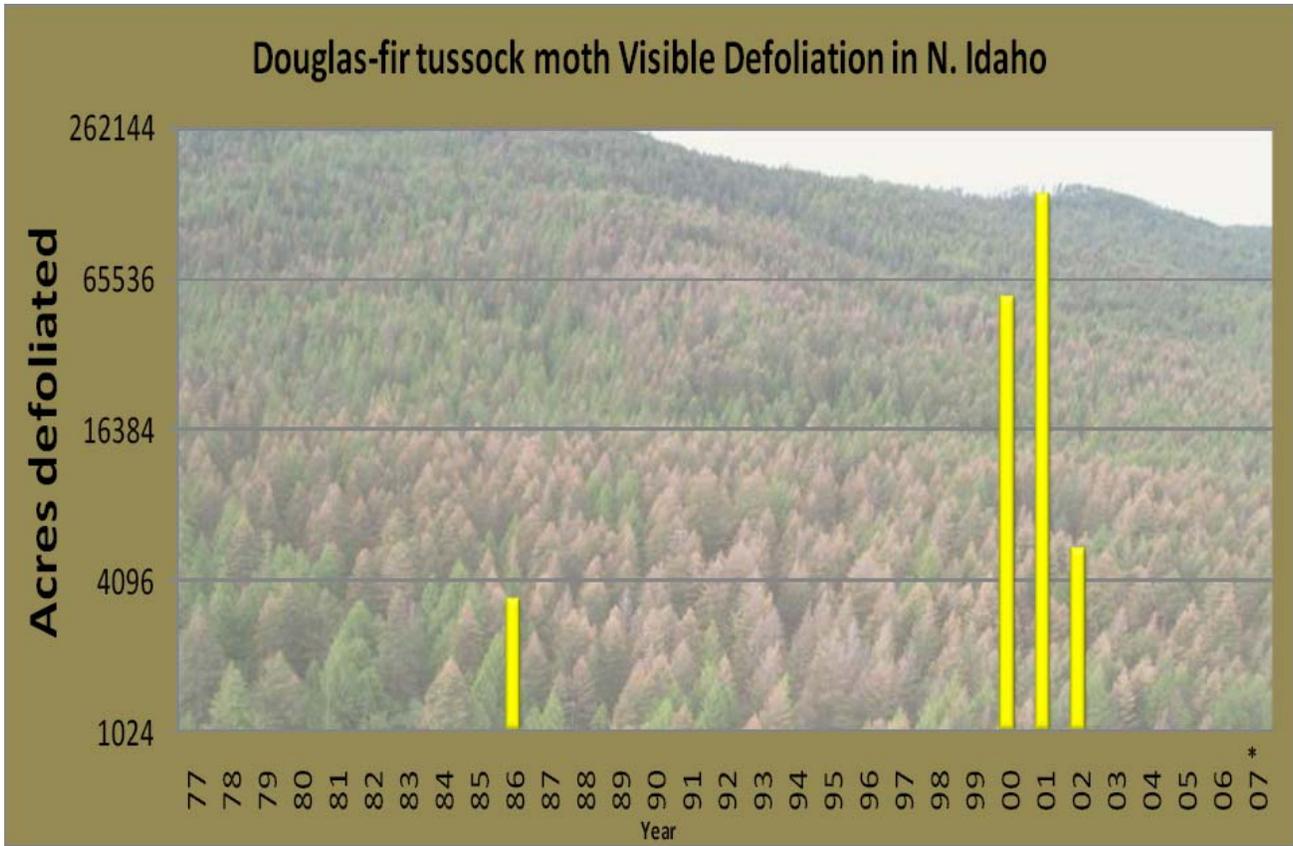


Figure 4. Aerially detected defoliation for the last two DFTM outbreaks in northern Idaho.

Appendix 1. Mean trap catch for IDL monitored plots from Coeur d'Alene to Moscow for the past 7 years.

