

MONTANA DEPARTMENT OF AGRICULTURE COOPERATIVE PEST SURVEY REPORT 2009



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USDA Forest Service
Montana Department of Natural Resources & Conservation
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2009 Surveys

- Gypsy Moth-GM
- Karnal Bunt-KB
- Pulse Crop Nematodes
- Emerald Ash Borer-EAB

- European Pine Shoot Moth-EPSM
- Small Grains Commodity Based
- Japanese Beetle Delimitation
- Potato Cyst Nematodes-PCN

This report was compiled by Patricia Denke, Kenneth P. Puliafico and Ian Foley with contributions from our survey interns.

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Introduction to the Program

The Cooperative Agricultural Pest Survey (CAPS) is a nationwide survey effort initiated by the USDA Animal Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ), to detect and/or monitor the spread of introduced plant pests. To achieve this goal, the USDA APHIS PPQ enlists the assistance of state cooperators. In Montana, state cooperators are coordinated through the Montana Department of Agriculture, and include not only the Department of Agriculture, but also Montana State University, the Montana Department of Natural Resources and Conservation, US-Forest Service, and others. In 2009, the Beaverhead County Weed and Pest District joined the other cooperators.

The Interns and Other Program Assistants

The Montana Department of Agriculture conducts several of the surveys. This would not be possible without the assistance of a group of dedicated people, who join the department for the summer as interns and survey technicians. We also had the invaluable assistance of Margaret Rayda, Pest Survey Specialist for North Dakota and Montana with the USDA-APHIS-PPQ and Amy Gannon, Forest Entomologist with DNRC. In addition, several Montana Department of Agriculture field inspectors, led by Velda Baltrusch of Great Falls, assisted in gathering Karnal bunt samples.

Interns for 2009 included Craig Carlson, Forrest Miller, and Brooke Cather. Brooke Cather was enrolled at Montana State University but transferred to BYU-Idaho for the winter semester. She has a life-long love of the outdoors. She has been a strong member of both her local 4-H club, and the FFA in Lolo, Montana. Brooke worked with the Pest Management Group as “the moth intern” on the western side of the continental divide. Craig Carlson is a student at North Dakota State University, studying horticulture. He was excited to be in Montana, and was headquartered in Bozeman. Craig worked primarily on the emerald ash borer project (with the big sticky purple things), all over the state. Forrest Miller joined the Pest Management Section for a summer internship from Missoula. He actually hails from Maryland. His major is environmental studies. His previous experiences have included working for the Maryland National Park and Planning Commission as a do-almost-everything person. He grew up on a farm in Maryland, which is something many people fail to realize exists. For the Montana Department of Agriculture, he worked on the small grains survey, which is a joint survey with Montana State University plant pathologist Dr. Mary Burrows.

In addition to the interns, we had the assistance of Dr. Ken Puiliafico as a technician. Ken graduated from MSU, and then worked in American Samoa for several years, where he (among other things) taught math and physics. He toiled under the auspices of people at MSU (in Europe) to obtain a Masters of Science in Entomology. He then proceeded to the University of Idaho, where he obtained his PhD. While his immediate training is related to biological control of weeds, Ken is a versatile person who can shift gears rapidly. His primary area of responsibility this summer was the entire Japanese beetle situation in the state. This included creating the plan and leading a delimiting survey, and beginning the transition of the Billings infestation to a formal regulated area with a structured eradication plan.

Cereal Leaf Beetle Detection Survey

***Oulema melanopus* (L.)**

Cereal leaf beetle (CLB), pictured below, is an exotic quarantine pest of forage and cereal grains. It is commonly found on small grains, particularly wheat, barley, and oats. The adults and immatures feed on the developing plants, at times causing extreme defoliation.



Image from <http://www.padil.gov.au>

Adult cereal leaf beetle.
Approximate length 1/8 to 1/4 inch long.

During 2009, the Cereal Leaf beetle survey was conducted alongside of a bundled small grain survey that is described later in this document. Sweep net samples were taken for the general survey and samples were screened specifically for CLB adults and larvae. Whole plants were also collected to check for the presence of eggs and larval feeding damage.

Cereal leaf beetles were found in 7 Montana counties during the 2009 sampling season. Counties that had been found positive for CLB in the past were not necessarily sampled during 2009. In total, 48 of Montana's 56 counties have had CLB detections since the discovery of the pest in the late 1980's. There were no noted range expansions for this pest during 2009 and the counties that remain free of CLB based on official survey are: Glacier, Liberty, Hill, Phillips, Valley, Daniels, Sheridan, Roosevelt, and Fallon.

Cereal Leaf Beetle Parasitoids

***Tetrastichus julis* (Walker) & *Anaphes flavipes* (Förster)**

The Cereal leaf beetle has spread across much of Montana during the past two decades. While initial movement was accompanied by severe outbreaks and economic damage, in more recent years the outbreaks have not been as severe. This may be, in part, due to the nature of the newly infested areas, which are generally drier and therefore less hospitable to the immature beetles. It

may also be due to the presence of two parasitoids released by the United States Department of Agriculture, Animal & Plant Health Inspection Service, Plant Protection & Quarantine (USDA APHIS PPQ) to assist in the management of this pest.

The first of these parasitoids to be released and recovered was *Tetrastichus julis*, an internal parasitoid of the CLB larva. The larvae of *T. julis* are maggot-like and bright orange in color. In some samples 100 percent of CLB larvae contained parasitoids, although this varies not only from place to place but also from day to day in the same place. Data suggest that this parasitoid is capable of movement as rapidly as CLB. CLB larvae were only collected at 3 sites in 2009 with parasitism rates by *T. julis* ranging between 0 and 66.67% in 2009.

The second parasitoid, *Anaphes flavipes*, is an egg parasitoid. Although this insect has been released at several Montana locations, the exact status has been more difficult to assess. This is due partially to the small size of the insect, and partially to the fact that CLB eggs are prone to desiccation, making it more difficult to determine when mortality was due to the parasitoid versus other causes. Based on previous year's data and recommendations from the Western Region CLB working group, this parasitoid was not a part of the official survey conducted by the MDA in 2009.



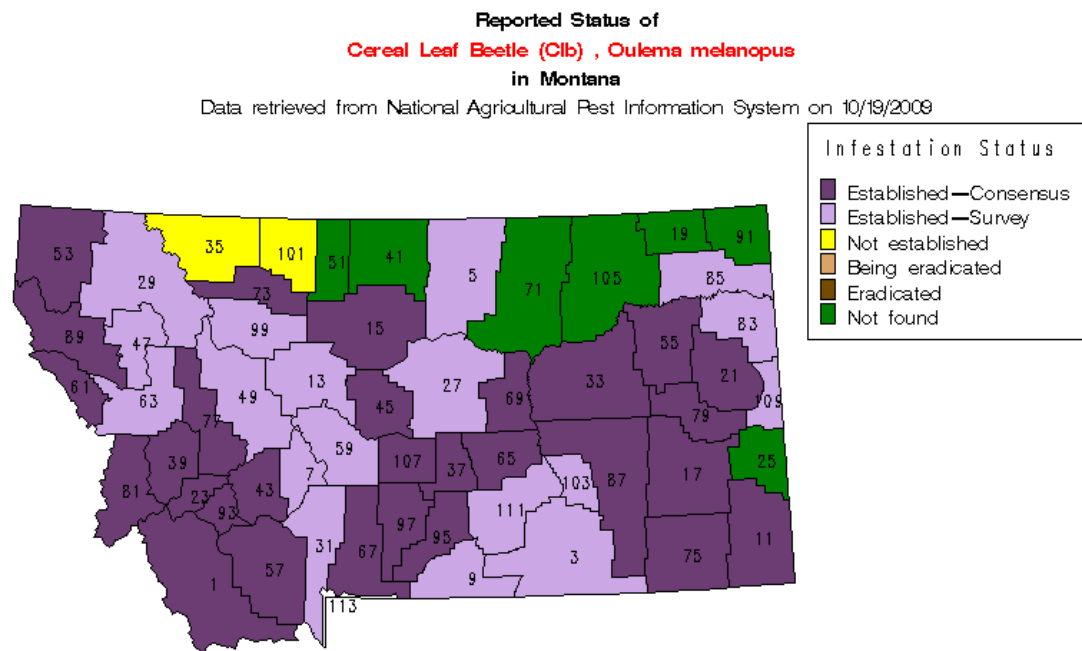
Image, Claude Pilon, www.bugguide.net

CLB larva parasitized by *T. julis*.

2009 sites positive for the presence of CLB and/or *Tetrastichus julis* (Walker)

Sample Number	County	CLB Adults	CLB larvae % TJ
SG10JUN09FLM001	BROADWATER	POSITIVE	No larvae
SG10JUN09FLM002	BROADWATER	POSITIVE	No larvae
SG14JUN09FLM002	YELLOWSTONE	POSITIVE	No larvae
SG14JUN09FLM003	YELLOWSTONE	POSITIVE	No larvae
SG15JUN09FLM002	BIG HORN	POSITIVE	10%
SG15JUN09FLM003	BIG HORN	POSITIVE	0%
SG15JUN09FLM004	BIG HORN	POSITIVE	No larvae
SG22JUN09FLM002	CASCADE	POSITIVE	No larvae
SG22JUN09FLM005	TETON	POSITIVE	66.67%
SG29JUN09FLM002	CHOUTEAU	POSITIVE	No larvae
SG18AUG09FLM001	FLATHEAD	POSITIVE	No larvae

RESULTS: Cereal leaf beetle was found at 11 sites in 7 counties; Broadwater, Yellowstone, Big Horn, Cascade, Teton, Chouteau, and Flathead. Larvae parasitized by *Tetrastichus julis* were recovered at two sites, one each in Bighorn and Teton counties.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.
Negative data spans over last 3 years only.

Gypsy Moth (GM) Detection Survey

Lymantria dispar (L.)

Gypsy moth (*Lymantria dispar* (L.)) was initially introduced into the Eastern U.S in the mid 1800's. It established rapidly and became a serious defoliating pest of various deciduous trees. The females oviposit on various surfaces, covering the eggs with hairs or scales. This insect is frequently moved on a variety of objects, such as RV's, firewood, furniture and other recreational equipment that has been left outdoors. The gypsy moth is the most destructive forest pest in the Eastern United States and large areas of the Northeastern US are under a federal quarantine to prevent the spread of this pest.

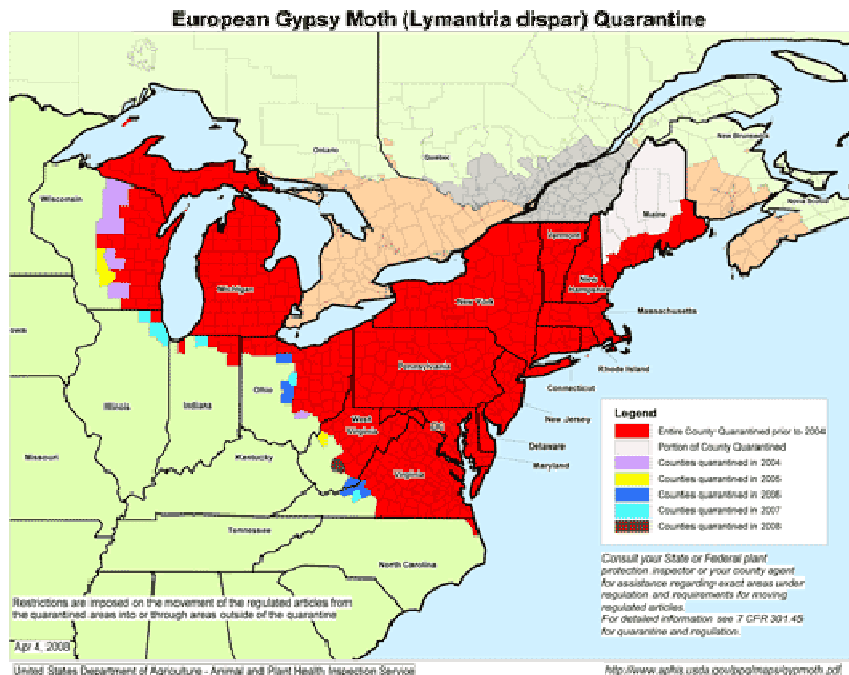


Image from <http://www.padil.gov.au>

Male Gypsy Moth

Traps are baited with a female sex-pheromone and only attract males.

Larvae are voracious predators and feed on over 500 different species of plants. Important native potential tree hosts of the Gypsy Moth in Montana include Aspen and Western Larch. Older larvae will also actively feed on Pines and Spruce. Many landscape plants, urban trees and shrubs across Montana would be subject to GM defoliation. There have been several positive GM traps in Montana in recent years: Cascade (1989, 1990), Gallatin (1988), Glacier (2001, 2003, 2007, and 2008), Lewis and Clark (1988), Liberty (1992), Missoula (1996), Park (2001), and Yellowstone (1993). All of these moths were certainly moved through anthropogenic means and this human caused movement of immobile egg masses and pupae represents the most significant entry pathway of the Gypsy Moth into Montana.

Major native Montana host plants are generally concentrated in the Western half of the state (see Western larch and quaking aspen distribution maps below), but suitable landscape and urban gypsy moth host plants can be found across Montana.



Gypsy moth caterpillar

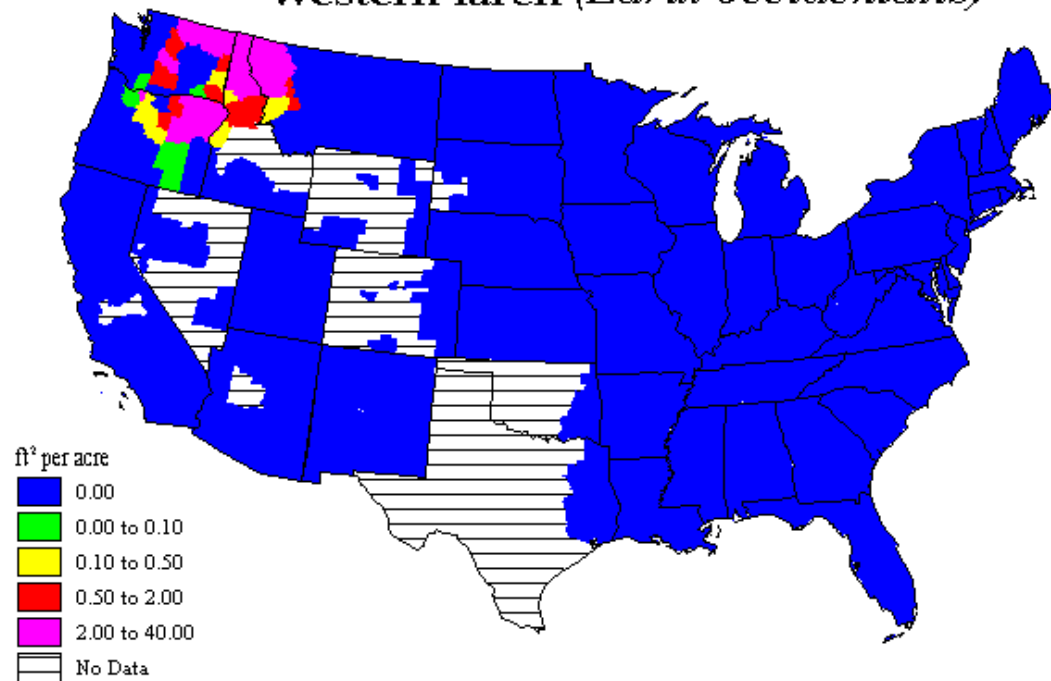
2009 MDA GYPSY MOTH TRAPS BY COUNTY	
# of Traps	County
15	BEAVERHEAD
1	MISSOULA
4	LAKE
25	RAVALLI
2	GRANITE
7	DEER LODGE
1	SILVER BOW
11	MINERAL
19	SANDERS
27	LINCOLN
20	FLATHEAD
10	LAKE
142	Total

In Montana, responsibility for the trapping of gypsy moth is a multi-agency cooperative effort between the USDA APHIS PPQ, The Montana Department of Agriculture (MDA), The Montana Department of Natural Resources & Conservation (DNRC), and the USDA Forest Service (USDA FS). The USDA APHIS PPQ is responsible for trapping in mainly the eastern portion of the state, while the MDA traps mainly in the western part of the state. The DNRC sets traps in Mineral and Missoula Counties and the USDA-FS sets traps in a large number of campgrounds, as well as other public recreation areas. All traps were placed by early June, and checked throughout the summer at two to three week intervals.

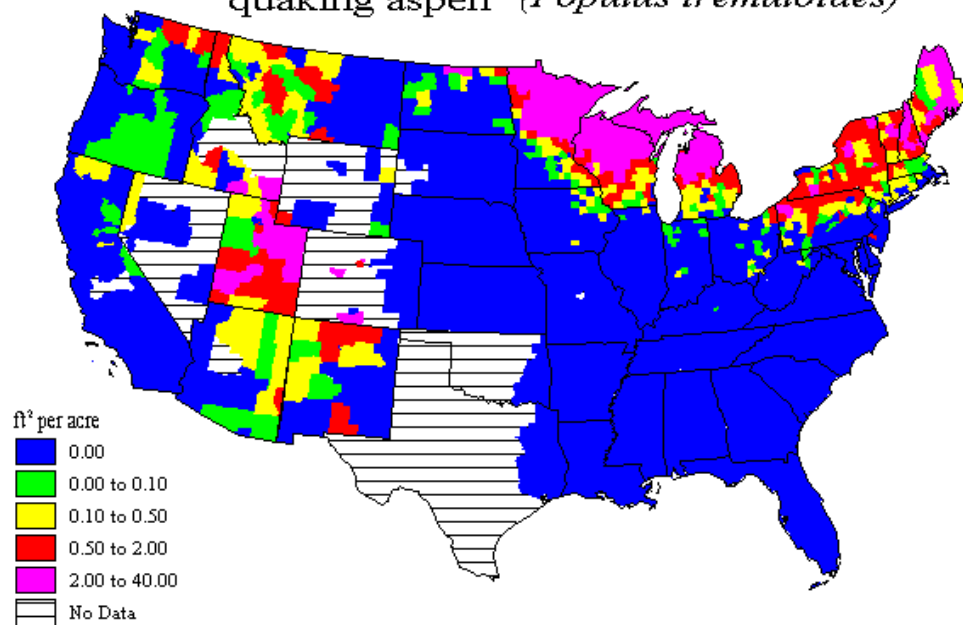
RESULTS: 142 GM traps were placed by MDA personnel in 2009. One trap (2 moths) in Lincoln County was confirmed positive for European Gypsy Moth by the USDA lab in Otis, MA. A more intense survey will take place in the area in 2010. The National Park Service trapped one male moth in the Many Glacier area of Glacier National Park in 2009. This area will also be trapped intensely in 2010.

