

Oregon Grasshopper and Mormon Cricket Survey Summary for 2010

The 2010 Oregon grasshopper survey season, conducted by ODA in cooperation with USDA APHIS PPQ, was Oregon's greatest grasshopper challenge since the major outbreaks of the late 1980's. Initially, grasshopper numbers were slow in developing, delayed by unseasonable cool and wet weather in May and June but erupted in great numbers late in the season as the weather finally warmed up. Most of the rangeland in the eastern third of Oregon was generally infested with economic populations by season's end. Malheur, Harney, Umatilla, Baker, and Morrow counties were especially hard hit (Fig. 1). Based on 2009 survey results we predicted that northern Harney County would have economic populations. We also expected to see areas with problem populations in Baker County, where an outbreak has been going on for three years but should be waning, as well as some building numbers in Umatilla and northern Malheur Counties. However we did not expect to see the widespread outbreak that materialized throughout the eastern third of the state.

Surveying began on 24 May and ended on 1 September. Nymphal survey takes place early in the season and is used to locate potential outbreak areas. Adult survey (6 July - 1 September) is used to make predictions for 2011 and estimated economic levels of 8 or more grasshoppers per square yard on **1,907,938 acres** in **12** counties of eastern Oregon. In 2010, a total of **1,905** sites were visited (Fig. 2) of which **795** were nymphal and **750** adult survey, and **360** treatment-related sites (Table 1). Eight of the 12 counties had greater than 10,000 economically infested acres: (Fig. 1; Table 2).

Table 1. Oregon Grasshopper Survey Statistics from 2005 through 2010. Economic infestation = >7 grasshoppers / yd².

Year	Number Counties Infested	Acres of Econ. Infest.	Sites Surveyed				Samples w/Econ Density	Mean GH / yd ^{2*}	Number of GH Surveyors
			Total	Nymph	Adult	Treatment			
2010	12	1,910,222	1,905	795	750	360	488	21	6
2009	11	151,974	998	491	507		108	18	4
2008	12	1,129,820	2,722	1116	1606		360	29	6
2007	13	798,358	1,585	706	870		298	18	6 (+2)
2006	14	97,399	1,368	750	618		100	16	6
2005	9	64,751	859	306	423		115	15	5

*Mean of economically infested samples

The cool and wet May-June period delayed emergence which complicated our surveying efforts. Normally in outbreak years most grasshoppers are adults by early July since outbreaks are usually associated with hot, dry conditions. This year we observed a unique situation where large populations of early instars mixed in with a significant number of late instars to adult in mid to late July. Some grasshoppers hatched normally during the few warm periods we had this spring, however when the bulk of the population hatched in late summer, control recommendations were complicated by the mix of young and older grasshoppers found together. Our preferred control product Dimilin, a growth regulator, is not effective on adult or late instar grasshoppers.

In preparation for the expected outbreak in **Harney County**, a grasshopper IPM workshop was held on April 8 at the Eastern Oregon Agricultural Research Center in Burns to provide land managers with tools to deal with grasshopper outbreaks. The workshop was presented and organized by USDA-APHIS-PPQ, ODA and OSU Extension Service. In total, 10 participants attended the workshop, including public and private land-managers, ranchers and growers.

In response to early season concerns an afternoon seminar on **Mormon cricket** biology and control was presented to private landowners in Enterprise (Wallowa County) on 28 April. One rancher used this information to treat some of his land in response to a subsequent cricket migration in May. Mormon crickets are not as big a problem in Oregon as they are our neighboring states, and we encountered very few in our survey this year.

The northern border of the **Malheur National Wildlife Refuge** was intensely monitored this spring because of economic populations that impacted adjacent private rangeland in 2009. Two treatments

were made by private ranchers near the Refuge using recommendations from ODA/APHIS. , However, no control was needed within the Refuge boundaries.

At the request of the Department of Defense **Umatilla Chemical Depot** APHIS treated 4242 acres to prevent grasshoppers from migrating from the Depot to surrounding high value cropland. A similar but smaller outbreak in 2005 was not treated and resulted in heavy crop damage to fields bordering the Depot. Grasshopper populations in the treated area averaged over 20 per square yard. The treatment took place July 7 with Dimilin applied by air at a rate of 1 ounce a.i. per acre. There was no RAATs skip due to the advanced age of the grasshopper population. Even though a percentage of the population was adult at the time of treatment, post treatment counts showed an average of 3 grasshoppers per yard for an 85 % reduction.