IDL 2001 - 2007 Douglas-fir Tussock Moth Trap Results

Plot #	Area	Mean Number of Moths Per Trap						
		2007	2006	2005	2004	2003	2002	2001
3	Lolo Pass	0 <sup>‡</sup>	0	0	0	0	8.2	110.2
4	Charles Butte	0 <sup>‡</sup>	0	0	0	0.2	28.2	84.8
5	Peterson Point	0 <sup>‡</sup>	*	0	0	0.2	15.8	101.0
6	East Dennis	0.2 <sup>‡</sup>	0	0	0	1.2	75	101.2
7	East Gold Hill	0 <sup>‡</sup>	0	0	0	0.2	14.8	53.8
8	Flat Creek	0 <sup>‡</sup>	0.4	0	0.2	0	7.6	88.0
9	Long Creek	3 <sup>‡</sup>	0.2	0	0.2	0.2	33.6	0.2
10	Paradise Point	0.2 <sup>‡</sup>	0.2	0	0.2	0	17	91.8
11	Mineral Mountain	0.5 <sup>‡</sup>	0	0	0	1.8	75.2	56.4
12	Mission Mountain	0.2 <sup>‡</sup>	1.2	0	1.2	0.2	25.6	1.6
13	Spring Valley Creek	0 <sup>‡</sup>	*	0	0	0	5.4	58.0
14	Vassar Meadows	0.4 <sup>‡</sup>	0	0	0	0	95.8	102.8
15	Fairview Knob	0.4 <sup>‡</sup>	0	0	0	0.2	39	105.8
21	West Twin (10-115)	0.4	*	0	0	0	8.8	75.4
22	Moscow Mtn (115-114)	0	0	0	0	0.2	5.8	78.0
101	Benewah	0.2 <sup>‡</sup>	1.4	0	1.4	2.8	52.2	92.4
102	Windfall Pass	0.75 <sup>‡</sup>	0.6	0	0.6	0.6	40.4	99.6
103	Squaw Creek	0	*	0	0	0.2	9.4	89.2
104	Moses Mountain	0	0	0	0	0.2	6.4	67.8
105	Little John Creek	0.6	0	0	0	1.4	45	78.4
106	Emida Peak	0.4	0	0	0.2	2.6	64.2	75.8
107	North-South Ski Area	0	0	0	0	0.6	83.2	107.2
108	Bald Mountain	*	*	0	0	0	25.2	53.8
109	Laird Park	0	0	0	0	1	66	86.0
110	North Fork Palouse River	0	0	0	0	1	83.2	75.2
111	Mica Mountain	0.2	0	0	0	0.2	67.6	93.6
112	Schwartz Creek	0	0	0	0	0.2	80.6	110.6
113	Big Bear Creek	0.6 <sup>‡</sup>	0.6	0	0.6	0.2	47.8	87.0
114	Big Meadow Creek	0 <sup>‡</sup>	0.2	0	0.2	0	11.2	70.2
115	East Twin Mountain	0.4 <sup>‡</sup>	0.2	0	0.2	0	7.6	85.4
116	Crane Point	0	*	0	0	0	51	89.0
117	Sheep Creek	0 <sup>‡</sup>	0.2	0	0.2	0	27.8	83.2
118	West Fork Mission Creek	0.2	*	0	0	0	22.2	47.6
119	1 Mi N. of Mineral Mtn (11-216)	0	*	0	0	0	25.2	0.2
200	2 mi W of Plummer	2.6	*	0	0	0	16.2	80.2
201	Coon Creek	3 <sup>‡</sup>	2	0	0.4	0.2	21.6	93.8
202	3 mi E of Benewah	* <sup>‡</sup>	0.2	0	0.2	0.6	21	102.2
203	Benewah Point	0.4	*	0	0	0	8.2	92.4
204	John's Point	*	*	0	0	0	23.8	*
205	3 mi E of Charles Butte	0.8 <sup>‡</sup>	0	0.2	0.2	0.4	63.6	72.6
206	Sunset Mountain	*	*	0	0	0	20.8	*
207	West Fork Emerald Creek	0	*	0	0	0	23.2	*
208	Cedar Butte	0	*	0	0	0	22.4	76.2
209	Abes Knob	0.2	*	0	0	0	23.8	88.4
210	West Fork Deep Creek	0.2 <sup>‡</sup>	0.2	0	0.2	0.2	77	90.6
211	Cherry Butte	0 <sup>‡</sup>	0	0	0.2	0.4	67.2	88.6
212	Jackson Mountain	0.2	*	0	0	0	19.6	*

IDL 2001 - 2007 Douglas-fir Tussock Moth Trap Results Cont.