Potentially important native Montana host plants of the Gypsy Moth

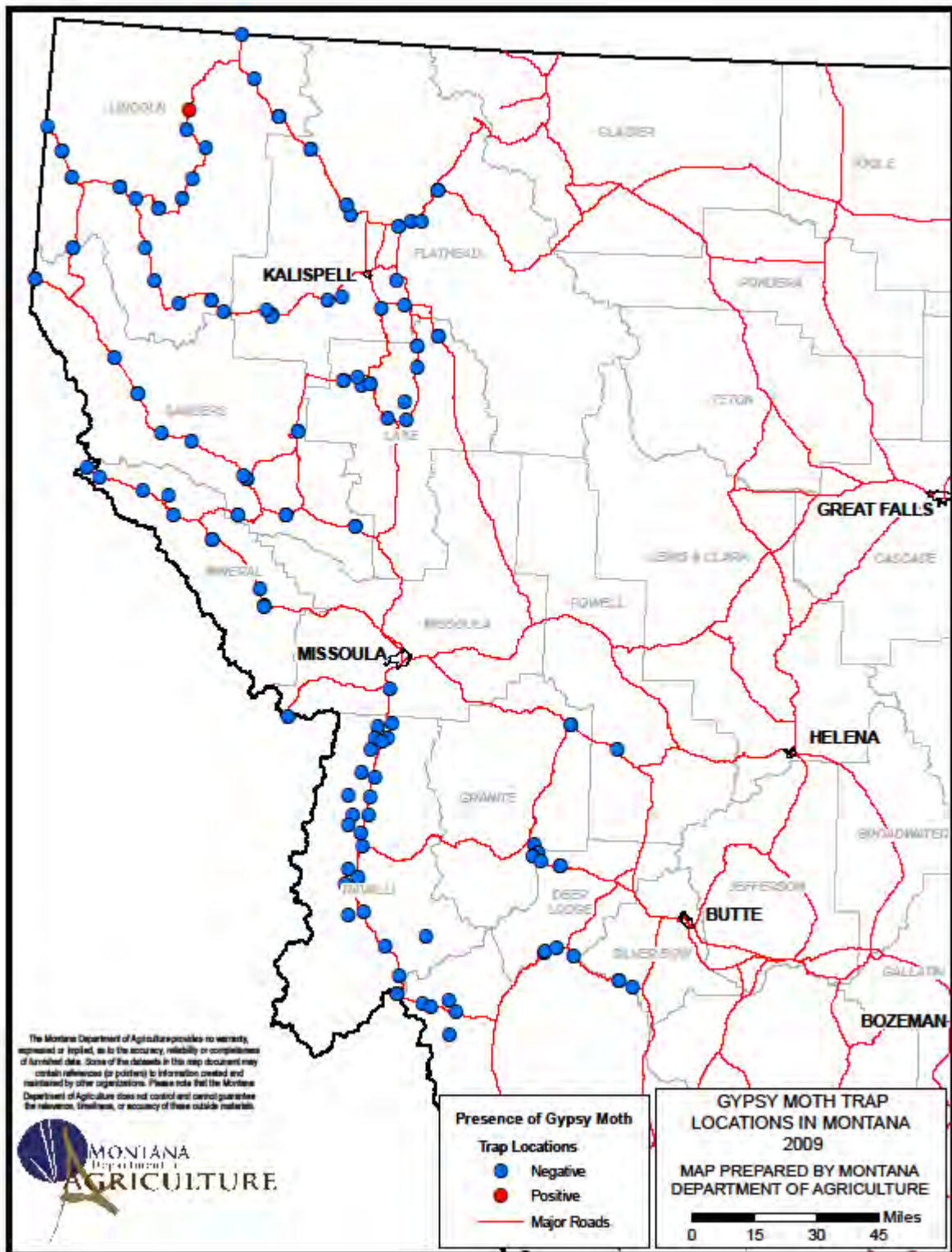
western larch (*Larix occidentalis*)



quaking aspen (*Populus tremuloides*)

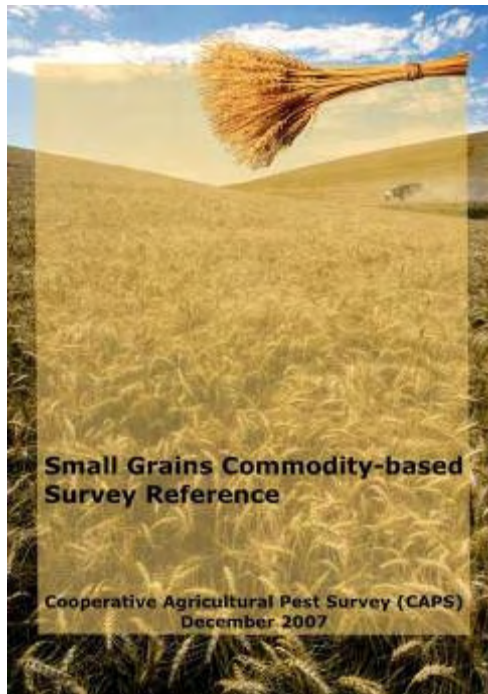


Locations of gypsy moth traps placed in Montana by MDA



Small Grains Commodity Based Survey (SG) Detection Survey

The USDA published guidelines for a small grains commodity based survey in 2008. The idea behind commodity based surveys is to target export commodities rather than individual pests. When undertaking a commodity based survey, multiple survey methods are used to take samples from a single commodity or group of similar commodities over a longer time period. In the small grains survey, the Department used sweep net samples, visual surveys, soil samples for nematodes, and whole plant samples for diseases. This methodology allows the survey to maximize the potential for pest detection and minimize the cost compared to several different surveys for individual pests.



The small grains survey targets 14 different types of exotic pests (see table 1 below) that could potentially damage small grains crops and negatively impact Montana exports. These pests include 8 arthropods, 2 mollusks, 3 nematodes, and 1 fungus like pathogen. In addition to the 14 exotic pests, samples were also screened for cereal leaf beetle and a number of other economically important nematodes and plant diseases.

Montana generally ranks in the top 5 nationally in the value of both wheat and barley crop production. Chouteau County, Montana is one of only two counties in the U. S. that produced over 20 million bushels of wheat in 2007.

Table 1. List of target species of the Small Grains Commodity Based Survey

Common Name	Species	Group
New Zealand Wheat Bug	<i>Nysius huttoni</i> White	Hemiptera: Lygaeidae
Old World Bollworm	<i>Helicoverpa armigera</i> Hübner	Lepidoptera: Noctuidae
Rice Cutworm	<i>Spodoptera litura</i> (F.)	Lepidoptera: Noctuidae
Egyptian Cotton Leafworm	<i>Spodoptera littoralis</i> (Boisduval)	Lepidoptera: Noctuidae
Owlet Moths	<i>Copitarsia</i> spp.	Lepidoptera: Noctuidae
Grape Berry Moth	<i>Lobesia botrana</i> (Denis & Schiffermuller)	Lepidoptera: Tortricidae
Silver-Y Moth	<i>Autographa gamma</i> (L.)	Lepidoptera: Noctuidae
African Black Beetle	<i>Heteronychus arator</i> F.	Coleoptera: Scarabaeidae
British Root-Knot Nematode	<i>Meloidogyne artiellia</i> Franklin	Nematoda: Meloidogyridae
Mediterranean Cereal Cyst Nematode	<i>Heterodera latipons</i> Franklin	Nematoda: Heteroderidae
Cereal Cyst Nematode	<i>Heterodera filipjevi</i> (Madzhidov)	Nematoda: Heteroderidae
Conical Land Snails	<i>Cochlicella</i> spp.	Pulmonata: Helicidae
Maritime Garden Snail	<i>Cernuella virgata</i>	Pulmonata: Hygromiidae
Philippine Downy Mildew	<i>Peronosclerospora philippinensis</i>	Oomycete

Since the initiation of the Small Grains Commodity Based survey, two of the target pests have been detected in North America for the first time. The Cereal Cyst Nematode was detected in Oregon (Union County) in 2008 (Smiley et al. 2008). This survey season, the Grape Berry Moth was detected in California (Napa County).



New Zealand Wheat Bug

Results: During the 2009 survey, 175 sweep net/visual survey samples were submitted. No suspect target pests were detected in any of the samples. Cereal Leaf Beetle (see CLB section) was detected in 11 samples. Economic levels of Wheat Stem Sawfly and Grasshoppers were found in a number of samples. Blister beetles populations (*Epicauta* sp.) were high in several samples and can be a pest in livestock feed, but no specific economic threshold have been established for Montana species.

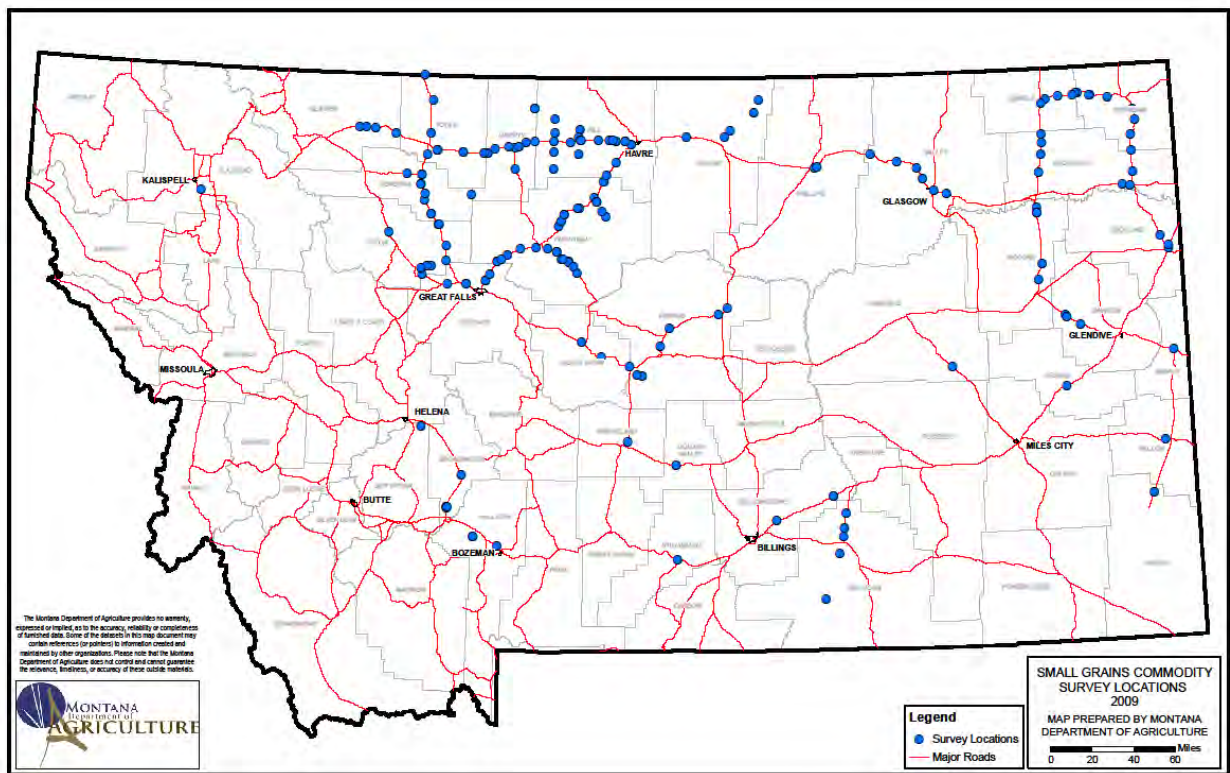
The Montana State University Plant Pathology lab processed 141 samples for plant diseases (see results table 2 below). Wheat Streak mosaic virus was detected in 7 samples. Wheat mosaic virus was detected in 2 samples. Triticum mosaic virus, rust, and barley and wheat yellow dwarf diseases were not detected in any of the samples. The abbreviations in table 2: Triticum mosaic virus = TriMV, Wheat Streak mosaic virus = WSMV, Wheat mosaic virus (High Plains virus) = WMoV(HPV), Barley yellow dwarf disease = BYDV-PAV, and Cereal yellow dwarf disease = CYDV-RPV

Soil samples for nematode detection analysis were sent to the University of Nebraska in Lincoln. *Heterodera trifolii* (Goffart), the clover cyst nematode, and *H. schachtii* Schmidt, the sugarbeet cyst nematode were tentatively identified morphologically pending DNA confirmation. Root lesion nematodes in the genus *Pratylenchus* were detected in several samples at levels that are probably causing yield reduction. For a complete list of nematodes detected in the samples see the table on page 29.

Table 2. Disease results. 0-negative, 1-positive. Orange rust diseases, green viruses.

Sample no.	Stripe Rust	Leaf Rust	Stem Rust	WSMV	WMoV(HPV)	TriMV	BYDV-PAV	CYDV-RPV
SG09JUN09FLM001	0	0	0	0	0	0	0	0
SG04JUN09BEC002	0	0	0	0	0	0	0	0
SG10JUN09FLM02	0	0	0	0	0	0	0	0
SG04JUN09BEC001	0	0	0	0	0	0	0	0
SG11JUN09FLM001	0	0	0	0	0	0	0	0
SG14JUN09FLM001	0	0	0	0	0	0	0	0
SG14JUN09FLM002	0	0	0	0	0	0	0	0
SG15JUN09FLM001	0	0	0	0	0	0	0	0
SG15JUN09FLM002	0	0	0	1	0	0	0	0
SG15JUN09FLM003	0	0	0	0	0	0	0	0
SG15JUN09FLM004	0	0	0	0	0	0	0	0
SG15JUN09FLM005	0	0	0	0	0	0	0	0
SG15JUN09FLM006	0	0	0	0	0	0	0	0
SG16JUN09FLM001	0	0	0	0	0	0	0	0
SG16JUN09FLM002	0	0	0	0	0	0	0	0
SG16JUN09FLM003	0	0	0	0	0	0	0	0
SG16JUN09FLM004	0	0	0	0	0	0	0	0
SG22JUN09FLM001	0	0	0	0	0	0	0	0
SG22JUN09FLM002	0	0	0	0	0	0	0	0
SG22JUN09FLM003	0	0	0	0	0	0	0	0
SG22JUN09FLM004	0	0	0	0	0	0	0	0
SG22JUN09FLM005	0	0	0	0	0	0	0	0
SG22JUN09FLM006	0	0	0	0	0	0	0	0
SG22JUN09FLM007	0	0	0	0	0	0	0	0
SG23JUN09FLM001	0	0	0	0	0	0	0	0
SG23JUN09FLM002	0	0	0	0	0	0	0	0
SG23JUN09FLM003	0	0	0	0	0	0	0	0
SG23JUN09FLM004	0	0	0	0	0	0	0	0
SG23JUN09FLM005	0	0	0	0	0	0	0	0
SG23JUN09FLM006	0	0	0	0	0	0	0	0
SG23JUN09FLM007	0	0	0	0	0	0	0	0
SG23JUN09FLM008	0	0	0	0	0	0	0	0
SG23JUN09FLM009	0	0	0	0	0	0	0	0
SG23JUN09FLM010	0	0	0	0	0	0	0	0
SG29JUN09FLM001	0	0	0	0	0	0	0	0
SG29JUN09FLM002	0	0	0	0	0	0	0	0
SG29JUN09FLM003	0	0	0	0	0	0	0	0
SG29JUN09FLM004	0	0	0	0	0	0	0	0
SG29JUN09FLM005	0	0	0	0	0	0	0	0
SG29JUN09FLM006	0	0	0	0	0	0	0	0
SG29JUN09FLM007	0	0	0	0	0	0	0	0
SG29JUN09FLM008	0	0	0	0	0	0	0	0
SG29JUN09FLM009	0	0	0	0	0	0	0	0
SG29JUN09FLM010	0	0	0	0	0	0	0	0
SG29JUN09FLM011	0	0	0	1	0	0	0	0
SG29JUN09FLM012	0	0	0	1	1	0	0	0
SG29JUN09FLM013	0	0	0	1	0	0	0	0
SG30JUN09FLM001	0	0	0	1	0	0	0	0
SG30JUN09FLM002	0	0	0	0	0	0	0	0
SG30JUN09FLM003	0	0	0	0	0	0	0	0
SG30JUN09FLM004	0	0	0	0	0	0	0	0
SG30JUN09FLM005	0	0	0	0	0	0	0	0
SG30JUN09FLM006	0	0	0	1	0	0	0	0
SG30JUN09FLM007	0	0	0	1	0	0	0	0
SG30JUN09FLM008	0	0	0	0	0	0	0	0
SG30JUN09FLM009	0	0	0	0	0	0	0	0
SG30JUN09FLM010	0	0	0	0	0	0	0	0
SG30JUN09FLM011	0	0	0	0	0	0	0	0
SG30JUN09FLM012	0	0	0	0	0	0	0	0
SG30JUN09FLM013	0	0	0	0	0	0	0	0
SG30JUN09FLM014	0	0	0	0	0	0	0	0
SG30JUN09FLM015	0	0	0	0	0	0	0	0

Small Grain Survey location in 2009



Karnal Bunt Detection Survey

Tilletia indica Mitra

Karnal Bunt (KB) is a fungal disease that affects wheat, durum wheat and triticale. The disease was discovered near Karnal, India in 1931, hence the name. KB was first detected in the United States in 1996, within the state of Arizona in durum wheat seed. Subsequently, the disease was found in portions of Southern California and Texas. The disease has never been detected in Montana field production. KB thrives in cool, moist temperatures as the wheat is starting to head out.

Karnal Bunt spores are windborne and can spread through the soil. Spores have the ability to survive within the soil for several years. Grain can also become contaminated by equipment. Therefore, controlling the transportation of contaminated seed is essential in preventing the spread to Montana production areas. In addition, early detection is essential if any type of control or eradication is to be attempted. Montana's participation in the annual karnal bunt survey is part of the early detection grid set out across the United States.



Credits: R. Duran, Washington State University www.forestryimages.org

Bunted Wheat

Montana's Grain Crop Production for 2008

ITEM	BUSHELS	RANK	% U.S. Total
All Wheat	164,730,000	5	6.6
Winter Wheat	94,380,000	5	5.1
Durum Wheat	10,830,000	4	12.9
Other Spring	70,500,000	6	12.0
Barley	37,740,000	3	15.7

<http://usda.mannlib.cornell.edu/usda/current/CropProdSu/CropProdSu-01-12-2006.txt>

RESULTS: Montana continued to sample for KB during the 2009 harvest. A total of 152 samples were collected from 34 counties across Montana. The USDA Laboratory in Olney, Texas conducted the testing. All samples tested negative for the presence of KB. This sampling

is critical for wheat growers in Montana. It confirms our wheat is free from KB, ensuring access to export markets.