At the request of BLM, APHIS conducted a treatment program 24-25 July on three separate blocks of BLM rangeland on the east side of the **Steens Mountain** in southern Harney County. The terrain was very remote and rugged. Due to the mixed age of the grasshopper population Sevin XLR plus was aerially applied at a rate of 12 ounces a.i. per acre to 13,088 acres. A RAATs skip of 100 feet between swaths resulted in 18,323 acres protected. A large portion that was mapped as needing treatment was not able to be treated because the terrain turned out to be too dangerous to fly. Pre and post treatment counts in the treated areas showed a reduction from an average of 33/yard to 8/yard (73 %).

After successfully treating a problematic grasshopper population at the **Portland International Airport** (PDX) with Dimilin in 2009 Port of Portland geared up to repeat treatment again in 2010. However, our survey throughout the season detected very few grasshoppers, indicating the benefits of a timely Dimilin application.

Due to repeated outbreaks of the clear-winged grasshopper, *Camnula pelucida*, we continue to watch the area in and around the **Klamath Marsh National Wildlife Refuge** very closely. From early through mid-season 2010 few areas of concern were found. However during the adult survey one isolated parcel of Refuge property, the "Buck Pasture", and several areas in the northeast region of Refuge, known as the "Lane Ranch." had high densities of *C. pelucida* mating and laying eggs (Fig. 3).

In **Harney County** we assisted the Roaring Springs Ranch and another rancher near Crane with pre- and post-treatment surveys for privately applied Dimilin to control high *Camnula* populations. Several private landowners in the Keating area of **Baker County** utilized loaned ODA ground application equipment, under a cooperative equipment use agreement, to make Dimilin applications to infestations on their holdings. The **Fort Klamath area** experienced some areas of economically significant grasshopper densities. With delimitation and control recommendations from ODA, two private landowners successfully treated ~ 2,000 acres with Dimilin during July. In **Union County** one landowner reported targeting a small population with Dimilin. We received many reports of high grasshopper populations for which we could only provide advice and sometimes limited survey due to limited time and resources.

Based on the results of the 2010 adult grasshopper survey we recommend landowners and land managers be prepared for a much worse outbreak in Oregon in 2011, especially those areas that saw significant increases this year. We cannot accurately predict where grasshopper outbreaks will occur because they depend greatly on climatic conditions at the time of hatch and early development, variables that cannot be accurately forecast. However, the areas of economic grasshoppers in 2010 serve as indicators of potential problem areas for 2011, and should be closely monitored in early spring of 2011. see Table 2 and the attached map. We encourage landowners in areas with high or building populations in 2010 to especially proactive in early 2011 if they are concerned about grasshopper impacts to crops and rangeland. Control is most effective on young grasshoppers. Contact us or your local Extension Office for advice, assistance, or to report grasshopper populations.

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2010 Oregon Grasshopper and Mormon Cricket Survey Map