Plot #	Area	Mean Number of Moths Per Trap						
		2007	2006	2005	2004	2003	2002	2001
216	1 mi NW of Mineral Mtn	0 <sup>‡</sup>	0.4	0	0.4	0.2	1	0.2
217	Head of Sheep Creek (216-117-2)	0 <sup>‡</sup>	0.2	0	0.2	0.6	21.2	97.2
300	Mission Mountain (#2)	0	0.4	0	0.4	0.6	6.4	67.0
301	1.5 mi S of Mineral Mtn	0 <sup>‡</sup>	0.2	0	0.2	0.2	69.4	91.2
302	Middle Fork of Deep Creek 1 (301-216-1)	1	*	0	0	0	63.8	3.6
303	Middle Fork of Deep Creek 2 (301-216-3)	0.2	0.4	0	0.2	1	58	15.8
400	3 mi S of Mineral Mtn	0.6 <sup>‡</sup>	0.2	0	0.2	0.6	75.8	86.6
401	Flynn Butte	0	0	0	0	3.2	95.2	96.4
402	2 mi SE of Browns Mdw	0.2 <sup>‡</sup>	0.2	0	0.2	0	15.2	57.4
500	3 mi SW of Harvard	0 <sup>‡</sup>	0.2	0	0.2	0	18.8	74.6
501	3 mi S of Moon Hill	0	*	0	0	0	16.2	97.6
502	3 mi W of Crane Point	0.2	*	0	0	0.6	67.6	75.0
503	3 mi N of Stanford Point	1	*	0	0	0	10.2	89.4
504	2 mi N of Stanford Point	0 <sup>‡</sup>	0.4	0	0.4	0.2	47.8	86.2
505	1 mi SW of Stanford Point	0.2 <sup>‡</sup>	*	0	0	0	38.4	47.0
506	1 mi S of Stanford Point	1	*	0	0	0	23.4	67.8
507	1 mi NE of Stanford Point	0	0	0	0	0.8	40.6	87.4
508	1 mi W of Stanford Point	0.4	0.2	0	0.2	0	20.6	92.4
509	2 mi NW of Stanford Point	1.2 <sup>‡</sup>	0.6	0.2	0.4	0.4	43.2	81.6
510	Moon Hill	0 <sup>‡</sup>	0.2	0	0.2	0.8	35	67.2
511	2 mi SE of Moon Hill	0	*	0	0	0.2	13.2	80.4
512	3 mi S of Mineral Mtn	0	*	0	0	0.2	70.2	*
513	2 mi SW of Moon Hill	1.4	*	0	0	0	9.6	9.2
514	1.5 mi NW of Avon	0	*	0	0	0	6.8	61.4
600	3.4 mi NNW of Princeton	0.25 <sup>‡</sup>	*	*	*	*	*	*
601	Macumber Meadows	0 <sup>‡</sup>	*	*	*	*	*	*
602	S of Shay Hill	0.2	*	*	*	*	*	*
603	3 mi. S of Chatcolet	0	*	*	*	*	*	*
701	Fourmile Creek	0.4	*	0	0	0	9	88.6
702	North of Granite Point	0	*	0	0.2	0	5.8	76
703	Bergs Creek	0	*	0	0	0	12.2	96.6
704	West Fork Big Bear Creek	0 <sup>‡</sup>	0.2	0	0.2	0.2	13.2	61
705	2 Mi NW of Stanford PT	1.5 <sup>‡</sup>	0.8	0	0.8	0.4	46.4	89.4
706	1 Mi S. of Iron Mtn	0.8 <sup>‡</sup>	*	0	0	0	27.2	87.8
707	Iron Mtn	*	*	0	0	0	6.6	97
708	Little Bear Creek	0.4 <sup>‡</sup>	*	0	0	0	65.6	108.6
709	Ruby Creek	0	*	0	0	0	50.4	96.2
710	Turnbow Creek	2.4 <sup>‡</sup>	1.4	0	1.4	0.2	43	70.6
711	East Fork Flat Creek	2 <sup>‡</sup>	2.6	0	2.6	0.2	55	71.4
712	Turnbow Point	0.2	*	0	0	0.2	7.8	38
713	3 Mi S. of Pottlatch	0 <sup>‡</sup>	*	0	0	0	6.6	30
714	Rocky Point	0.8	*	0	0	0	13.2	79.6
715	Hatter Creek	0 <sup>‡</sup>	0.6	0	0.6	0.2	7.4	32
716	Head of Hatter Creek	0	*	0	0	0	11.8	80.8
717	Nora Creek	0	*	0	0	0	21.2	81.4
718	Crummaring Creek	0.2	*	0	0	0	12.4	70.4
719	Basalt Hill	0.2	*	0	0	0	19	11.6
720	Browns Meadow	0.4	0	0	0	0.2	11.2	2.6
721	Smith Creek	0	*	0	0	0	100.2	70.6