Wheat Production in Montana (2008)

2009 Karnal Bunt Survey Numbers

County	2008 Production Total Bushels	# of 2009 KB Samples	County	2008 Production Totals Bushels	# of 2009 KB Samples
Choteau	22,923,000	23	Prairie	892,000	1
Hill	16,336,000	14	Wheatland	722,000	1
Roosevelt	5,907,000	8	Carter	1,150,000	1
Sheridan	5,840,000	7	Lake	895,000	1
Valley	7,077,000	7	Musselshell	603,000	0
Daniels	4,794,000	5	Stillwater	1,208,000	1
Fergus	6,922,000	7	Custer	737,000	0
McCone	4,597,000	5	Golden Valley	835,000	1
Liberty	8,274,000	7	Lewis & Clark	683,000	0
Toole	6,430,000	6	Beaverhead	696,000	0
Pondera	7,781,000	7	Madison	670,000	0
Blaine	5,524,000	5	Petroleum	718,000	0
Cascade	5,574,000	6	Treasure	604,000	0
Teton	7,712,000	6	Powder River	697,000	0
Richland	2,631,000	4	Park	363,000	0
Dawson	3,475,000	3	Meagher	297,000	0
Big Horn	4,420,000	4	Carbon	285,000	0
Glacier	4,187,000	4	Missoula	142,500	0
Phillips	3,498,000	3	Jefferson	153,000	0
Gallatin	2,856,000	3	Ravalli	105,500	0
Judith Basin	2,415,000	3	Sweet Grass	173,000	0
Garfield	3,179,000	2	Sanders	51,500	0
Yellowstone	3,236,000	2	Mineral	0	0
Broadwater	1,751,000	1	Deer Lodge	0	0
Flathead	1,095,000	1	Granite	0	0
Rosebud	1,742,000	1	Lincoln	0	0
Fallon	1,065,000	1	Powell	0	0
Wibaux	638,000	1	Silver Bow	0	0
			Totals	164,559,500	152

Sample	County	Results	Date Read	Sample	County	Results	Date Read
MT-105	Blaine	Negative	9/8	MT-101	Big Horn	Neg	10/8
MT-106	Blaine	Negative	9/8	MT-102	Big Horn	Neg	10/13
MT-107	Blaine	Negative	9/8	MT-103	Big Horn	Neg	10/13
MT-108	Blaine	Negative	9/8	MT-104	Big Horn	Neg	10/13
MT-109	Blaine	Negative	9/8	MT-110	Broadwater	Neg	10/8
MT-112	Cascade	Negative	9/8	MT-111	Carter	Neg	10/8
MT-113	Cascade	Negative	9/8	MT-133	Chouteau	Negative	9/9
MT-114	Cascade	Negative	9/8	MT-134	Chouteau	Negative	9/9
MT-115	Cascade	Negative	9/8	MT-135	Chouteau	Negative	9/9
MT-116	Cascade	Negative	9/8	MT-136	Chouteau	Negative	9/9
MT-117	Cascade	Negative	9/8	MT-137	Chouteau	Negative	9/9
MT-118	Chouteau	Negative	9/9	MT-138	Chouteau	Negative	9/9
MT-119	Chouteau	Negative	9/9	MT-139	Chouteau	Negative	9/9
MT-120	Chouteau	Negative	9/9	MT-140	Chouteau	Negative	9/9
MT-121	Chouteau	Negative	9/9	MT-141	Daniels	Neg	10/8
MT-122	Chouteau	Negative	9/9	MT-142	Daniels	Neg	10/8
MT-123	Chouteau	Negative	9/9	MT-143	Daniels	Neg	10/8
MT-124	Chouteau	Negative	9/9	MT-144	Daniels	Neg	10/8
MT-125	Chouteau	Negative	9/9	MT-145	Daniels	Neg	10/8
MT-126	Chouteau	Negative	9/9	MT-146	Dawson	Neg	10/8
MT-127	Chouteau	Negative	9/9	MT-147	Dawson	Neg	10/8
MT-128	Chouteau	Negative	9/9	MT-148	Dawson	Neg	10/8
MT-129	Chouteau	Negative	9/9	MT-149	Fallon	Neg	10/8
MT-130	Chouteau	Negative	9/9	MT-150	Fergus	Negative	9/9
MT-131	Chouteau	Negative	9/9	MT-151	Fergus	Negative	9/9
MT-132	Chouteau	Negative	9/9	MT-152	Fergus	Negative	9/9
MT-155	Fergus	Negative	9/14	MT-153	Fergus	Negative	9/9
MT-156	Fergus	Negative	9/14	MT-154	Fergus	Negative	9/9
MT-158	Gallatin	Negative	9/14	MT-157	Flathead	Neg	10/8
MT-164	Hill	Negative	9/8	MT-159	Gallatin	Neg	10/8
MT-165	Hill	Negative	9/8	MT-160	Gallatin	Neg	10/8
MT-166	Hill	Negative	9/8	MT-161	Garfield	Neg	10/8
MT-167	Hill	Negative	9/8	MT-162	Garfield	Neg	10/8
MT-168	Hill	Negative	9/8	MT-163	Golden Valley	Neg	10/8
MT-169	Hill	Negative	9/8	MT-181	Lake	Neg	10/13
MT-170	Hill	Negative	9/8	MT-189	McCone	Neg	10/8
MT-171	Hill	Negative	9/8	MT-191	McCone	Neg	10/13
MT-172	Hill	Negative	9/8	MT-192	McCone	Neg	10/13
MT-173	Hill	Negative	9/8	MT-193	McCone	Neg	10/13
MT-174	Hill	Negative	9/8	MT-194	Phillips	Neg	10/13
MT-175	Hill	Negative	9/8	MT-195	Phillips	Neg	10/13
MT-176	Hill	Negative	9/8	MT-196	Phillips	Neg	10/13
MT-177	Hill	Negative	9/8	MT-204	Prairie	Neg	10/13
MT-178	Judith Basin	Negative	9/14	MT-205	Richland	Neg	10/13
MT-179	Judith Basin	Negative	9/14	MT-206	Richland	Neg	10/13
MT-180	Judith Basin	Negative	9/14	MT-207	Richland	Neg	10/13
MT-182	Liberty	Negative	9/14	MT-208	Richland	Neg	10/13
MT-183	Liberty	Negative	9/14	MT-210	Roosevelt	Neg	10/13
MT-184	Liberty	Negative	9/14	MT-211	Roosevelt	Neg	10/13
MT-185	Liberty	Negative	9/14	MT-212	Roosevelt	Neg	10/13
MT-186	Liberty	Negative	9/14	MT-213	Roosevelt	Neg	10/13
MT-187	Liberty	Negative	9/14	MT-214	Roosevelt	Neg	10/13
MT-188	Liberty	Negative	9/14	MT-215	Roosevelt	Neg	10/13
MT-190	McCone	Neg	10/8	MT-216	Roosevelt	Neg	10/13
MT-197	Pondera	Negative	9/8	MT-217	Rosebud	Neg	10/13
MT-198	Pondera	Negative	9/8	MT-218	Sheridan	Neg	10/13
MT-199	Pondera	Negative	9/8	MT-219	Sheridan	Neg	10/13
MT-200	Pondera	Negative	9/8	MT-220	Sheridan	Neg	10/13
MT-201	Pondera	Negative	9/9	MT-221	Sheridan	Neg	10/13
MT-202	Pondera	Negative	9/9	MT-222	Sheridan	Neg	10/13
MT-203	Pondera	Negative	9/9	MT-223	Sheridan	Neg	10/13
MT-209	Roosevelt	Negative	9/14	MT-224	Sheridan	Neg	10/13
MT-226	Teton	Negative	9/14	MT-225	Stillwater	Neg	10/13
MT-227	Teton	Negative	9/14	MT-238	Valley	Neg	10/13
MT-228	Teton	Negative	9/14	MT-239	Valley	Neg	10/13
MT-229	Teton	Negative	9/14	MT-240	Valley	Neg	10/13
MT-230	Teton	Negative	9/14	MT-241	Valley	Neg	10/13
MT-231	Teton	Negative	9/14	MT-242	Valley	Neg	10/13
MT-232	Toole	Negative	9/14	MT-243	Valley	Neg	10/13
MT-233	Toole	Negative	9/14	MT-244	Valley	Neg	10/13
MT-234	Toole	Negative	9/14	MT-246	Wibaux	Neg	10/13
MT-235	Toole	Negative	9/14	MT-247	Yellowstone	Neg	10/13
MT-236	Toole	Negative	9/14	MT-248	Yellowstone	Neg	10/13
MT-237	Toole	Negative	9/14	MT-250	Glacier	Neg	10/13
MT-245	Wheatland	Negative	9/14	MT-251	Glacier	Neg	10/13
MT-249	Glacier	Negative	9/14	MT-252	Glacier	Neg	10/13

USDA-APHIS-PPQ-Karnal Bunt Project, Olney, TX

Emerald Ash Borer (EAB) Detection Survey

***Agrilus planipennis* Fairmaire**

The emerald ash borer (EAB) is an exotic and extremely damaging pest that attacks and kills ash trees (*Fraxinus* sp.). In hardwood forests of the Eastern United States, this beetle is a severe threat to native forest ecosystems, as well as urban landscape trees. While native ash in Montana and the Intermountain West is limited to riparian areas, ash is a very significant urban landscape tree. Due to its hardy nature and cold tolerances, green ash has been planted in some Montana neighborhoods at densities approaching 100%.



Emerald Ash Borer

The emerald ash borer is native to Asia, but was introduced into the Eastern United States sometime in the 1990's. It was first discovered in southeastern Michigan in 2002. It is suspected to have arrived in North America in solid wood packing materials (SWPM) used to ship commodities in the international market. Since 2002, EAB has been detected in Indiana, Illinois, Maryland, Michigan, Ohio, Pennsylvania, West Virginia, Wisconsin, Missouri, and Minnesota. EAB attacks and kills both healthy and stressed or dying trees, with the time from infestation to tree mortality being two to three years. It is estimated that EAB has killed 40 million ash trees in Michigan alone, with tens of millions more having been killed in other adjacent states.



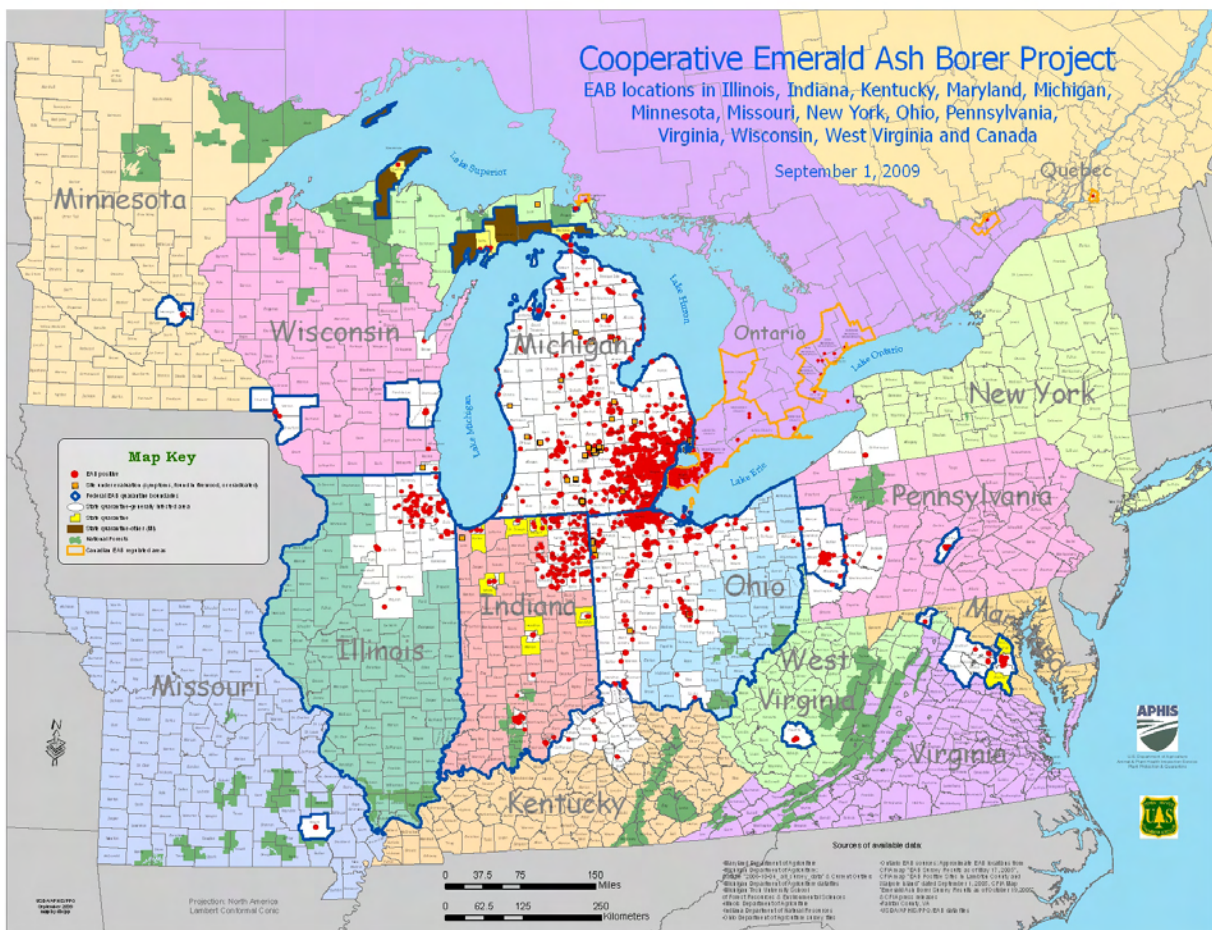
Declining ash due to EAB damage. www.entomology.wisc.edu



Emerald ash borer traps (image on left) are hung preferably in ash trees (*Fraxinus* sp.). The large purple trap, which is sticky on the outside, acts as a panel flight intercept trap, with insects that fly into the panels become irremovably stuck in Tanglefoot®. The trap is baited with a Manuka Oil lure that mimics the plant volatiles released by a damaged ash tree.

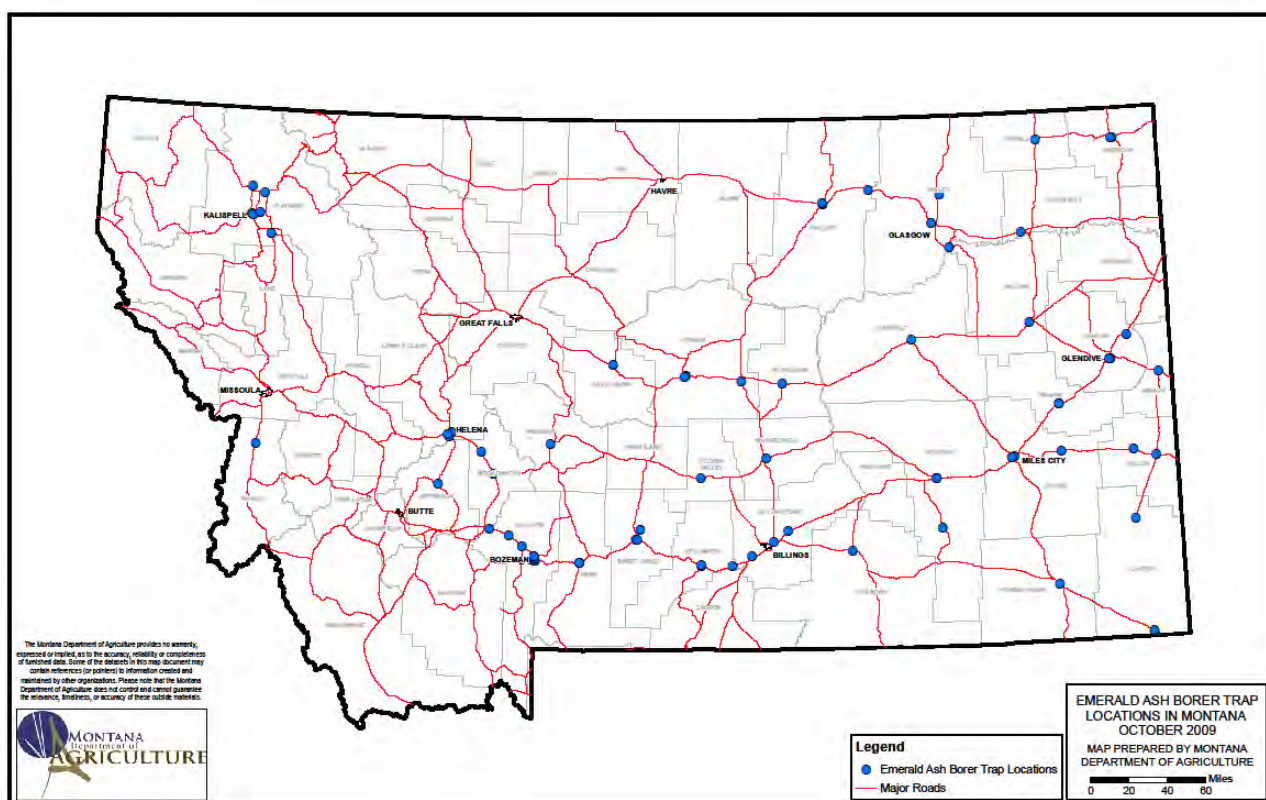
The map below shows (red dots) the current positive finds of EAB. In 2009, EAB was newly confirmed in the state of Minnesota.

Due to various outreach efforts across the state and nation regarding EAB and the general poor health of ash trees in Montana, the Department has started to receive reports from the public about suspect EAB in Montana. Each report is investigated on a case by case basis.



2009 MDA EMERALD ASH BORER TRAPS BY COUNTY			
# of Traps	County	# of Traps	County
1	MEAGHER	3	CARTER
2	PRAIRIE	3	STILLWATER
1	JEFFERSON	3	YELLOWSTONE
2	FALLON	3	ROSEBUD
1	RAVALLI	1	GARFIELD
11	GALLATIN	1	MCCONE
5	LEWIS AND CLARK	1	PETROLEUM
1	BIG HORN	3	FERGUS
2	SHERIDAN	1	WIBAUX
1	DANIELS	1	GOLDENVALLEY
3	PHILLIPS	1	MUSSELSHELL
3	VALLEY	3	SWEET GRASS
1	ROOSEVELT	1	JUDITH BASIN
4	DAWSON	2	BROADWATER
4	CUSTER	2	PARK
1	POWDER RIVER	8	FLATHEAD
		80	Total

Locations of EAB traps placed in Montana by MDA



RESULTS: No suspect EAB were trapped in 2009 by MDA personnel. The native species *Agrilus politus* (Say) and *A. granulatus* (Say) were caught in EAB traps in 2009 (see image below).