Oregon Department of Agriculture (ODA) in Cooperation with USDA-APHIS-PPQ

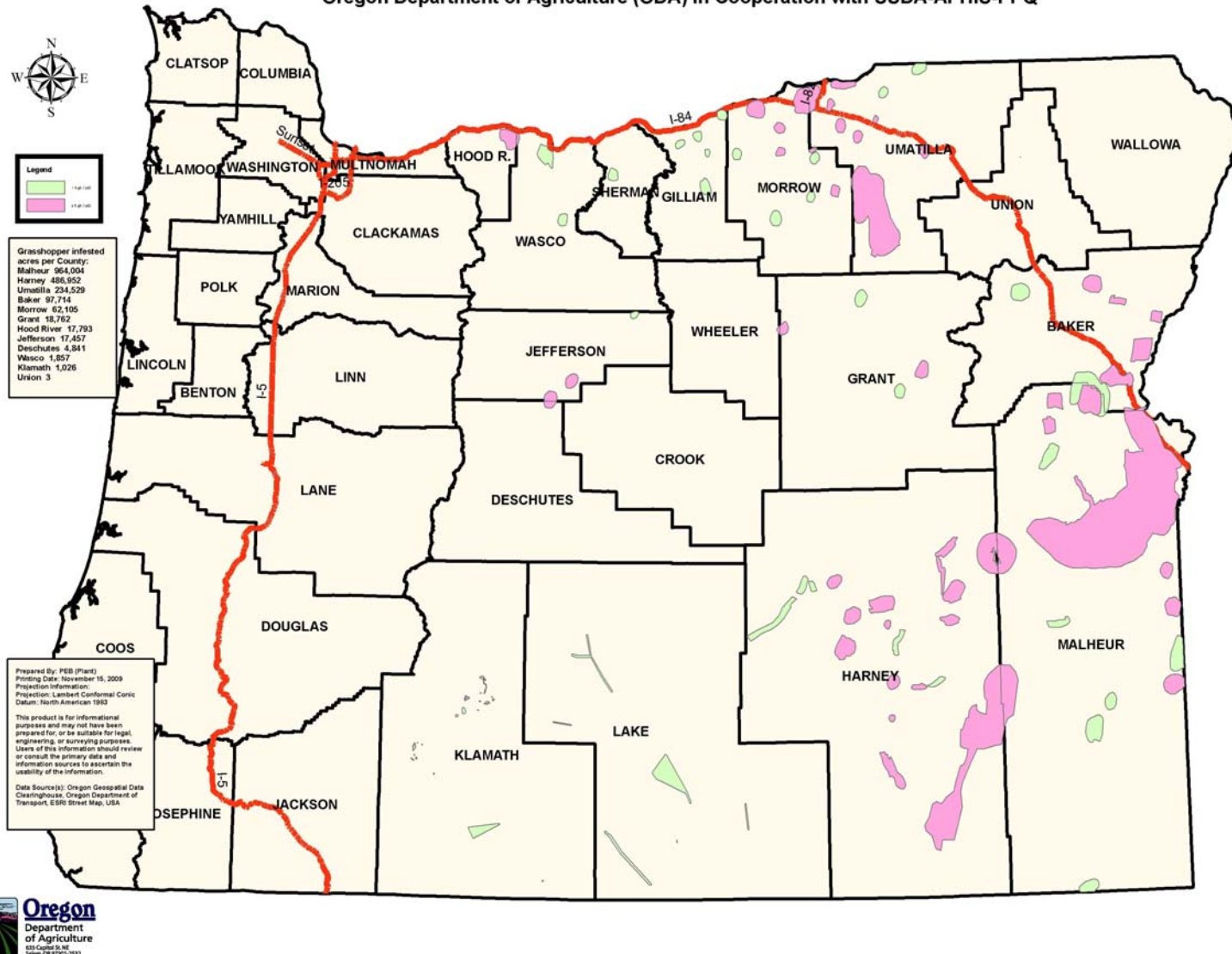


Figure 1. 2010 estimated areas of economic and sub-economic infestation.