IDL 2001 - 2007 Douglas-fir Tussock Moth Trap Results Cont.

Plot #	Area	Mean Number of Moths Per Trap						
		2007	2006	2005	2004	2003	2002	2001
722	Prospect Peak	0	*	0	0	0	31.2	56.8
723	West Fork Mission Creek	0	*	0	0	0	27.8	22.2
724	Huckleberry Mtn	0 <sup>‡</sup>	*	0	0	0	16.6	77.2
725	North Fork Pine Creek	0.75	*	0	0	0	21.6	93
726	Mineral Creek	0	*	0	0	0	20.2	78
727	South of Sanders	0	*	0	0	0	77.8	86.8
800	Mason Butte	7.25	*	*	*	0	20.8	63
801	1 mi SW of Moctileme Butte	0.2	*	*	*	0	30.2	91.4
802	1.9 mi S of Plummer	0	*	*	*	0	24.8	75.2
803	Little Plummer Creek	5.8	*	*	*	0	18	54.4
804	Syringa Creek	0	*	*	*	0	21.2	66.4
805	John Point	*	*	*	*	0	20.4	61.6
806	2 mi W of Pettis Point	0	*	*	*	0	22.6	71.2
807	Davis Creek	0	*	*	*	0	17.8	55.6
808	Renfro Creek	0	*	*	*	0	14.8	44.2
809	Crystal Creek	0.2	*	*	*	0	10.4	29.4
810	Child Creek	0	*	*	*	0	17.2	52.8
811	Hobo Pass	0.6	*	*	*	0	7.8	25.4
812	Hemlock Butte	0.4	*	*	*	0	9.2	28.2
813	Carpenter Peak	0	*	*	*	0	18.8	57.8
814	Tyson Creek	0	*	*	*	0	30.2	87.6
815	Heinaman Creek	0	*	*	*	0	25.2	85.2
816	Green Mtn	0	*	*	*	0	31	86.2
817	Willow Creek	1.2	*	*	*	0	22.2	73.2
818	Head of Emerald Creek	0.6	*	*	*	0	28.2	86
819	East Fork Emerald Creek	0	*	*	*	0	25	75.2
820	Head of Bobs Creek	0	*	*	*	0	25.4	79
821	East Fork of Potlatch River	0	*	*	*	0	25.2	67.2
822	Head of Moose Creek	0.2	*	*	*	0	24.8	69.6
823	Beals Butte	0	*	*	*	0	39	106.2
	Number of Sites Trapped:	120	51	98	98	122	122	117
	Average Number of Moths per Plot:	0.42	0.33	0.00	0.16	0.23	31.30	71.50

\* Indicates Sites Not Trapped

‡ Indicates larval survey

Appendix 2. Mean trap catch for USFS monitored plots from Potlatch to Lucille for the past 7 years.