Agrilus politus (Say), image by I. Foley.

2009 Statewide Emerald Ash Borer Traps	
Agency	Total Number of Traps
MDA	80
DNRC	40
USDA-APHIS-PPQ	60
Total	180

European Pine Shoot Moth (EPSM)
***Rhyacoinia buoliana* (Denis & Schiffermüller)**
Quarantine Support Survey

Montana has had a quarantine for the European pine shoot moth (EPSM) since prior to 1962. This insect is a pest in the production of lumber, nursery trees and Christmas trees that are long-needled pines. Feeding by the larval stage in the growing tips causes death of leaders, resulting in trees with Y-shaped trunks, or other deformities, which are aesthetically unpleasing (lowering value in nursery and Christmas tree trade) or are not usable for major lumber markets due to a need for additional work to salvage merchantable trunks.

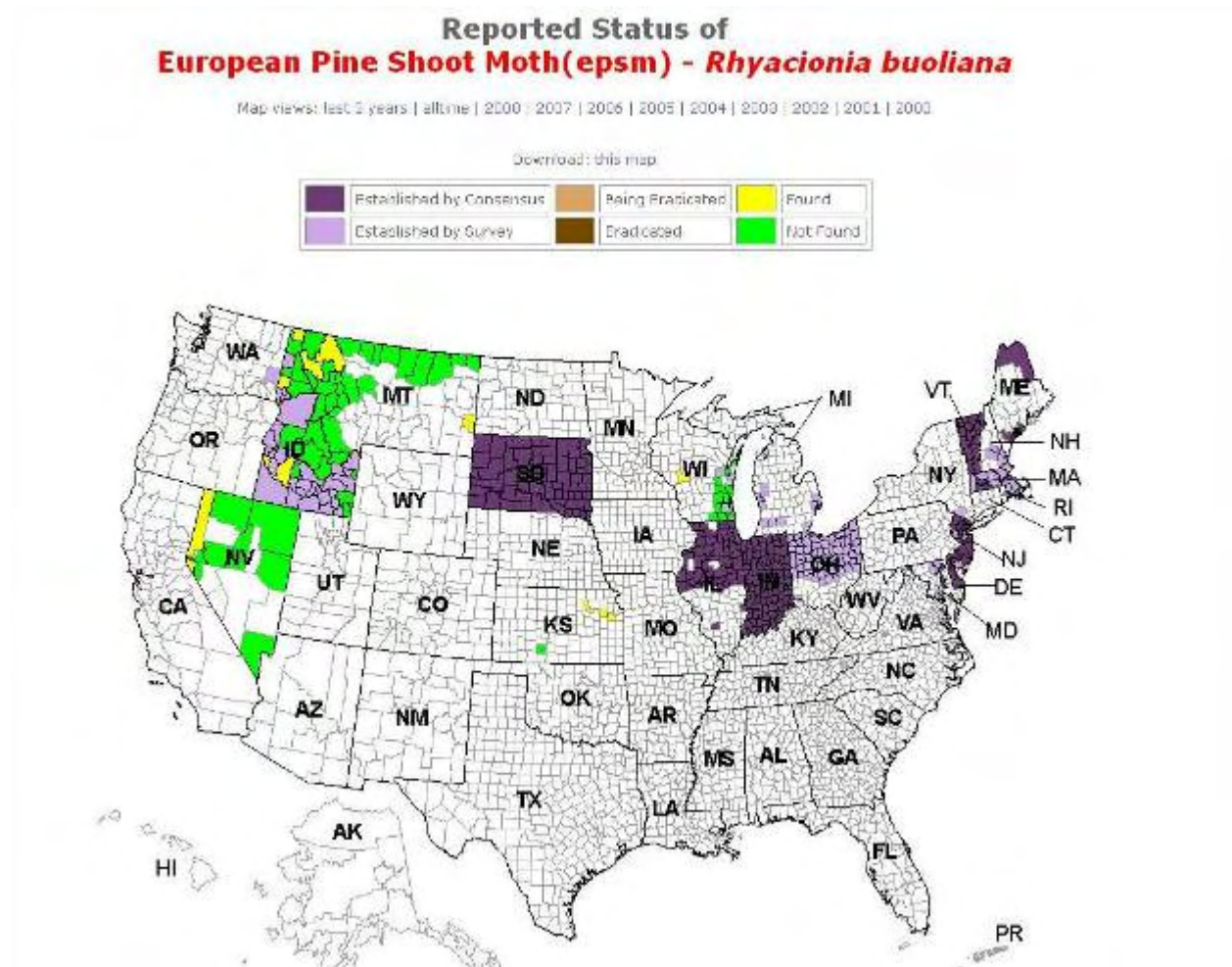


Adult European pine shoot moth, www.padil.gov.au

The insect itself is very small. The wingspan of the typical adult is under ¼ inch. However, the adult is very brightly colored, with orange and silver patterning on the wings. There are a number of native pine shoot moths with similar coloration, so identification is dependent on dissection of the male genitalia. The larvae initially feed in the tips of the branches in the new year's growth where they web the needles together for protection. Older larvae move to the needle sheath and mine into individual needles, after which they move on to the needle buds. They overwinter as larvae in the infested branch tips. Larvae emerge to feed again in the spring. This spring feeding is the most damaging, as it involves large larvae feeding on new foliage. The larvae pupate in the needle foliage in the tunnels and webbing they created while feeding. Moths emerge in mid-summer.

Monitoring for the EPSM is done using wing traps and species specific pheromones. These pheromones are attractive to the male moths, but female moths can also be caught in the traps.

The majority of the areas of concern for EPSM are in the western portion of the state, west of the continental divide. This area is trapped each year for the presence of EPSM. MDA is responsible for exotic moth trapping in high risk counties west of the continental divide. This includes the following counties; FLATHEAD, GRANITE, LAKE, LINCOLN, MISSOULA, MINERAL, POWELL, RAVALLI, and SANDERS. There are several native tortricid species in the genus *Rhyacionia* that occur in Montana.



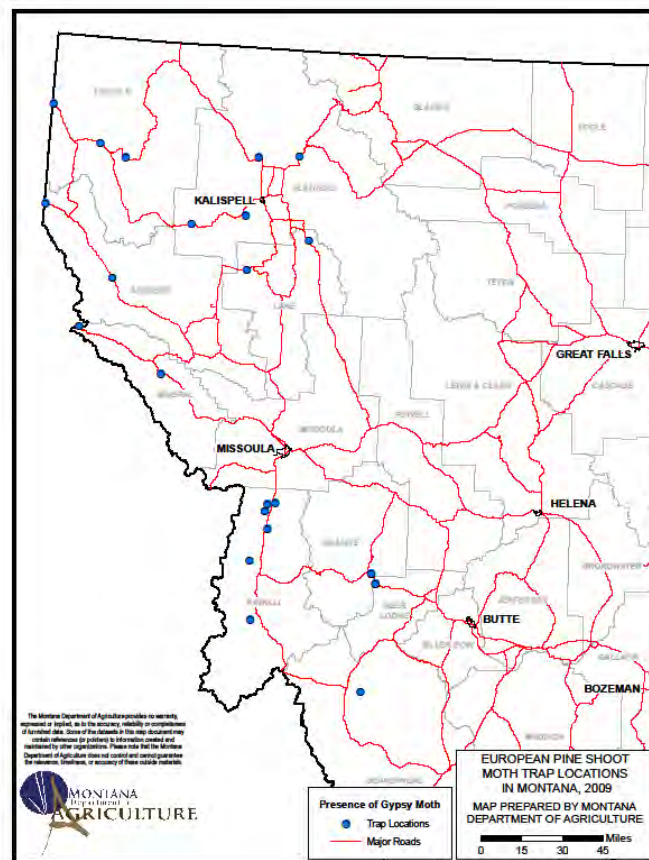
2009 MDA EUROPEAN PINE SHOOT MOTH TRAPS BY COUNTY			
# of Traps	County	# of Traps	County
1	BEAVERHEAD	2	SANDERS
2	MINERAL	3	LINCOLN
4	DEER LODGE	4	FLATHEAD
6	RAVALLI	2	LAKE
		24	Total



Figure 1. European pine shoot moth wing trap.

RESULTS: No traps were positive for EPSM in 2009. The Washington State Department of Agriculture regional Lepidoptera screening lab identified the following species in EPSM traps in 2009: *Ancylis mediofasciana* (Tortricidae), *Dichrorampha sedatana* (Tortricidae), *Grapholita imitativa* (Tortricidae), *Rhyacionia zozana* (Tortricidae), and *Sitochroa chortalis* (Crambidae).

Locations of EPSM traps placed in Montana by MDA



Pulse Crop Nematode Survey Export Support



William M. Brown Jr., www.Bugwood.org
Howard F. Schwartz, Colorado State University

Damage to an alfalfa field caused by the stem and bulb nematode, *Ditylenchus dipsaci*.

Nematodes can cause dramatic reductions in pulse crop yields. The nematodes surveyed for are primarily of regulatory significance and could negatively impact agricultural export markets if detected within Montana.

Damage caused by the pea cyst nematode, *Heterodera goettingiana* results in patches of stunted, bright yellow plants. Yellowing begins at the base of the plant with the older leaves and continues to move up the plant affecting the entire plant. Some of the affected plants may also die prematurely due to lack of chlorophyll. The roots of affected plants develop abnormally and nitrogen deficiency typically occurs due to a lack of nitrogen fixing nodules on the roots. As a result, seed production is also significantly reduced. The nematodes can persist for an extended period of time within the soil without a known host, yet cause significant damage when crops are planted again.

Montana Department of Agriculture employees collected 45 soil samples throughout Daniels, Roosevelt, Sheridan and Valley Counties. Crops represented in the samples included chickpeas, lentils, green peas, yellow peas and fallow fields.

Soil was analyzed for over thirty five nematode species, sixteen species of regulatory concern and nineteen other plant-parasitic genera, including: *Globodera rostochiensis*, *Globodera pallida*, *Ditylenchus destructor*, *Ditylenchus dipsaci*, *Meloidogyne chitwoodii*, *Meloidogyne fallax*, *Meloidogyne hapla*, *Meloidogyne javanica*, *Meloidogyne artiellia*, *Nacobbus abberans*, *Heterodera glycines*, *Heterodera latipons*, *Heterodera goettingiana* and *Pratylenchus* sp.

This information is important for Montana farmers in their management techniques and it also allows specific areas to be certified as free from some of these nematodes. This enables

Montana producers to gain access to a wider agricultural export market for their crops. Montana growers plant over 500,000 acres of pulse crops (dry peas, dry beans, lentils, and garbanzo beans) annually, harvested crops are valued at over \$50 million. Montana pulse crops are exported to many Asian and Middle Eastern countries including China, India, Pakistan, Egypt, Nepal, and Turkey.

RESULTS:

2009 NEMATODE SURVEY RESULTS		
Species of Regulatory or Economic Concern	Group	POSITIVE/NEGATIVE
<i>Bursaphelenchus xylophilus</i> (Steiner and Buhrer)	Pine wilt	NEGATIVE
<i>Ditylenchus destructor</i> Thorne	Potato rot	NEGATIVE
<i>Ditylenchus dipsaci</i> (Kühn)	Bulb and stem	NEGATIVE
<i>Globodera pallida</i> (Stone)	Potato cyst	NEGATIVE
<i>Globodera rostochiensis</i> (Wollenweber)	Potato cyst	NEGATIVE
<i>Heterodera glycines</i> Ichinohe	Soybean cyst	NEGATIVE
<i>Heterodera latipons</i> Franklin	Cereal cyst	NEGATIVE
<i>Meloidogyne arenaria</i> (Neal)	Root knot	NEGATIVE
<i>Meloidogyne artiellia</i> Franklin	Root knot	NEGATIVE
<i>Meloidogyne chitwoodi</i> Golden et al.	Root knot	NEGATIVE
<i>Meloidogyne fallax</i> Karssen	Root knot	NEGATIVE
<i>Meloidogyne hapla</i> Chitwood	Root knot	POSITIVE
<i>Meloidogyne incognita</i> (Kofoed & White)	Root knot	NEGATIVE
<i>Meloidogyne javanica</i> (Treub)	Root knot	NEGATIVE
<i>Meloidogyne mayaguensis</i> Rammah and Hirschmann	Root knot	NEGATIVE
<i>Nacobbus aberrans</i> (Thorne)	False root knot	NEGATIVE
Other Plant-Parasitic Genera	Group	POSITIVE/NEGATIVE
<i>Anguina</i>	Seed gall	NEGATIVE
<i>Aphelenchoides</i>	Bud and leaf	NEGATIVE
<i>Belonolaimus</i>	Sting	NEGATIVE
<i>Cactodera</i>	Cactus cyst	POSITIVE
<i>Ditylenchus</i> other species	Other	POSITIVE
<i>Helicotylenchus</i>	Spiral	POSITIVE
<i>Heterodera</i> other species	Cyst	POSITIVE
<i>Hemicycliophora</i>	Sheath	NEGATIVE
<i>Hoplolaimus</i>	Lance	NEGATIVE
<i>Longidorus</i>	Needle	NEGATIVE
<i>Mesocriconema</i>	Ring	POSITIVE
<i>Paratrichodorus</i>	Stubby root	NEGATIVE
<i>Paratylenchus</i>	Pin	POSITIVE
<i>Pratylenchus</i>	Root lesion	POSITIVE
<i>Quinisulcius</i>	Stunt	POSITIVE
<i>Rotylenchulus</i>	Reniform	NEGATIVE
<i>Trichodorus</i>	Stubby root	NEGATIVE
<i>Tylenchorhynchus</i>	Stunt	POSITIVE
<i>Xiphinema</i>	Dagger	POSITIVE
<i>Merlinius</i>	Stunt	POSITIVE

All samples were processed in the lab of Dr. Thomas O. Powers at the Department of Plant Pathology, University of Nebraska.

Meloidogyne hapla Chitwood, the northern root knot nematode was detected in a single sample. The northern root knot nematode affects many species of vegetables and weeds and can cause significant economic damage. Root lesion nematodes, *Pratylenchus* sp., are probably causing yield losses for some growers. Other plant parasitic genera that were detected were not found in high enough numbers to indicate that they are causing yield losses. Typically, genera such as *Paratylenchus* and *Quinisulcius*, only are injurious to crops when numbers approach 500-1,000 individuals per 100 cc of soil.



Pea field in Northeastern Montana.

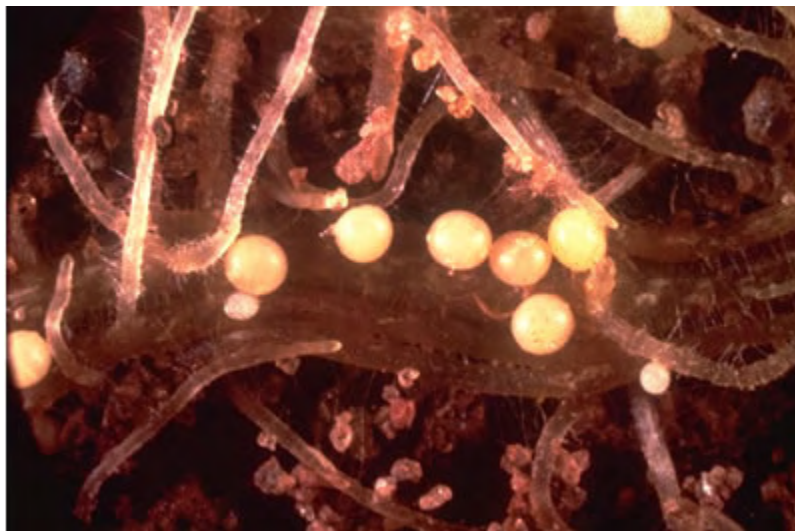
Potato Cyst Nematodes
***Globodera pallida* (Stone) & *G. rostochiensis* (Wollenweber)**
Detection Survey

INTRODUCTION

Montana is a supplier of seed potatoes for much of the Pacific Northwest. Because of this, it is imperative that the quality of Montana's potatoes, and their reputation, be maintained. Recently, *Globodera pallida* was found in Idaho, in commercial potato fields. In the aftermath of this find, several trading partners closed their doors not only to Idaho potatoes but also to other crops including nursery stock. In addition, farms in the "infested area" are undergoing treatments to eliminate the nematodes and operate under restrictions that create new challenges. If this organism were discovered on seed potatoes from Montana, there is a real possibility that it would destroy the seed potato industry. The Montana potato industry plants over 10,000 acres annually with crops valued at over \$30 million.

Shortly after this find, producers in Alberta (Canada) found golden cyst nematode (*Globodera rostochiensis*) in fields. This initiated international action again, with subsequent trace-forward action involving a Montana field.

The presence of either of these organisms in Montana would have devastating impacts on the seed potato industry. Action can be taken now to 1) systematically determine if these pests have invaded Montana and, 2) shield the potato industry by creating an internal quarantine system, so that if potato cyst nematodes were found in any area of the state, the remaining production areas could continue to ship.



Globodera pallida cysts, www.eppo.org/



Globodera rostochiensis cysts, www.eppo.org/

PLAN OF ACTION

A statewide survey of seed potato producers was developed to adequately represent and sample potato production areas. Surveys in 2009 were conducted in several counties with potato crops identified as economically important to Montana's export markets. The counties sampled in 2009 were Beaverhead, Gallatin, Madison, and Sheridan.

Samples were collected using USDA protocols. Each sample consisted of five pounds of soil per acre of crop in field that were just harvested from potatoes. Data collected included date of collection, collector, potato variety, seed generation, and field number.

RESULTS

Six grower operations were sampled for a total of 658 acres samples. Sample processing is ongoing, but so far, no positive samples have been found. This survey is planned to continue in the spring, prior to planting.

Status Report Japanese Beetle (*Popillia japonica* Newmann)

Billings, Montana 2009

Japanese beetles (JB) were discovered in Billings in 2001 near the Logan International Airport and have spread into the city of Billings over the following years. Early delimitation surveys found that the JB were in the neighborhoods below the Rimrocks, a series of dry sandstone cliffs immediately south of the airport. Thus far JB have only been found in an area within a one mile radius of the campus of Montana State University – Billings, near the intersection of Montana State Highway 3 and Rimrock Road. In 2008 an official regulated area was established to prevent the spread of infested material out of this area. The regulated area includes over 650 properties including many private homes and a few large landowners including MSU-B and Rocky Mountain College, the airport and other land managed by the City of Billings.

During 2009 an adaptive survey for JB was established in June, with a limited number of traps placed in areas that were found to have JB in previous years. Plastic JB traps baited with a floral scent and female sex pheromones were used to survey for JB adults (Figure 1). Throughout the summer whenever any of the traps were found to be positive additional traps were placed in the surrounding area to determine the full extent of the infestation.