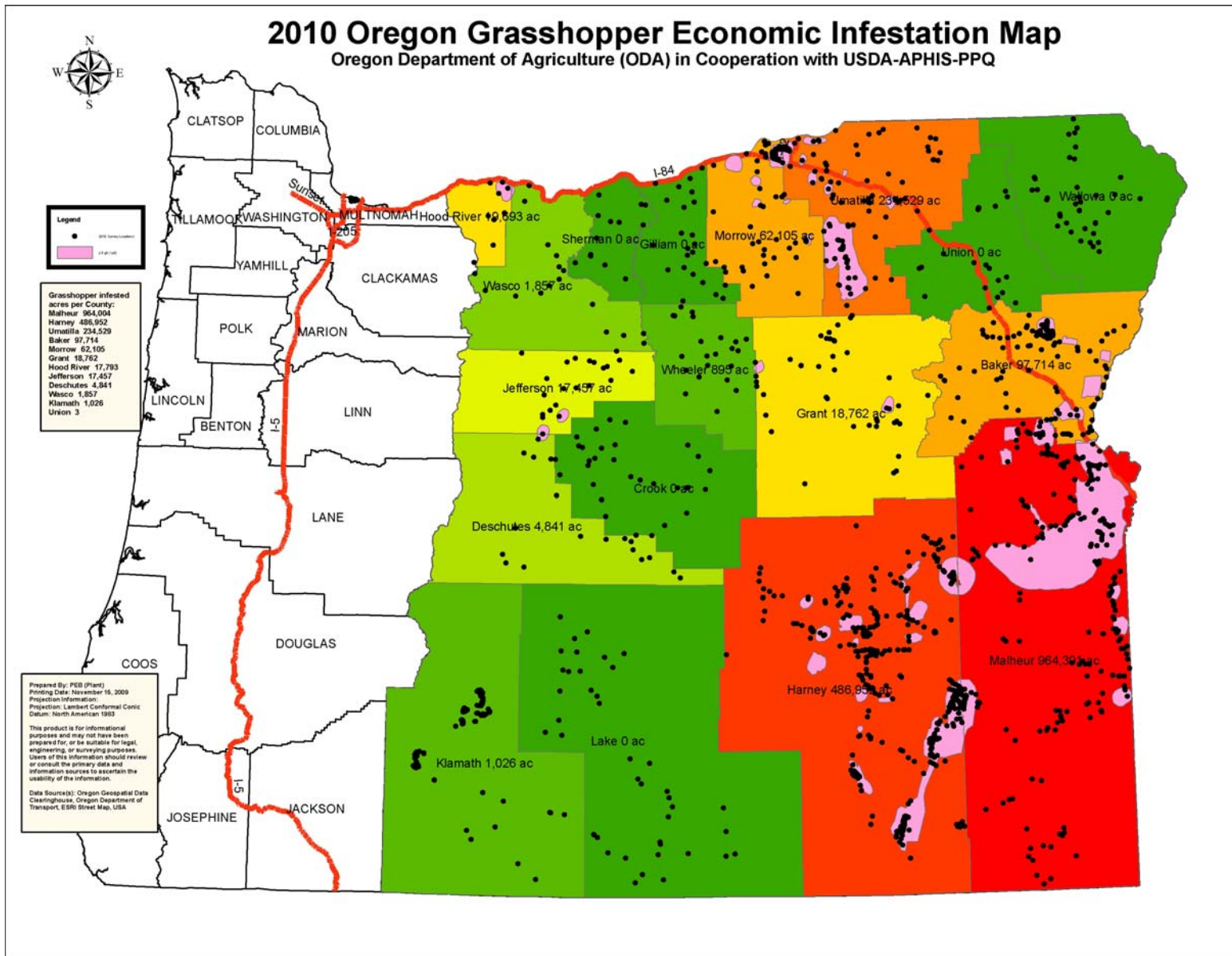


Figure 2. 2010 survey locations and areas of economic infestation superimposed on counties ranked by economically infested acreage.

Table 2. Estimate of the acreage with economic levels of grasshopper infestation (>7 grasshoppers / yd²) based on the 2010 adult survey results

County	Region	Acres Infested	Ownership as a Percentage of Area	
			Public	Private
Baker		97,714		
	Connor Creek - Daly Creek	27,902	49	51
	Glasgow Butte - Sparta	7,473	40	60
	Huntington	2,285	90	10
	Mormon Basin	1,550	37	63
	Olds Ferry	1,265	16	84
	Richland - Daly Creek - Posy Valley	7,911	57	43
	Rye Valley - Lime	30,497	46	54
	Sawtooth Ridge - Balm Creek Reservoir	18,831	50	50
Deschutes		4,841		
	Opal City	4,841	11	89
Grant		18,762		
	Dixie Meadows	12,206	35	65
	Mount Misery - Miller Flat - Kimberly	6,556	39	61
Harney		486,952		
	Crane - Tin Can Ridge	23,609	58	42
	Diamond Swamp - Diamond	5,016	78	22
	Fields - Borax Lake - Andrews - V Lake	93,945	81	19
	Frenchglen	2,415	95	5
	Hughet Spring - Southwest Harney Lake	24,426	84	16
	Jackass Butte	10,490	59	41
	Lambing Canyon - Juniper Lake	52,615	96	4
	Mahon Creek	9,989	11	89
	Mann Lake - Coffin Butte - Johnny Ck - Mickey Spr	97,287	89	11
	Miranda Flat - Alvord Hot Springs	22,222	44	56
	New Princeton	10,257	25	75
	Northwest Harney Lake	15,652	60	40
	Redess - Northeast Harney Lake - The Narrows	24,203	14	86
	Roaring Springs - Home Creek Butte	23,502	63	37
	Sage Hen Hill	10,329	90	10
	Selle Gap - Warm Springs Reservoir	108	92	8
	Stinkingwater Pass - Buchanan	12,408	70	30
	The Narrows	3,001	53	47
	Upton Mountain - Warm Springs Creek	45,478	95	5
Hood River		17,793		
	Hood River	6,450	0	100
	Ketchum Reservoir - Parkdale	3,854	11	89
	White Salmon	7,488	7	93
Jefferson		17,457		
	Gray Butte - Buck Butte	9,670	96	4
	Opal City	7,787	32	68
Klamath		1,026		
	Fort Klamath area - Agency Lake	227	0	100
	Klamath National Wildlife Refuge	265	0	100
	Lenz	534	0	100
Malheur		964,004		
	Adrian	5,078	30	70
	Alder Creek	7,961	99	1
	Antelope Reservoir - Jordan Valley - Hooker Creek	22,796	19	81
	Avery Creek	34,259	92	8
	Becker Creek	20,207	24	76