**USFS 2001 - 2007 Douglas-fir Tussock Moth Trap Results**

Plot #	Site Name	Mean Number of Moths per Trap						
		2007	2006	2005	2004	2003	2002	2001
1-1	Lodge Pt	0.0	0.0	0.0	0.0	0.2	1.2	1.6
1-2	Goddard	*	*	*	*		*	*
1-3	Pine Knob	0.2	0.3	0.0	0.0	0.0	1.0	4.8
1-4	Potatoe Hill	0.0	0.0	0.0	0.0	0.0	0.2	0.2
1-5	Big Tinker	0.0	0.2	0.0	0.0	0.0	0.6	1.4
2-1	Rhett Cr	0.0	0.0	0.0	0.0	0.0	0.0	0.4
2-2	Christie Cr	0.0	0.0	0.0	0.0	0.0	0.0	8.0
2-3	Cow Cr Saddle	*	*	0.0	0.0	0.0	0.2	0.2
2-4	Low Saddle	0.0	0.4	0.0	0.0	0.0	0.0	0.4
2-5	S. Cow Cr	0.0	0.0	0.0	0.0	0.0	0.0	1.8
2-6	Spring Mtns	0.0	0.0	*	*	*	*	*
3-1	Keuterville	0.0	0.0	0.0	0.0	0.0	0.0	2.2
3-2	Cottonwood Butte	0.0	0.0	0.0	0.0	0.0	0.0	2.8
4-1	Lake Waha	0.0	0.0	0.0	0.2	0.0	0.0	10.2
4-2	Black Pine	0.2	0.0	0.0	0.0		0.2	18.2
4-3	Junction	0.0	0.0	0.0	0.0	0.0	0.0	*
4-4	Captain John	0.0	0.0	0.0	0.0	0.0	0.2	3.6
4-5	Webb Cr	0.0	0.0	0.0	0.0	0.0	0.0	1.4
4-6	Forest	*	*	*	*	*	*	*
5-1	Johnson	*	0.0	0.0	0.0	0.0	4.8	4.0
5-2	Angel Butte	*	0.0	0.0	0.0	0.4	0.8	5.8
5-3	Grangemont	1.4	1.4	0.0	0.0	0.4	2.2	16.2
5-4	Bargamin Cr	4.6	0.0	0.0	0.0	0.0	4.8	35.6
5-5	Bald Mtn	3.4	1.8	0.0	0.0	0.2	9.0	36.0
5-6	Summit Landing	3.2	0.6	0.0	0.0	0.2	0.0	14.6
5-7	Shin Pt	0.0	0.0	0.0	0.0	0.0	1.3	13.2
5-8	Swanson Cr	0.8	0.6	0.0	0.0	1.4	0.0	17.5
5-9	Skull Cr	*	*	*	*		*	*
5-10	Cooper	0.0	0.0	0.0	0.0	0.0	0.2	3.8
6-1	Canyon Junction	0.4	0.0	0.0	0.0	0.0	0.8	11.2
6-2	Fan saddle	0.0	0.0	0.0	0.0	0.0	0.2	0.6
7-1	Laird Park	0.2	0.0	0.0	0.0	0.0	52.2	*
7-2	Little Bald Mtn.	0.0	0.0	0.0	0.0	0.2	22.0	*
7-3	Little Boulder Cr.	0.0	1.2	0.0	0.0	4.0	40.4	*
7-4	W. Fork Potlatch R.	0.0	0.8	0.6	0.0	2.4	40.4	*
7-5	Elk Creek Falls	0.2	0.4	0.4	0.0	4.8	15.8	*
7-6	Morris Creek	0.0	0.2	0.0	0.0	0.2	26.5	*
Number of Plots Trapped:		31	33	33	33	32	33	26
Mean Number of Moths per Site:		0.47	0.24	0.03	0.01	0.45	6.82	8.30
* Indicates Plots Not Trapped								