Figure 1. Japanese beetle trap placed below Virginia creeper vines on the Leavens Pumping Station fence. This trap yielded more than 400 adult JB. The fence encloses a large area of well irrigated turf grass, some of which appears to be damaged by wild turkeys foraging for JB larvae.

Results: The first adult JB were detected in mid-July 2009, while adult emergence peaked by the first week of August and then decreased throughout the summer. By August 21, a total of 149 traps were placed and 49 were positive for JB (Figure 2). A total of 1,377 adult JB were captured during this period (Figure 3) and a total of 1,906 were captured in the area after first frost. This is almost ten times the combined total number of beetles captured in all the previous

years of the survey program. Over 92% of the JB adults were found around the Leavens Pumping Station on Rimrock Road which is managed by the City of Billings Public Works Department (Figure 1). This property is adjacent to MSU-B, where an additional 70 JB or 5% of the total JB captured were found across the campus and on University-owned rental properties. These results are consistent with previous years' surveys and suggest that a population has become established in this area. It also appears that the majority of the JB population is still localized in the center of the regulated area and only a few individuals are dispersing outwards. The furthest JB positive trap was found 0.8 miles south of the Leavens Pumping Station.

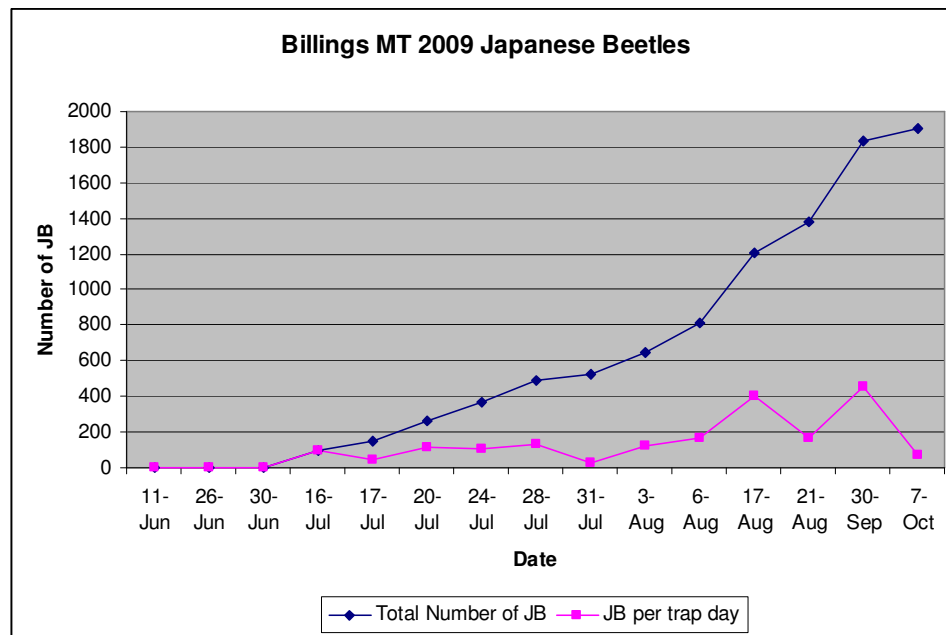


Figure 2. A total of 1377 JB adults were captured by the 21st of August, 2009 and 1,906 at the end of the flight season. The calculated number of JB adults per positive trap per day shows that adult beetle emergence peaks late in the summer.

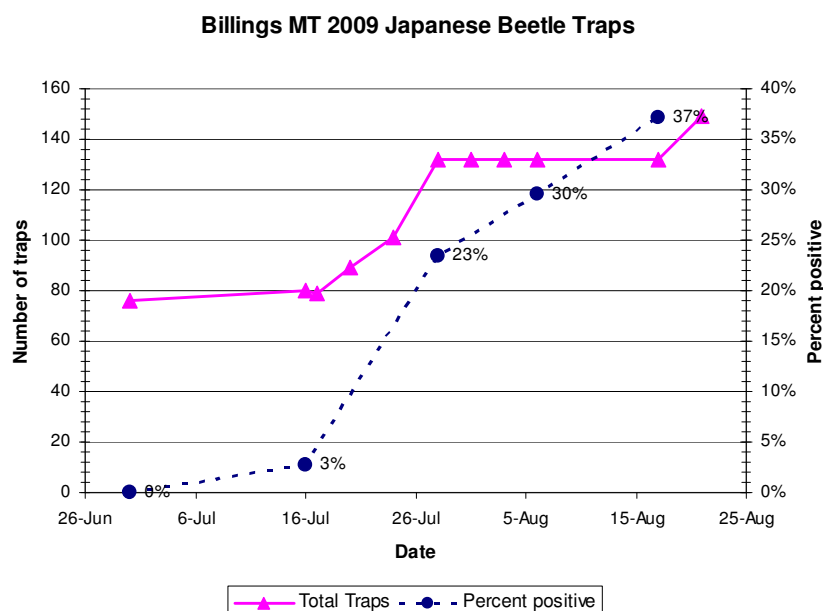


Figure 3. The number of traps placed in Billings was increased throughout the season in response to positive findings to a total of 149 traps (solid line). The percent of individual traps found with JB adults at least once during the season also increased (dotted line).

The Montana Department of Agriculture produced a new informational pamphlet to help homeowners and other land owners to voluntarily control JB on their properties. This year the City of Billings, Public Works Department has treated for both adult and larval JB. On August 4 and 25 a long lasting pyrethroid insecticide was sprayed on the Virginia creeper on the fences of the Leavens Pumping Station. The City also treated turf grass within the facility with Merit WS 75® on August 19 to eliminate larvae. Annual treatment of MSU-B grounds with Merit WS 75® is scheduled to continue during fall turf management on both campus lawns and University owned rental properties. The airport regularly treats for white grubs as part of their landscape maintenance program. The combined efforts of all the landowners within the regulated area are necessary to prevent further increases in the JB population. Long-term trends suggested by this year's results (Figure 4) make it clear that immediate action is needed if we hope to stop the spread of JB in Billings.

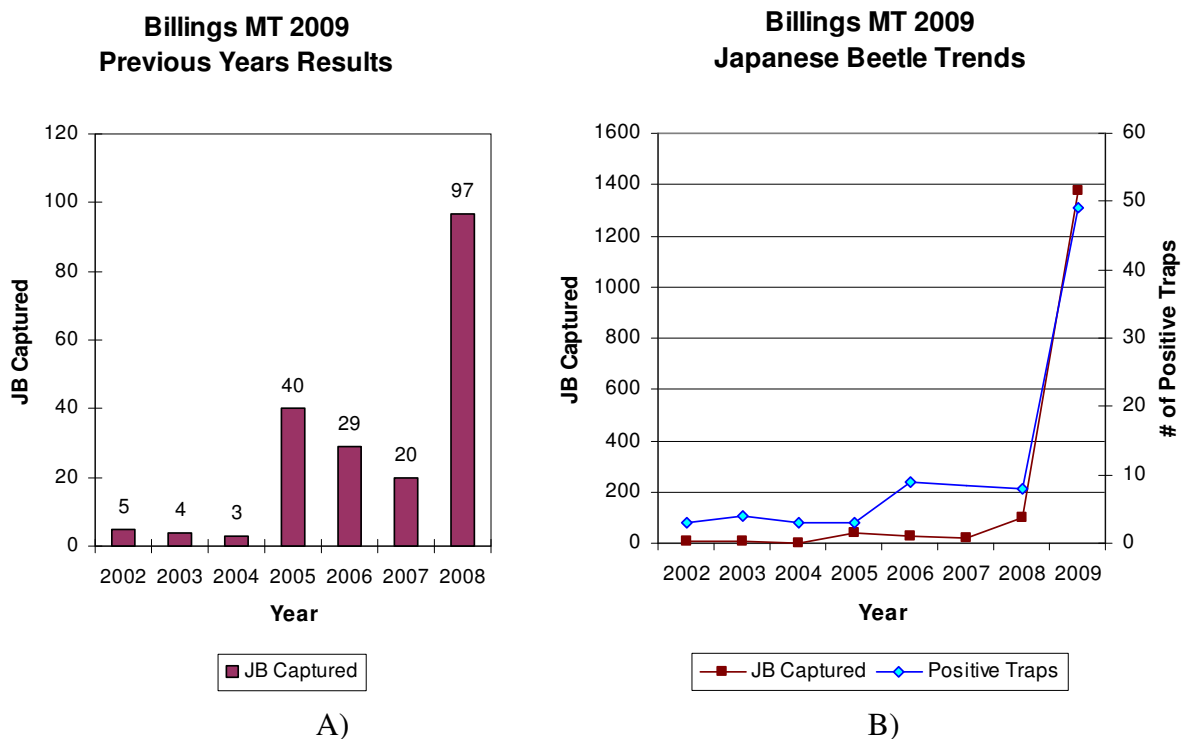


Figure 4.A) Results from 2002 to 2008 show an increasing number of JB captured. B) Trends from 2009 data indicate the potential for exponential increases in JB populations in Billings with a corresponding increase in JB distribution as seen in the number of positive traps.



Flathead County, Montana 2009 Delimitation Survey

In 2008 two adult male JB were captured in a surveillance trap near the loading dock of a nursery near Kalispell, MT. This area of Kalispell is located within the lower Flathead River valley and was traditionally wheat and canola farms and hay fields. There are also a number of nurseries, tree farms, sod farms and market gardens scattered throughout the valley that are threatened by any potential JB outbreak. Development within the last 20 years has greatly increased the number of private residences, some of which have extensive landscaping which may be susceptible to JB attack. Furthermore, this area is within 20 miles of the Flathead cherry orchards – an important cultural and agricultural product enjoyed throughout the state.

The discovery of JB initiated a delimitation survey of the lower Flathead Valley in the first week of June, 2009. A delimitation survey is used to determine the presence, location and extent of possible JB infestations, and is recommended by the National Plant Board's Japanese Beetle Harmonization Plan. The prescribed survey plan covers 49 square miles within a 7 x 7 mile grid (see Figure 7). JB traps are placed within the grid with at least 49 traps in the center, and decreasing to 25 traps in the surrounding inner grids, while the outermost grids have five traps per square mile. A total of 449 traps were baited with the floral scented and sex pheromone lures and distributed (Figure 5). Eight teams of 2-3 people from the staff of the Montana Department of Agriculture – Pest Management Bureau and USDA APHIS PPQ placed traps, mapped the location and recorded their positions using GPS units. Teams also recorded trap information in personal digital assistants (PDAs) provided by the USDA. It took approximately 2 days to complete the distribution of the traps.



Figure 5. Japanese beetle traps prepared for distribution.

Due to the rural and agricultural landscape, several traps were placed in habitats usually considered unsuitable for JB larval establishment, but that might provide food for adults during

dispersal (Figure 6.). These habitats also made locating traps difficult as crops and roadside plants grew. To facilitate future monitoring all of traps were revisited throughout June to adjust the hand-drawn maps and confirm GPS coordinates. Then every two to three weeks all 449 traps were inspected for JB, and monitoring continued throughout the summer.

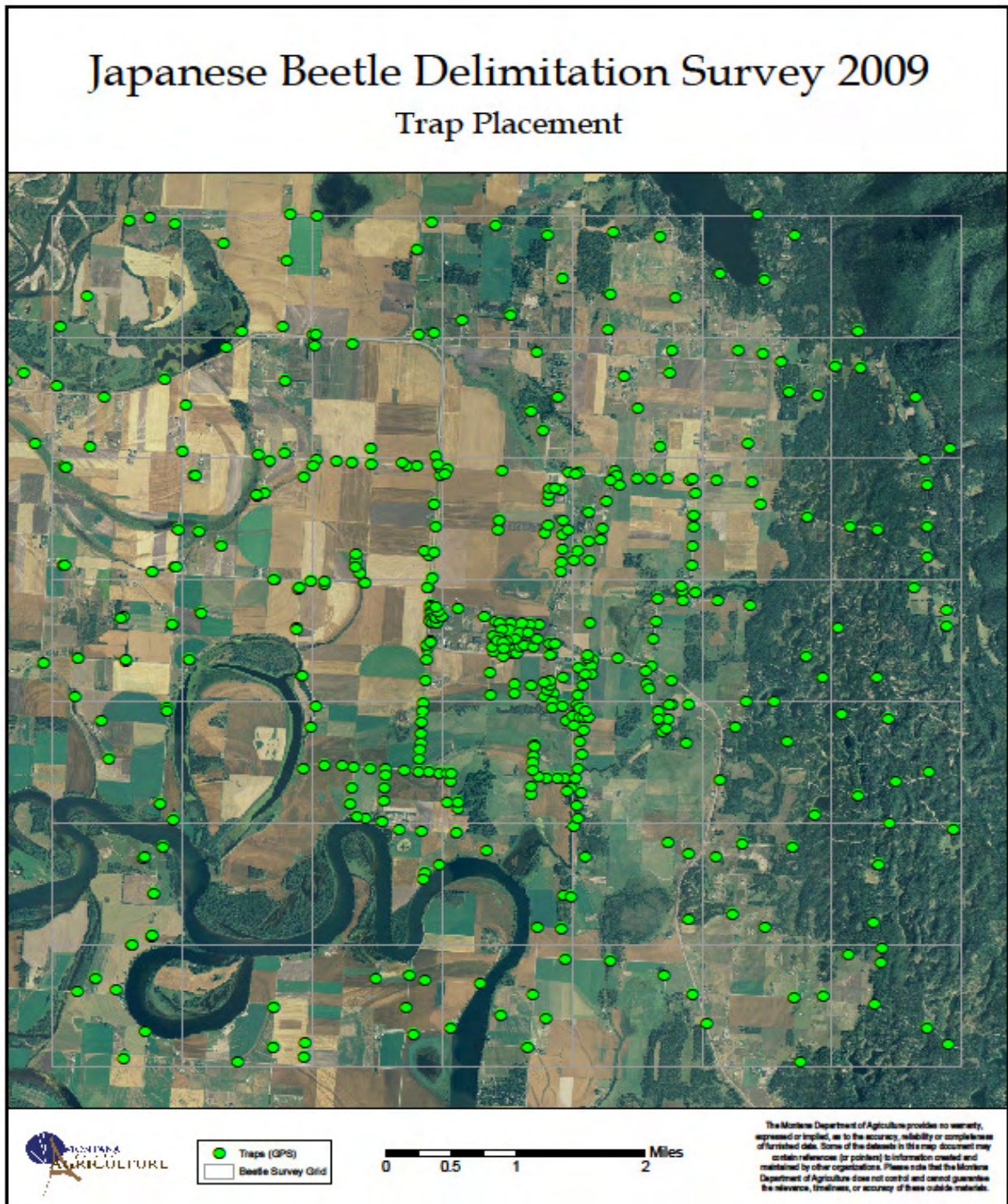


Figure 6. Japanese beetle traps placed within agricultural habitats in the lower Flathead River valley near Creston, MT in 2009.

Results: No JB were discovered in any of the traps in Flathead County. Accidental bi-catch included several species of bees, wasps, flies, butterflies, moths and beetles. Bees (Hymenoptera superfamily Apoidea) and ladybird beetles (Coleoptera family Coccinellidae) were collected from the bi-catch for further study.

The outermost traps were removed on the last week of August, and the remaining traps are scheduled for final inspection and removal in late September. From these results we can conclude that initial finding of JB must have come from “hitchhikers” on nursery stock delivered from an infested area. Continued monitoring of high-risk nurseries and plant retailers by both the business owners and MDA personnel is necessary to prevent future JB establishment in the Flathead area.

Figure 7. Location of delimitation survey traps 2009. All traps were negative for JB.



**Japanese Beetle Trapping
USDA APHIS PPQ
MONTANA AIRPORTS
2009**

The USDA APHIS PPQ traps for Japanese beetles at selected high risk airports within the state. Based on airport size, and number of flights from infested areas, traps are placed around the perimeter of the airports, and in any landscaping that might increase risk of JB infestation.

During 2009, the USDA APHIS PPQ placed and monitored 60 traps at seven airports. These were Billings (29 traps), Bozeman (5 traps), Butte (5 traps), Great Falls (5 traps), Helena (5 traps), Missoula (6 traps), and Kalispell (5 traps).

There were no detections of JB during the 2009 season in traps monitored by the USDA APHIS PPQ.

Multicolored Asian Lady Beetle Detected in Montana

In 2009, the Multicolored Asian Lady Beetle *Harmonia axyridis* (Pallas) was found in trap residues of EAB and JB traps in both Kalispell and Billings. The first report of this potential pest species was confirmed from Department CAPS trap residues from 2006 and 2007 (Foley et al. 2009).

Initially introduced into North America as a classic biological control agent of aphids, the multicolored Asian Lady beetle is now considered a pest itself. The negative impacts include a decrease in native predators, contaminant on, and physical damage to fruit, as a nuisance to apiculturists via seasonal aggregations in bee hives, and as a physical nuisance, source of bites, and even human allergens when seeking seasonal shelter in homes and other structures. Population levels of this beetle will continue to be informally monitored to see if they reach the extremes that have been seen in other states.

Figure 1. Multicolored Asian lady beetles attempting to enter a home.



Continental Divide Trail Project

The project started July 1, 2009 or as soon as travel was possible. We had a pre-meeting with the contractors to discuss what was expected. The project required the contractor to employ the following: two inventory personnel, four llamas, and one re-supply person.

Total area covered along the Beaverhead County / Idaho border along the Continental Divide was 310 miles. During this project the two inventory personnel monitored the border taking hundreds of photos and GPS points to correlate with photos.

Nothing alarming was found during the two month project. We had suspicions that Spotted Knapweed was coming at us from Idaho and this project showed that our suspicions was correct. One other species that was found right on top of the Divide that was a surprise was Hoary Alyssum. This species was found at about 7500 feet in elevation along a two track road.





Canada Thistle



Tall Buttercup



Hounds Tongue Hawk Weed

Final Report
Project Title: A Survey of Biological Weed Control Agents
Adventive to the US
Agreement #: MDA 10-30-003

December 17, 2009
Jeffrey Littlefield
Ann deMeij

Montana State University
Department of Land Resources & Environmental Sciences
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Watermillfoil Site - Lincoln Co., MT

INTRODUCTION

Numerous weed feeding arthropod species have been introduced into the United States. In some cases these organisms apparently arrived with their weedy host, where as others were intentionally released or became established by unknown means. Currently biological control agents of weeds are rigorously tested to determine their environmental safety prior to their introduction into the United States. These potential biocontrol agents are required to meet NEPA guidelines prior to APHIS issuing a 526 permit for their importation or interstate movement. A number of arthropod species which have not gone through the review process are or have been utilized for weed control. Some of these insects are “adventive” in that they were unintentionally introduced into the US but historically have had a limited distribution. Several biocontrol agents were “approved” prior to the enactment of NEPA. Although they were tested for host specificity the testing criteria was less rigorous compared to today’s standards. Some agents have been approved for release in Canada but not in the US, but may have already dispersed into the United States. To compound the issue a number of these arthropods have been collected and redistributed by commercial companies selling biological control agents. Recently APHIS has rescinded permits for interstate shipments of these insects. Little is known regarding the establishment or distribution of these adventive arthropods, or possible feeding on non-target plant species.