Table 2, continued.

County	Region	Acres Infested	Ownership as a Percentage of Area	
			Public	Private
	Cairo	33,485	13	87
	Cow Valley East - Bridgeport	4,933	25	75
	Cow Valley West	12,056	18	82
	Double Mountain	35,914	93	7
	Folly Farm - Ryegrass Butte	52,505	91	9
	Grassy Mountain	33,139	100	0
	Graveyard Point - Owyhee Ridge	10,750	93	7
	Harper	32,363	83	17
	Henry Gulch	34,376	52	48
	Huntington	11,081	71	29
	Hurley Flat	23,292	94	6
	Johnny Creek SW	1,013	100	0
	Jonesboro	14,580	71	29
	Kane Spring Gulch	26,613	97	3
	Keeney Ridge	33,643	97	3
	Malheur Butte	22,083	4	96
	McCarthy Ridge	17,244	60	40
	Mitchell Butte	28,952	47	53
	Monument Peak	23,055	79	21
	Mormon Basin	12,783	49	51
	Namorf	7,790	91	9
	Olds Ferry	6,010	38	62
	Owyhee	22,439	3	97
	Owyhee Dam	18,837	93	7
	Rockville	17,060	77	23
	Rufino Butte	18,995	86	14
	Selle Gap - Warm Springs Reservoir - Juntura	39,824	95	5
	Sourdough Spring	36,213	95	5
	South Mountain	10,836	89	11
	The Elbow	9,073	100	0
	Tims Peak	37,080	95	5
	Tub Mountain - Moores Hollow	35,220	59	41
	Twin Springs	19,238	98	2
	Upton Mountain - Warm Springs Creek	0	100	0
	Vale East	33,014	60	40
	Vale West - Vines Hill	47,774	26	74
	Wendt Butte - Cow Valley West	14,992	4	96
	Westfall - Little Valley	9,449	62	38
	Willowcreek	26,000	14	86
Morrow		62,105		
	Butter Creek Junction	1,779	0	100
	Crow Butte	18,507	10	90
	Lena - Franklin Hill	6,075	0	100
	Ordnance - Chemical Depot	24,066	40	60
	Strawberry Canyon	4,500	0	100
	Vinson	726	1	99
	Well Spring - Strawberry Canyon	6,453	76	24
Umatilla		234,529		
	Barnhart	2,058	0	100
	Butter Creek Junction	384	0	100
	Carney Butte	20,889	3	97
	Echo	8,164	0	100
	Gurdane	35,675	0	100
	Hermiston	4,918	0	100
	Nolin	6,540	0	100

Table 2, continued.

County	Region	Acres Infested	Ownership as a Percentage of Area	
			Public	Private
	Nye	19,933	0	100
	Ordnance - Chemical Depot	14,738	49	51
	Table Rock	7,293	100	0
	Ukiah	66,778	8	92
	Umatilla - Hat Rock	11,087	9	91
	Vinson	36,071	0	100
Union		3		
	Elgin	3	0	100
Wasco		1,857		
	White Salmon	1,857	0	100
Wheeler		895		
	Mount Misery	895	62	38
TOTAL		1,907,938	58	42