OBJECTIVES

The objectives of our survey were to determine in the State of Montana:

- The extent of establishment of these adventive insects
- The extent which they may utilize their weedy host; indicating possible impact
- If non-target impacts occur, i.e. feeding on other plant species

METHODS

Survey Organisms & Weed Hosts

Initially we conduct a survey of eleven arthropod species and their weedy hosts (Table 1). In the course of this survey we added the stem mining weevil, *Microplontus edentulus*, on scentless chamomile based on an additional survey of the literature of agents released in Canada. Also during the survey additional arthropod species and plant diseases were also observed and noted.

Survey Methods

This survey was conducted from mid June to late September depending upon the phenology (i.e. presence) of the insect. The survey was conducted primarily in western Montana (Figure 1) concentrating our efforts in counties bordering other states and Canadian provinces, major metropolitan areas, and/or in known weed infestations. The number of survey locations varied as to the extent of the weed infestation, e.g. more Canada thistle sites were sampled compared to scentless chamomile.

Table 1. Survey organisms and their host plants.

Arthropod	Feeding Habits	Host(s)
<i>Agonopterix alstroemeriana</i>	Defoliating moth	Poison hemlock- <i>Conium maculatum</i>
<i>Brachypterolus pulicarius</i>	Flower weevil	Toadflax – <i>Linaria</i> spp.
<i>Cassida rubiginosa</i>	Defoliating tortoise beetle	Musk thistle - <i>Carduus nutans</i> Canada thistle - <i>Cirsium arvense</i>


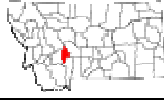
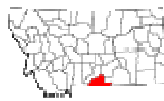
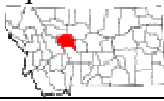

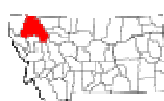
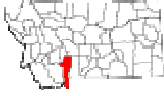
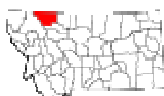
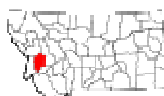
<i>Euhrychiopsis lecontei</i>	Stem mining weevil	Eurasian watermilfoil - <i>Myriophyllum spicatum</i>
<i>Gymnetron antirrhini</i>	Seed head weevil	Toadflax - <i>Linaria</i> spp
<i>Gymnetron tetrum</i>	Seed head weevil	Mullein - <i>Verbascum thapsus</i>
<i>Larinus planus</i>	Seed head weevil	Canada thistle - <i>Cirsium arvense</i>
<i>Microplontus edentulus</i>	Stem weevil	Scentless chamomile - <i>Tripleurospermum perforatum</i>
<i>Mogulones cruciger</i>	Crown weevil	Houndstongue - <i>Cynoglossum officinale</i>
<i>Omphalapion hookeri</i>	Seed weevil	Scentless chamomile - <i>Tripleurospermum perforatum</i>
<i>Rhopalomyia tripleurospermi</i>	Gall midge	Scentless chamomile - <i>Tripleurospermum perforatum</i>
<i>Trichosircalus horridus</i>	Crown weevil	Musk thistle - <i>Carduus nutans</i>



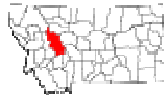





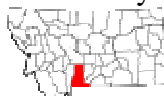





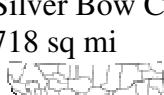


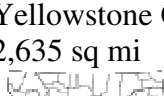
At each survey site the following information was recorded: GPS location, site/ habitat descriptions, size and estimated density of the host weed, and the estimated abundance and feeding intensity of the survey insect. Plants that are closely related to the weed host (i.e. same plant tribe) and that were adjacent to the site were also inspected for the survey insect and feeding. Most insects were readily identified in the field but immature insects were reared to the adult. During the survey additional arthropod species and plant diseases were observed and noted. Some of these organisms were also considered adventive where as others were known biocontrol agents that have been ‘approved’ for release.

Results

Approximately 223 sites were visited during this survey (Table 2). Often multiple weeds were surveyed at individual sites. In total 354 collections were made consisting of twenty four different plants and twenty four arthropod and/or pathogen species. Closely related plant species (to that of the target weed) were generally lacking at collection sites, therefore non-target impacts to these natives could not be estimated reliably. Summaries of the survey are provided for each different weed species or species groups (see below).

Figure 1. Montana counties surveyed.

Beaverhead County 5,543 sq mi 	Broadwater County 1,192 sq mi 	Carbon County 2,048 sq mi 
Cascade County 2,712 sq mi 	Deer Lodge County 737 sq mi 	Flathead County 5,099 sq mi 
Gallatin County 2,507 sq mi 	Glacier County 2,995 sq mi 	Granite County 1,728 sq mi 

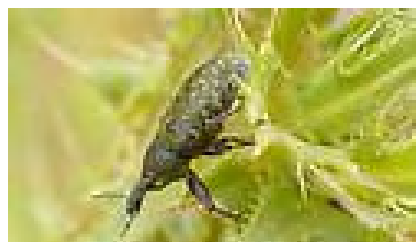
Jefferson County 1,657 sq mi 	Lake County 1,494 sq mi 	Lewis and Clark Co. 3,461 sq mi 
Liberty County 1,430 sq mi 	Lincoln County 3,613 sq mi 	Madison County 3,587 sq mi 
Mineral County 1,220 sq mi 	Missoula County 2,598 sq mi 	Park County 2,656 sq mi 
Park County 2,656 sq mi 	Pondera County 1,625 sq mi 	Powell County 2,326 sq mi 
Ravalli County 2,394 sq mi 	Sanders County 2,762 sq mi 	Silver Bow County 718 sq mi 
Teton County 2,273 sq mi 	Toole County 1,911 sq mi 	Yellowstone County 2,635 sq mi 

***Carduus/ Cirsium* Thistles - *Carduus nutans* (Musk thistle) & *Cirsium arvense* (Canada thistle)**

Several adventive organisms were found associated with *Carduus* and *Cirsium* thistles in Montana. These include: *Aceria anthocoptes*, *Cassida rubiginosa*, *Larinus planus*, and *Puccinia carduorum*.

Aceria anthocoptes was widely distributed in Montana (over 30% of sites N=58 sites). This mite is associated primarily with leaves of Canada thistle plants although wavyleaf thistle (*Cirsium undulatum*) was infested at one site in Yellowstone County, and a few mites were found on bull thistle (*Cirsium vulgare*) in Carbon County. The mite does not appear to have much impact on Canada thistle plants.

Cassida rubiginosa, a defoliating tortoise beetle, was also wide spread in western Montana. Over 55% of musk and Canada thistle sites (N=79) surveyed had evidence of beetle feeding. *Cassida* has two generations per year but adults were more prevalent in the spring.



Defoliation was variable



***Cassida rubiginosa*
(photo Giethoorn)**

ranging up to 60% or more. Generally defoliation was light (< 25%). Both musk and Canada thistles were fed upon and at several sites some light feeding was observed for wavyleaf and bull thistles.

The flower feeding weevil, *Larinus planus* was also widely distributed in Montana but somewhat localized (over 31% of sites N=58 sites). The weevil was slightly more common in northern Montana but populations were also found in Yellowstone and Carbon Counties. *Larinus* was found infesting primarily Canada thistle but was occasionally observed in wavyleaf and bull thistles. Weevil populations were relatively low and appeared to have limited impact on seed production of thistles.

The musk thistle rust, *Puccinia carduorum*, was accidentally intruded into Virginia and purposefully redistributed in 1987. It is now present in much of the eastern half of the US and in California, Oregon, and Wyoming. We observed the rust on musk thistle leaves and tertiary flower buds at three sites located in Deer Lodge, Granite and Ravalli Counties. Infections were only slight and were observed in late summer or early autumn. This is the first report of the rust in Montana.

The root crown feeding weevil *Trichosirca horridus* was initially released in Ravalli, Gallatin, Park, Yellowstone and Broadwater Counties in the 1980's. Now the weevil is widely distributed in western Montana. Musk thistle is its preferred host although Canada and bull thistle may also be attack (to a lesser degree on Canada thistle). One wavyleaf thistle plant in Gallatin County appeared to be infested with larvae although these were dead. It was not certain if these larvae were *T. horridus* or a *Baris* sp. which also infests *Cirsium*. At this site adult *T. horridus* were also found resting on the plant. Two biocontrol agents for Canada thistle, the stem gall fly *Urophora cardui* and the stem mining weevil *Ceutorhynchus litura* were also found at a number of sites.

***Centaurea* Knapweeds - Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*) & Diffuse knapweed (*Centaurea diffusa*)**

An eriophyid mite was collected on both diffuse and spotted knapweed. This mite has been tentatively identified as *Aceria* sp. although it is very similar to *Aceria thessalonicae*, an eriophyid investigated as a potential biological control agent of diffuse knapweed (Littlefield per. com.). The mite is widespread and was observed at 70% of the sites (N=17). This mite is a vagrant mite often associated with leaves and stems of the plant. In most cases mite populations were relatively low to moderate. The mite was also observed on ornamental knapweeds such as bigheaded knapweed (*Centaurea macrocephala*) and cornflower (*Centaurea cyans*). This is the first record on an eriophyid mite on *Centaurea* species in North America.



Puccinia. jaceae originates in Western Europe and first recorded in North American in 1988 from Oliver, BC. The rust appears to be fairly dispersed in the western US and Canada. One infested spotted knapweed plant was observed in Lewis and Clark County during this survey. An

adjacent diffuse knapweed plant was uninfected.

***Conium maculatum* (Poison hemlock)**

The defoliating moth *Agonopterix alstroemeriana* (Lepidoptera: Oecophoridae) was first recorded in North America in New York State in 1973. The moth has since been accidentally introduced to



***Agonopterix alstroemeriana*
(photo Coombs)**

the Pacific Northwest and has rapidly colonized poison hemlock infestations in the western US. In Montana the moth appears widely distributed being found at two thirds of the sites sampled (N=9). Defoliation of plants were at times heavy (90+%), although most of our sampling occurred while the larvae were still small. The moth appears to be specific to poison hemlock. Although we observed feeding on *Cicuta* species, this feeding was attributed to other lepidopteron species (probably Tortricidae).

***Cynoglossum officinale* (Houndstongue)**

Mogulones cruciger (Coleoptera: Curculionidae) is a root weevil released in 1997 in Canada for the biological control of hounds tongue. This weevil has not been approved for release in the US due to concerns regarding non-target impacts on native Boraginaceae. *Mogulones* is well established in many areas of Alberta and British Columbia. Adult specimens or suspect feeding damage has been reported in Montana, although the exact locations of collections were unknown (J. Story, Montana State University; M. Schwarzaender, University of Idaho; G. Markin, USFS per. comm.). During this survey, fifty six locations were sampled



throughout western Montana. No adults or larvae were collected although suspect feeding in the roots were observed at four sites located in Missoula, Pondera, and Toole Counties.

Another weevil similar in appearance, *Ceutorhynchus punctiger*, was collected on hound tongue in Gallatin County. This weevil did not appear to be feeding on hounds tongue. Its host has been reported as dandelion, *Taraxacum officinale*; which was intermixed with hound tongue at the sample site.

***Hypericum perforatum* (St Johnswort)**



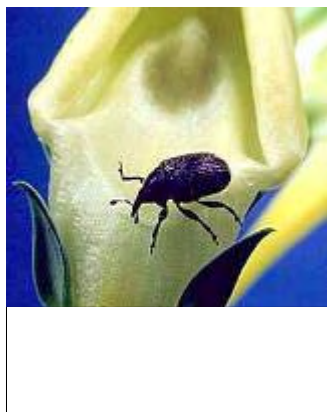
During this survey we also sampled St Johnswort. We observed an eriophyid mite *Aculus* sp. (probably (*Aculus hyperici* Family Eriophyidae). This mite appears to be widespread being found at 70% of the sample sites (N=10). This is a vagrant mite (non-gall forming), generally located at the leaf-stem axil or among flower bracts. Significant impact to the plant was not apparent; although some russetting of the leaves occurred. This lack of impact could be because mite populations were relatively low. *Aculus hyperici* has been introduced to Australian and New Zealand for the biological control of St Johnswort. Feeding by this species may result in the stunting of the plant.

Another biological control agent, *Aplocera plagiata* (Lepidoptera: Geometridae) was also observed in Lake County. This moth

appeared to have a limited distribution within Montana; the other known population that we are aware of is in Gallatin County. *Chrysolina* beetles were also found to be ubiquitous in Montana, although not recorded at every site.

***Linaria* Toadflaxes – *Linaria vulgaris* (Yellow toadflax) & *Linaria genistifolia* ssp. *dalmatica* (Dalmatian toadflax)**

Two flower/bud feeding beetles were accidentally introduced into the United States in the early 1900's. Both species were most likely brought in with contaminated yellow toadflax nursery stock. Both beetles are now wide spread in distribution in northeastern and northwestern North America.



The flower feeding weevil, *Gymnetron antirrhini*, was commonly observed feeding on yellow toadflax. Nearly 85% of yellow toadflax sites (N=26) had the weevil present. The weevil was not found on Dalmatian toadflax, with the exception of one site in Saunders County where the weevil was feeding on Dalmatian toadflax but did not infest the flower heads.

Another beetle, *Brachypterolus pulicarius*, was also common on yellow toadflax but to a lesser extent compared with *Gymnetron antirrhini*. *Brachypterolus* was collected at nearly 35% of the yellow toadflax sites and at only one Dalmatian toadflax site (Park County). Two other biocontrol agents, the stem mining weevil *Mecinus janthinus* and the defoliating moth *Calophasia lunula* were collected.

Nearly 30% of Dalmatian toadflax sites and only one yellow toadflax site in Mineral County had *Mecinus janthinus* feeding. Feeding by *Mecinus* on yellow toadflax in North America is uncommon. *Calophasia lunula* was observed feeding on both toadflax species but was less common (17% of sites) compared with other agents.

***Myriophyllum spicatum* (Eurasian watermilfoil)**



Eurasian watermilfoil, *Myriophyllum spicatum*, is an introduced aquatic weed widespread throughout much of the US. The only known occurrence in Montana is in the Noxon and Cabinet Reservoirs in Sanders County. *Euhrychiopsis lecontei* is a native stem mining weevil found across much of the Northern US. This weevil has been utilized as a potential biological control agent, but its presence and distribution is not known in Montana.

Thirty-one sites were inspected for Eurasian watermilfoil. Of these sites only one had *Myriophyllum spicatum* present (at a known infestation in the Noxon Reservoir. Nineteen sites had native watermilfoil present (either *Myriophyllum sibiricum* or *Myriophyllum verticillatum*). The native watermilfoils could not be differentiated since they were not in flower. One collection made at the Toston Dam, Broadwater County could be a possible hybrid between a native and Eurasian watermilfoils (similar leaflet numbers as Eurasian but turions were present). Other sites sample either had no watermilfoil present or had other aquatic plants (fanweed, coontail or pondweed). *Euhrychiopsis lecontei* was collected at two sites. One adult was collected in Lincoln County and several larvae were found in Broadwater County. At Broadwater County a moth larva was also found, but died before pupating. The moth, *Acentria ephemerella* (Lepidoptera:

Crambidae), is an European adventive widely distributed in the Lake States and Northeastern US and Canada, as well as central Alberta. An unidentified weevil (perhaps *Phytobius* sp.) was also collected in Lincoln, Granite and Teton Counties.

***Tripleurospermum perforatum* (Scentless chamomile)**

Tripleurospermum perforatum (= *Matricaria perforata*) has been a target for a biological control program in western Canada since 1992. Three agents have been released and established:

Rhopalomyia tripleurospermi a tip gall midge; *Omphalapion hookeri*, a flower feeding weevil, and *Microplontus edentulous*, a stem mining weevil. Scentless chamomile was not frequently encountered during our survey in Montana. Six locations were surveyed in Missoula, Pondera, Saunders, and Toole Counties. Most sites were roadsides or disturbed areas and were somewhat moist; at least during part of the growing season. A weevil (possibly *O. hookeri*) was found within the flowers of chamomile plants in Toole County, but none were located within the flower samples collected. At a nearby site, stems of some plants had emergence holes caused by a stem mining insect. It was not determined if this feeding was caused by *M. edentulous*. This was probably unlikely since the weevil has an apparent limited distribution in Canada (http://www.for.gov.bc.ca/HFP/biocontrol/agents/Microplontus_edentulus.htm).



Gymnetron tetrum (photo mantine)

***Verbascum thapsus* (Common mullein)**

The flower feeding weevil, *Gymnetron tetrum* was accidentally introduced into United States before prior to 1876 and to Washington State prior to 1942. The weevil is widespread in the eastern half of the US, and in the western half of the US is found in Oregon and California and has also been redistributed to Idaho, South Dakota and Wyoming. Fifty-five sites in Montana were surveyed. Weevils were observed at 19 sites widely distributed in the western half of Montana. Although adults have been observed elsewhere feeding on early developing flowers, in Montana we observed adults throughout the flowering period of common mullein. Weevil populations appear to be low. Typically we collected only a couple of adult weevils per plant, seldom more than five adults. Gross and Werner (1978) reported that up to 50 percent of seeds may be destroyed by the larval feeding of this species in Washington. However in Montana, weevil populations appear to be much lower than those found elsewhere in the western US. It is uncertain whether these populations will increase with time.



(photo jhwma.org)

Summary



Most of the adventive agents initially surveyed for were found to be widely distributed within western Montana, although populations tend to be somewhat localized. Impacts of these organisms on their weedy hoist appear somewhat limited, primarily due to low populations. It is uncertain whether these populations will increase with time or if they will remain relatively static due to environmental conditions or other factors. The possible utilization of native plants

by these adventive was not determined since there was limited overlap with the native plants and the related weed species. Many of our collection sites were located in disturbed habitats that may be less conducive to the establishment of many of the native species. Several new adventive species were also collected during this survey and are reported for the first time in the US.

Acknowledgements

We thank the assistance of C. Delphia, K. Puliafico and J. Peckham in the collection and preparation of samples. We also thank J. Story, A. Knutson, G. Markin and various land managers for suggesting potential collection sites. Special thanks to P. Denke (MDA) for assisting in the data entry and project coordination.

Table 3. Species codes used for plants, arthropods and pathogens (Plant codes – taken from Plants.gov Insect codes – first two letters of genus-species)

Plant Code	Plant Species	Common Name		Insect Code	Insect Species
CABOM	<i>Cabomba</i> species	Fanweed		ACAN	<i>Aceria anthocoptes</i>
CANU4	<i>Carduus nutans</i>	Musk thistle		ACsp	<i>Aceria</i> species
CEDE4	<i>Ceratophyllum demersum</i>	Coontail		Ausp	<i>Aculus</i> species
CEDI3	<i>Centaurea diffusa</i>	Diffuse knapweed		AGAL	<i>Agonopterix alstroemeriana</i>
CECY2	<i>Centaurea cyans</i>	Cornflower		APPL	<i>Aplocera plagiata</i>
CEDE15	<i>Centaurea dealbata</i>	Persian knapweed		BRPU	<i>Brachypterolus pulicarius</i>
CEMA9	<i>Centaurea macrocephala</i>	Bigheaded knapweed		CALU	<i>Calophasia lunula</i>
CEMO	<i>Centaurea montana</i>	Montane knapweed		CARU	<i>Cassida rubiginosa</i>
CEST8	<i>Centaurea stoebe</i> ssp. <i>micranthos</i>	Spotted knapweed		CELI	<i>Ceuthorhynchus litura</i>
CIAR4	<i>Cirsium arvense</i>	Canada thistle		EULE	<i>Euhrychiopsis lecontei</i>
CIRSI	<i>Cirsium</i> species	Thistles		GYAN	<i>Gymnetron antirrhini</i>
CISC2	<i>Cirsium scariosum</i>	Elk thistle		GYTE	<i>Gymnetron tetrum</i>
CIUN	<i>Cirsium undulatum</i>	Wavyleaf thistle		LAPL	<i>Larinus planus</i>
CIVU	<i>Cirsium vulgare</i>	Bull thistle		MEJA	<i>Mecinus janthinus</i>
COMA2	<i>Conium maculatum</i>	Poison hemlock		MIED	<i>Microplontus edentulus</i>
CYOF	<i>Cynoglossum officinale</i>	Houndstongue		MOCU	<i>Mogulones cruciger</i>
HYPE	<i>Hypericum perforatum</i>	St Johnswort		OMHO	<i>Omphalapion hookeri</i>
LIDA	<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>	Dalmatian toadflax		PUCA	<i>Puccinia carduorum</i>
LIVU2	<i>Linaria vulgaris</i>	Yellow toadflax		PUJA	<i>Puccinia jaceae</i>
MYRIO	<i>Myriophyllum</i> species	Watermilfoil		RHCO	<i>Rhinocyllus conicus</i>
MYSP2	<i>Myriophyllum spicatum</i>	Eurasian watermilfoil		RHTR	<i>Rhopalomyia tripleurospermi</i>
POTAM	<i>Potamogeton</i> species	Pondweed		TRHO	<i>Trichosircaus horridus</i>
TRPE21	<i>Tripleurospermum perforatum</i>	Scentless chamomile		URCA	<i>Urophora cardui</i>
VETH	<i>Verbascum thapsus</i>	Mullein		RHTR	<i>Rhopalomyia tripleurospermi</i>

Table 2. Listing of adventive agents and their plant host - 2009.

Weed	Agent Present	Latitude	Longitude	Location	Waypoint	Date
CANU4	RHCO	N47° 19' 43.3535	W115° 1' 20.0667	Beaverhead Co. – Rt 43 Powerhouse	Bvhd01	09/11/09
CANU4	RHCO	N46° 37' 21.1141	W111° 37' 29.5820	Broadwater Co. - Canyon Ferry Hellgate Rd & HWY 284	BW06	07/17/09
CANU4	CARU RHCO	N46° 9' 20.3037	W111° 29' 33.6551	Broadwater Co. – Frank Rd Jaapiella site	BW04	08/25/09
CANU4	CARU RHCO	N46° 29' 20.6246	W111° 31' 10.6140	Broadwater Co. – Lower Confederate Gulch Rd	BW07	07/17/09
CANU4	CARU RHCO	N46° 11' 40.2325	W112° 58' 11.0492	Deer Lodge Co. – Road to Lost Creek SP	DI2	08/11/09
CANU4	CARU PUCA RHCO	N46° 10' 12.7752	W113° 10' 12.1462	Deer Lodge Co. – Road to Warm Springs Picnic Area	DeerCn002	09/23/09
CANU4	TRHO RHCO	N48° 8' 51.8423	W114° 34' 41.0182	Flathead Co. – Ashley Lake Rd	Ad 11	07/22/09
CANU4	CARU RHCO	N45° 36' 17.7007	W110° 55' 36.8573	Gallatin Co. – Bear Canyon New World Trail	Galla2	09/02/09
CANU4	CARU TRHO	N45° 41' 54.8980	W111° 3' 27.9023	Gallatin Co. – Bozeman N 19th	T1	07/16/09
CANU4	TRHO RHCO	N45° 48' 54.0589	W111° 10' 10.3958	Gallatin Co. – N. Belgrade	Belg2	07/16/09
CANU4	TRHO RHCO	N45° 48' 54.0551	W111° 10' 10.3928	Gallatin Co. – N. Belgrade	Horr1	07/16/09
CANU4	CARU TRHO RHCO	N45° 48' 0.3118	W111° 11' 11.9360	Gallatin Co. – N. of Belgrade	Belg1	07/16/09
CANU4	CARU TRHO	N45° 48' 0.3118	W111° 11' 11.9343	Gallatin Co. – N. of Belgrade	Wavyleaf	07/16/09
CANU4	RHCO	N48° 25' 18.6717	W112° 53' 7.8469	Glacier Co. – Hyw 89	Ad12	07/23/09
CANU4	CARU TRHO RHCO	N46° 39' 35.4078	W113° 8' 48.2504	Granite Co. – Drummond Fairgrounds	Gran2	08/13/09
CANU4	CARU TRHO PUCA RHCO	N46° 9' 57.0069	W113° 19' 43.3897	Granite Co. – FS Rd 672 & 406	GranCn002	09/23/09
CANU4	RHCO	N45° 49' 21.1008	W111° 51' 6.9333	Jefferson Co. – Lewis & Clark Caverns	L&c cavern	07/17/09
CANU4	CARU RHCO	N47° 12' 12.8105	W114° 6' 41.3329	Lake Co. - Arlee	La02	09/09/09
CANU4	CARU TRHO	N46° 37' 27.1957	W111° 58' 51.1230	Lewis & Clark Co. – Near Helena	Lc7	09/03/09
CANU4	RHCO	N45° 18' 37.0182	W111° 58' 22.8367	Madison Co. – Granite Creek Rd	Mad7	08/05/09
CANU4	CARU	N47° 1' 18.0082	W113° 22' 49.4374	Missoula Co. – Harpers Lake	Ad8	07/22/09 07/30/09
CANU2	CARU TRHO RHCO	N45° 28' 59.7882	W110° 37' 16.3874	Park Co. – Mallards Rest Fishing Access	Mallards Rest	07/14/09
CANU4	RHCO	N48° 10' 32.0083	W112° 28' 47.0525	Pondera Co. – Hyw 89	Ad16	
CANU4	CARU TRHO RHCO	N46° 43' 21.3172	W112° 39' 56.6136	Powell Co. – Rt 114 near sawmill	Pow7	08/18/09
CANU4	CARU TRHO PUCA RHCO	N46° 15' 17.4540	W114° 11' 41.1970	Ravalli Co. – East Side Hwy s. Corvallis	RavaCn002	09/25/09
CANU4	CARU RHCO	N46° 35' 7.8982	W114° 4' 47.4808	Ravalli Co. – Near Poker Joe's Fishing Access	Rav2	08/12/09
CANU4	TRHO RHCO	N47° 19' 32.0477	W114° 12' 23.0467	Sanders Co. - Bison Range	Agrilus002	06/18/09
CANU4	CARU RHCO	N47° 31' 42.2243	W111° 14' 16.1081	Teton Co. – Eyraud Lakes	Teton01	09/04/09

CANU4	RHCO	N47° 59' 27.6496	W112° 19' 4.3947	Teton Co. – Road to Byrum	Ad17	07/23/09
CANU4	TRHO RHCO	N48° 27' 49.0568	W111° 28' 39.6487	Toole Co. – N. of Devon Rd	ToolCn001	09/13/09
CANU4	RHCO	N45° 16' 41.0154	W109° 12' 30.1102	Toole Co. - Shelby	ToolCn002	09/15/09
CIAR4	CARU	N44° 58' 31.2853	W112° 54' 39.6307	Beaverhead Co. – Red Rock	Red	07/22/09
CIAR4	CARU	N45° 16' 35.0307	W112° 30' 49.8247	Beaverhead Co. – Stone Creek Raceway	Bh1	08/05/09
CIAR4		N46° 37' 21.1141	W111° 37' 29.5820	Broadwater Co. - Canyon Ferry Hellgate Rd & HWY 284	BW06	07/17/09
CIAR4	ACAN	N46° 9' 20.3037	W111° 29' 33.6551	Broadwater Co. – Frank Rd Jaapiella site	BW04	08/25/09
CIAR4	LAPL CARU URCA ACAN	N45° 59' 15.0859	W108° 7' 9.0571	Carbon Co. – Hw 310 & Edgar Rd	CarbCa002	09/21/09
CIAR4	LAPL URCA	N45° 20' 8.6434	W109° 10' 53.4817	Carbon Co. – S. of Roberts	CarbCa001	09/20/09
CIAR4	CARU	N47° 9' 43.8484	W111° 49' 19.9068	Cascade Co. – Great Falls Big Springs SP	Cas3	09/04/09
CIAR4	CARU	N46° 37' 25.9683	W111° 58' 50.9578	Cascade Co. – I-15 exit 244	Cas1	09/03/09
CIAR4	CARU ACAN	N46° 11' 40.1810	W112° 58' 11.0720	Deer Lodge Co. – Galen	DI3	08/11/09
CIAR4		N46° 5' 48.3368	W112° 50' 28.8091	Deer Lodge Co. – Near Opportunity	DI1	08/11/09
CIAR4		N48° 7' 57.8053	W114° 34' 43.6635	Flathead Co. – Ashley Lake Rd	Ad 10	07/22/09
CIAR4	LAPL CELI	N48° 11' 59.0236	W114° 58' 47.8484	Flathead Co. – Lynch Lake	FlatH01	08/19/09
CIAR4	TRHO	N45° 41' 54.8980	W111° 3' 27.9023	Gallatin Co. – Bozeman N 19th	T1	07/16/09
CIAR4	CARU	N45° 39' 24.8855	W110° 56' 46.6008	Gallatin Co. – E. of Bozeman	Galla1	09/02/09
CIAR4	CARU ACAN	N45° 40' 7.8832	W111° 3' 10.2808	Gallatin Co. - MSU	MSU	09/22/09
CIAR4	CARU	N45° 53' 56.9537	W111° 32' 0.3787	Gallatin Co. – Three Forks Ponds	3forks ponds	07/17/09
CIAR4	LAPL ACAN	N48° 51' 16.7341	W112° 14' 4.1462	Glacier Co. – Hay Lake Rd	GlacCa002	09/13/09
CIAR4	LAPL ACAN	N48° 34' 39.1393	W112° 51' 40.1019	Glacier Co. – HY2 Sullivan Bridge	GlacCa001	09/10/09
CIAR4	CARU LAPL ACAN	N46° 39' 40.4469	W113° 8' 52.6476	Granite Co. – Drummond Fishing Access	Gran1	08/13/09
CIAR4	CARU RHCO	N45° 54' 57.0199	W111° 44' 30.6680	Jefferson Co. – Boulder cut-off Rd	J4	08/11/09
CIAR4	CARU	N47° 10' 8.5604	W114° 4' 51.9037	Lake Co. – Jacko River Fish Hatchery	La01	09/09/09
CIAR4	CARU	N47° 17' 51.8656	W114° 8' 37.4538	Lake Co. - N. Polson	La04	09/09/09
CIAR4	TRHO	N46° 37' 27.1957	W111° 58' 51.1230	Lewis & Clark Co. – Near Helena	Lc7	09/03/09
CIAR4	CAUR	N46° 37' 4.5422	W112° 3' 30.5121	Lewis & Clark Co. – Helena Fairgrounds	Lc4	09/03/09
CIAR4		N47° 15' 9.2164	W112° 3' 49.4070	Lewis & Clark Co. – RT 287 mile post 14 N	Lc2	08/07/09
CIAR4	LAPL URCA ACAN	N48° 33' 26.7938	W111° 46' 20.2021	Liberty Co. – Black Jack Rd	LibeCa001	09/15/09
CIAR4	CARU	N48° 19' 15.5110	W111° 4' 10.1665	Liberty Co. - Joplin	LibeCa002	09/15/09
CIAR4	LAPL CARU	N48° 52' 37.0118	W115° 3' 10.0291	Lincoln Co. - Eureka	Eureka1	07/29/09

CIAR4	LAPL	N48° 45' 0.1833	W114° 59' 25.8192	Lincoln Co. – Fortine Meadow Creek Rd	Fortine003	07/30/09
CIAR4	LAPL	N48° 44' 57.2882	W114° 56' 32.0768	Lincoln Co. – Fortine Marl Lake Rd	Fortine 002	07/30/09
CIAR4	LAPL	N48° 44' 57.2882	W114° 56' 32.0768	Lincoln Co. – Fortine Marl Lake Rd	Fortine 002	07/30/09
CIAR4	LAPL	N48° 45' 53.3204	W114° 53' 54.5681	Lincoln Co. – Fortine roadside river park	Fortine	07/30/09
CIAR4	LAPL	N48° 51' 38.3098	W114° 55' 46.8181	Lincoln Co. – Therriault Road	Therri	07/30/09
CIAR4		N45° 26' 35.7870	W111° 42' 21.4633	Madison Co. – Meadow Lake Fishing Access	Mad3	08/05/09
CIAR4	CARU	N47° 34' 24.2764	W115° 9' 56.3355	Mineral Co. – RT 135 near Co. line	Min01	09/09/09
CIAR4	CARU LAPL URCA ACAN	N48° 45' 11.1858	W113° 56' 33.6488	Missoula Co. - Miller Creek Rd	MissCa002	09/24/09
CIAR4	CARU ACAN URCA	N46° 22' 43.8396	W112° 44' 11.0321	Missoula Co. – S. of Lolo	Mis1	08/12/09
CIAR4	CARU URCA CELI	N45° 39' 37.1026	W110° 44' 41.1374	Park Co. – Lake Drive w of Livingston	Pois1	07/14/09
CIAR4	CARU TRHO	N45° 28' 59.7882	W110° 37' 16.3874	Park Co. – Mallards Rest Fishing Access	Mallards Rest	07/14/09
CIAR4	RHCO	N48° 17' 30.8888	W112° 31' 52.4044	Pondera Co. – Hyw 89	Ad14	07/23/09
CIAR4	ACAN	N48° 17' 46.8836	W112° 14' 41.9907	Pondera Co. – S. Cutbank MT358	PondCa	09/11/09
CIAR4	CARU	N46° 22' 43.5216	W112° 44' 10.6399	Powell Co. – Deer Lodge exit Arrowstone Park	Pow1	08/11/09
CIAR4	CARU LAPL	N46° 29' 53.1105	W112° 44' 27.7033	Powell Co. – Kohrs Bend Fishing Access	Pow2	08/12/09
CIAR4	TRHO ACAN	N46° 43' 21.3172	W112° 39' 56.6136	Powell Co. – Rt 114 near sawmill	Pow7	08/18/09
CIAR4	LAPL CARU URCA ACAN	N46° 10' 5.2027	W114° 9' 33.3410	Ravalli Co. – Demmons Rd	RavaCa002	09/25/09
CIAR4	ACAN	N46° 35' 9.5788	W114° 4' 13.2795	Ravalli Co. – Poker Joe’s Fishing Access	Rav1	08/12/09
CIAR4	CARU ACAN	N46° 35' 7.8694	W114° 4' 47.6602	Ravalli Co. – S. of Stevensville	Rav3	08/12/09
CIAR4		N47° 34' 24.3175	W115° 9' 56.3952	Sanders Co. – Between Thompson Falls & Plains	San05	09/09/09
CIAR4	CARU	N47° 21' 22.0990	W114° 10' 51.5376	Sanders Co. - Bison Range	Agrilus005	06/18/09
CIAR4		N47° 42' 5.7211	W114° 40' 14.2944	Sanders Co. – Dry Fork Reservoir	San1	09/09/09
CIAR4		N45° 59' 35.0968	W112° 31' 47.2197	Silver Bow Co. – KOA CG	Sb2	08/11/09
CIAR4	CARU URCA	N47° 32' 59.5980	W112° 19' 27.0236	Teton Co. – Flowcree Canal Rd	Tet1	08/07/09
CIAR4		N47° 59' 27.6496	W112° 19' 4.3947	Teton Co. – Road to Byrum	Ad17	07/23/09
CIAR4	LAPL	N48° 31' 29.8690	W111° 51' 15.8472	Toole Co. – Shelby Shel-oole Lake	ToolCa001	09/13/09
CIAR4	LAPL ACAN	N48° 53' 2.0883	W111° 54' 8.9107	Toole Co. – Stevens Rd Kevin	ToolCa002	09/14/09
CIAR4	LAPL URCA	N45° 44' 46.1284	W108° 31' 20.2433	Yellowstone Co. – Billings Riverfront Park	YellCa001	09/18/09
CIAR4	URCA RHCO ACAN	N45° 46' 17.5250	W108° 29' 26.2708	Yellowstone Co. – Billings Two Moon Park	YellCa002	09/18/09
CIAR4	CELI ACAN	N45° 44' 32.4732	W108° 32' 19.6652	Yellowstone Co. – Billings Two Moon Park	YellCo002	09/18/09

CIRSI	RHCO	N48° 10' 2.6028	W115° 37' 23.9402	Lincoln Co. – Bear Creek Rd	Hawk3	07/28/09
CIRSI	RHCO	N45° 18' 10.8787	W111° 58' 35.4868	Madison Co. – Browns Gulch Rd	Mad6	08/05/09
CIRSI	CARU	N48° 11' 11.9052	W112° 34' 15.0695	Pondera Co. – Swift Creek Road	Ad15	07/23/09
CISC2	RHCO	N48° 19' 7.5710	W113° 21' 3.3588	Flathead Co. – Marias Pass CG	FlatLv003	09/11/09
CIUN	RHCO	N45° 48' 0.3118	W111° 11' 11.9360	Gallatin Co. – N. of Belgrade	Belg1	07/16/09
CIUN	Weevil sp	N45° 48' 0.3118	W111° 11' 11.9343	Gallatin Co. – N. of Belgrade	Wavyleaf	07/16/09
CIUN	RHCO	N48° 42' 39.4089	W111° 54' 2.4633	Glacier Co. – E. of Sweetgrass Rd	GlacWlt001	09/13/09
CIUN	LAPL	N45° 49' 21.1008	W111° 51' 6.9333	Jefferson Co. – Lewis & Clark Caverns	L&c cavern	07/17/09
CIUN	RHCO	N47° 23' 18.5124	W112° 18' 35.9841	Lewis & Clark Co. – RT 287 Bowans Corner	Lc3	08/07/09
CIUN		N47° 7' 38.3385	W112° 2' 30.8672	Lewis & Clark Co. – RT 287 n. of Wolf Creek	Lc1	08/07/09
CIUN		N47° 31' 42.2243	W111° 14' 16.1081	Teton Co. – Eyraud Lakes	Teton01	09/04/09
CIUN		N47° 59' 27.6496	W112° 19' 4.3947	Teton Co. – Road to Byrum	Ad17	07/23/09
CIUN	CARU ACAN	N45° 39' 39.4496	W108° 23' 3.4771	Yellowstone Co. – Wets Creek Rd	YellWlt001	09/18/09
CIVU	RHCO	N45° 16' 35.0307	W112° 30' 49.8247	Beaverhead Co. – Stone Creek Raceway	Bh1	08/05/09
CIVU	TRHO	N45° 16' 40.5532	W109° 12' 31.0822	Carbon Co. – Cooney State Park	CarbBt001	09/20/09
CIVU		N45° 41' 54.8980	W111° 3' 27.9023	Gallatin Co. – Bozeman N 19th	T1	07/16/09
CIVU		N45° 53' 56.9537	W111° 32' 0.3787	Gallatin Co. – Three Forks Ponds	3forks ponds	07/17/09
CIVU		N48° 34' 35.1735	W112° 51' 48.6877	Glacier Co. – HY 2 Blackfoot	GlacVt001	09/11/09
CIVU		N46° 37' 27.1957	W111° 58' 51.1230	Lewis & Clark Co. – Near Helena	Lc7	09/03/09
CIVU		N48° 52' 37.0118	W115° 3' 10.0291	Lincoln Co. - Eureka	Eureka1	07/29/09
CIVU		N48° 45' 0.1833	W114° 59' 25.8192	Lincoln Co. – Fortine Meadow Creek Rd	Fortine003	07/30/09
CIVU		N48° 44' 57.2882	W114° 56' 32.0768	Lincoln Co. – Fortine Marl Lake Rd	Fortine 002	07/30/09
CIVU		N48° 44' 57.2882	W114° 56' 32.0768	Lincoln Co. – Fortine Marl Lake Rd	Fortine 002	07/30/09
CIVU		N48° 14' 51.4410	W114° 58' 15.0870	Lincoln Co. - Island Lake	Isl	08/18/09
CIVU	CARU	N46° 35' 7.8694	W114° 4' 47.6602	Ravalli Co. – S. of Stevensville	Rav3	08/12/09
CIVU	CARU	N47° 21' 22.0990	W114° 10' 51.5376	Sanders Co. - Bison Range	Agrilus005	06/18/09
CIVU	RHCO	N48° 29' 53.2451	W111° 50' 44.7637	Toole Co. - Sunburst	ToolBt001	09/14/09
CIVU	LAPL	N45° 59' 49.8618	W108° 7' 36.1516	Yellowstone Co. – West M Rd Warden	YellBt001	09/21/09
CECY2	ACsp	N45° 46' 44.1841	W111° 10' 39.6582	Gallatin Co. - Belgrade	Belg005	08/18/09
CEDA3	ACsp	N46° 35' 16.8908	W111° 55' 0.6538	Lewis & Clark Co. – East Helena	East Helena	07/04/09
CEDE15		N45° 46' 44.1841	W111° 10' 39.6582	Gallatin Co. - Belgrade	Belg005	08/18/09
CEDI3		N48° 27' 49.0568	W111° 28' 39.6487	Toole Co. – N. of Devon Rd	ToolCn001	09/13/09
CEDI3		N48° 31' 29.8690	W111° 51' 15.8472	Toole Co. – Shelby Shel-oole Lake	ToolCa001	09/13/09

CEMA9	ACsp	N45° 46' 44.1841	W111° 10' 39.6582	Gallatin Co. - Belgrade	Belg005	08/18/09
CEMO		N45° 46' 44.1841	W111° 10' 39.6582	Gallatin Co. - Belgrade	Belg005	08/18/09
CEST8	ACsp	N46° 11' 40.2325	W112° 58' 11.0492	Deer Lodge Co. – Road to Lost Creek SP	DI2	08/11/09
CEST8	ACsp	N46° 10' 12.7752	W113° 10' 12.1462	Deer Lodge Co. – Road to Warm Springs Picnic Area	DeerCn002	09/23/09
CEST8	ACsp	N45° 46' 44.1841	W111° 10' 39.6582	Gallatin Co. - Belgrade	Belg005	08/18/09
CEST8		N45° 53' 13.1862	W112° 6' 27.4805	Jefferson Co. - Cardwell	J5	08/11/09
CEST8	PUJA ACsp	N46° 35' 16.8908	W111° 55' 0.6538	Lewis & Clark Co. – East Helena	East Helena	07/04/09
CEST8	ACsp	N46° 56' 7.5989	W113° 58' 47.7941	Lincoln Co. – Little Wolf Creek	Linc01	07/09/09
CEST8	ACsp	N48° 14' 32.7018	W114° 52' 26.5350	Lincoln Co. – No Bear Creek	No bear	08/19/09
CEST8		N47° 1' 4.8490	W114° 44' 13.0739	Mineral Co. – Tarkis Rd	Min2	08/13/09
CEST8	ACsp	N46° 45' 11.1858	W113° 56' 33.6488	Missoula Co. – S. access Mt Jumbo	MissLd002	09/24/09
CEST8		N48° 16' 53.2192	W112° 52' 31.9197	Pondera Co. – Heart Butte Rd	PondCo001	09/12/09
CEST8	ACsp	N46° 22' 43.5216	W112° 44' 10.6399	Powell Co. – Deer Lodge exit Arrowstone Park	Pow1	08/11/09
CEST8	ACsp	N46° 35' 9.5788	W114° 4' 13.2795	Ravalli Co. – Poker Joe’s Fishing Access	Rav1	08/12/09
CEST8	ACsp	N45° 58' 34.7281	W112° 28' 34.5953	Silver Bow Co. – I-90 Exit 227 frontage Rd	Sb1	08/11/09
CEST8		N45° 59' 35.0968	W112° 31' 47.2197	Silver Bow Co. – KOA CG	Sb2	08/11/09
CEST8		N47° 31' 42.2243	W111° 14' 16.1081	Teton Co. – Eyraud Lakes	Teton01	09/04/09
CEST8	ACsp	N45° 44' 30.3730	W108° 32' 24.3630	Yellowstone Co. – Riverfront Park Billings	Yell008	07/28/09
COMA2		N45° 27' 52.9720	W108° 51' 37.2182	Carbon Co. – Hy 212 s. Laurel	CarbPh001	09/21/09
COMA2	AGAL	N46° 37' 25.9683	W111° 58' 50.9578	Cascade Co. – I-15 exit 244	Cas1	09/03/09
COMA2	AGAL	N45° 41' 58.0063	W111° 3' 28.8571	Gallatin Co. – Bozeman N 19th	P2	07/16/09
COMA2	AGAL	N45° 53' 56.9537	W111° 32' 0.3787	Gallatin Co. – Three Forks Ponds	3forks ponds	07/17/09
COMA2	AGAL	N45° 52' 23.5704	W112° 11' 53.0740	Jefferson Co. – Pipestone Pass	Pipe stone	07/17/09
COMA2	AGAL	N45° 39' 37.1026	W110° 44' 41.1374	Park Co. – Lake Drive w of Livingston	Pois1	07/14/09
COMA2		N46° 36' 34.2730	W112° 36' 7.6381	Powell Co. – Avon	Ad 6	07/22/09
COMA2	AGAL	N45° 37' 49.7111	W108° 25' 6.5699	Yellowstone Co. - Billings	YellPh001	09/18/09
COMA2		N45° 36' 1.8675	W108° 24' 19.5087	Yellowstone Co. – Pryor Creek Rd	YellPh002	09/19/09
CYOF		N45° 45' 37.3317	W112° 47' 35.4850	Beaverhead Co. – Jerry Creek Rd	Bvd2	09/11/09
CYOF		N45° 47' 37.9708	W112° 54' 4.7556	Beaverhead Co. – Jerry Creek Rd	Bvd3	09/11/09
CYOF		N46° 37' 21.1141	W111° 37' 29.5820	Broadwater Co. - Canyon Ferry Hellgate Rd & HWY 284	BW06	07/17/09
CYOF		N46° 13'28.9316	W111° 10' 9.8173	Broadwater Co. – Dry Creek	BW02	08/25/09
CYOF		N46° 29' 20.6246	W111° 31' 10.6140	Broadwater Co. – Lower Confederate Gulch Rd	BW07	07/17/09
CYOF		N45° 27' 15.4361	W109° 5' 31.3672	Carbon co. – S. of Roberts	CarbCo001	09/20/09

CYOF	N47° 9' 43.8484	W111° 49' 19.9068	Cascade Co. – Great Falls Big Springs SP	Cas3	09/04/09
CYOF	N46° 37' 25.9683	W111° 58' 50.9578	Cascade Co. – I-15 exit 244	Cas1	09/03/09
CYOF	N48° 7' 57.8053	W114° 34' 43.6635	Flathead Co. – Ashley Lake Rd	Ad 10	07/22/09
CYOF	N48° 11' 59.0236	W114° 58' 47.8484	Flathead Co. – Lynch Lake	FlatH01	08/19/09
CYOF	N45° 36' 17.7007	W110° 55' 36.8573	Gallatin Co. – Bear Canyon New World Tr	Galla2	09/02/09
CYOF	N45° 40' 0.1506	W110° 49' 2.7287	Gallatin Co. – E. of Jackson Creek Rd	Toad1	07/14/09
CYOF	N48° 51' 33.8695	W113° 19' 20.5723	Glacier Co. – Duck Lake CG	GlacCo001	09/11/09
CYOF	N48° 27' 24.0468	W112° 49' 7.9587	Glacier Co. – Hyw 89	Ad13	07/23/09
CYOF	N48° 48' 40.1348	W112° 14' 29.2033	Glacier Co. – Whiskey Gap Rd	GlacCo002	09/12/09
CYOF	N46° 39' 40.4469	W113° 8' 52.6476	Granite Co. – Drummond Fishing Access	Gran1	08/13/09
CYOF	N46° 32' 36.0181	W111° 55' 25.9719	Jefferson Co. – Montana City	Jef1	09/03/09
CYOF	N47° 10' 8.5604	W114° 4' 51.9037	Lake Co. – Jacko River Fish Hatchery	La01	09/09/09
CYOF	N47° 17' 51.8656	W114° 8' 37.4538	Lake Co. - N. Polson	La04	09/09/09
CYOF	N46° 37' 4.5422	W112° 3' 30.5121	Lewis & Clark Co. – Helena Fairgrounds	Lc4	09/03/09
CYOF	N47° 7' 38.3385	W112° 2' 30.8672	Lewis & Clark Co. – RT 287 n. of Wolf Creek	Lc1	08/07/09
CYOF	N48° 53' 35.9345	W115° 7' 16.6509	Lincoln Co. – Eureka Black Lake Rd & RT 37	Eureka1 003	07/29/09
CYOF	N48° 45' 0.1833	W114° 59' 25.8192	Lincoln Co. – Fortine Meadow Creek Rd	Fortine003	07/30/09
CYOF	N48° 44' 57.2882	W114° 56' 32.0768	Lincoln Co. – Fortine Marl Lake Rd	Fortine 002	07/30/09
CYOF	N48° 45' 53.3204	W114° 53' 54.5681	Lincoln Co. – Fortine roadside river park	Fortine	07/30/09
CYOF	N48° 16' 34.7437	W115° 3' 18.7869	Lincoln Co. – FS 536 Road	536rd	09/09/09
CYOF	N48° 52' 13.3837	W114° 56' 57.1057	Lincoln Co. – Glenn Lake	Glen	07/29/09
CYOF	N48° 44' 59.4497	W114° 53' 19.1446	Lincoln Co. – Ranger Station Murphy Lake	Dickey 002	07/30/09
CYOF	N48° 52' 36.7103	W115° 5' 15.2080	Lincoln Co. – W. of Eureka	Eureka1 002	07/29/09
CYOF	N48° 25' 46.8283	W114° 28' 16.1169	Madison Co. – Sterling Rd w of Norris	Mad1	08/05/09
CYOF	N47° 0' 44.5878	W114° 40' 47.5395	Mineral Co. – I-90 Fish Creek exit (66)	Min1	08/12/09
CYOF	N47° 0' 46.9928	W114° 44' 4.1121	Mineral Co. – N. of Superior Slomay Gulch	Min4	08/12/09
CYOF	N47° 15' 55.2966	W114° 59' 19.7797	Mineral Co. – Tamarack Rd	Min5	08/13/09
CYOF	N46° 5' 38.4347	W112° 48' 25.6492	Missoula Co. – HWY 95 n. of Missoula	Mis01	09/08/09
CYOF	MOCU? N48° 59' 39.2783	W111° 58' 0.4304	Missoula Co. - Miller Creek Rd	MissCo003	09/24/09
CYOF	N46° 19' 24.7632	W113° 17' 12.6486	Missoula Co. – Duncan Rd n. Missoula	MissCo002	09/24/09
CYOF	MOCU? N46° 52' 6.9242	W113° 58' 27.8829	Missoula Co. – Hwy 12 Lolo Creek CG	MissCo004	09/24/09
CYOF	N47° 1' 16.9274	W114° 6' 45.0135	Missoula Co. – Hy 93 n. Missoula	MissCo001	09/24/09
CYOF	N46° 50' 8.3128	W114° 6' 7.3340	Missoula Co. – McClay Park Missoula	Mcalay 002	06/03/09

CYOF		N46° 52' 41.2894	W113° 58' 35.9204	Missoula Co. – Missoula Greenough Park	Miss3	06/30/09
CYOF		N46° 52' 43.05	W113° 58' 24.42	Missoula Co. – Missoula Greenough Park	Miss4	06/30/09
CYOF		N48° 17' 19.4783	W114° 52' 46.4180	Missoula Co. – Missoula Wy 12 & Yuma ranch Rd	Miss007	06/03/09
CYOF		N46° 7' 18.8017	W111° 24' 13.8694	Missoula Co. – Sawmill Gulch	Miss008	06/03/09
CYOF		N45° 42' 55.4150	W110° 15' 39.8423	Park Co. – Hwy 89	ParkCo002	09/19/09
CYOF		N45° 28' 59.7882	W110° 37' 16.3874	Park Co. – Mallards Rest Fishing Access	Mallards Rest	07/14/09
CYOF		N48° 16' 53.2192	W112° 52' 31.9197	Pondera Co. – Heart Butte Rd	PondCo001	09/12/09
CYOF	MOCU?	N48° 16' 53.7594	W112° 52' 29.7899	Pondera Co. – Spotted Eagle Rd	PondCo002	09/12/09
CYOF		N46° 48' 9.9956	W112° 48' 29.3727	Powell Co. – Nevada Lake	Nevada	08/18/09
CYOF		N46° 46' 31.4523	W114° 22' 47.5522	Ravalli Co. – Demmons Rd	RavaCo001	09/25/09
CYOF		N46° 10' 5.2027	W114° 9' 33.3410	Ravalli Co. – Sleeping Child Rd	RavaCo002	09/25/09
CYOF		N47° 42' 5.7211	W114° 40' 14.2944	Sanders Co. – Dry Fork Reservoir	San1	09/09/09
CYOF		N46° 1' 39.1627	W112° 43' 42.1674	Silver Bow Co. – I-90 exit	Sb3	08/11/09
CYOF		N47° 32' 59.5980	W112° 19' 27.0236	Teton Co. – Flowcree Canal Rd	Tet1	08/07/09
CYOF	MOCU?	N48° 59' 39.2783	W111° 58' 0.4304	Toole Co. - Sweetgrass	ToolCo001	09/13/09
CYOF		N45° 48' 32.6671	W108° 27' 41.8135	Yellowstone Co. – Billings Riverfront Park E. side	YellCo001	09/18/09
CYOF		N45° 44' 32.4732	W108° 32' 19.6652	Yellowstone Co. – Billings Two Moon Park	YellCo002	09/18/09
HYPE	AUsp	N48° 11' 59.0236	W114° 58' 47.8484	Flathead Co. – Lynch Lake	FlatH01	08/19/09
HYPE		N48° 19' 29.6737	W114° 47' 32.0888	Flathead Co. – Sylvia Lake Rd	Siteb 003	08/20/09
HYPE	AUsp	N45° 40' 49.8195	W110° 56' 40.9553	Gallatin Co. – Bozeman Story Hills	Gall01	08/18/09
HYPE	APPL AUsp	N48° 2' 11.6692	W113° 57' 41.4940	Lake Co. – Hwy 83 & Red Owl Rd/ Kelley Rd	Ad21	07/27/09
HYPE		N47° 17' 51.9669	W114° 8' 37.4538	Lake Co. – RT 28 Elms	La05	09/09/09
HYPE	AUsp	N48° 10' 5.8609	W115° 36' 15.6920	Lincoln Co. – Bear Creek Rd	Mul	07/28/09
HYPE	AUsp	N48° 14' 58.6634	W114° 59' 44.1232	Lincoln Co. – Surprise Hill & Island Lake	Surpup	08/18/09
HYPE	AUsp	N47° 0' 46.9928	W114° 44' 4.1121	Mineral Co. – N. of Superior Slomay Gulch	Min4	08/12/09
HYPE		N46° 35' 9.5788	W114° 4' 13.2795	Ravalli Co. – Poker Joe's Fishing Access	Rav1	08/12/09
HYPE	AUsp	N47° 34' 24.3175	W115° 9' 56.3952	Sanders Co. – Between Thompson Falls & Plains	San05	09/09/09
LIDA		N46° 37' 21.1141	W111° 37' 29.5820	Broadwater Co. - Canyon Ferry Hellgate Rd & HWY 284	BW06	07/17/09
LIDA		N46° 15' 3.2068	W111° 40' 20.3049	Broadwater Co. – Crow Creek CG n. of Raidersburg	BW03	08/25/09
LIDA		N47° 9' 43.8484	W111° 49' 19.9068	Cascade Co. – Great Falls Big Springs SP	Cas3	09/04/09
LIDA	MEJA	N46° 37' 25.9683	W111° 58' 50.9578	Cascade Co. – I-15 exit 244	Cas1	09/03/09
LIDA		N46° 32' 36.0181	W111° 55' 25.9719	Jefferson Co. – Montana City	Jef1	09/03/09
LIDA	MEJA	N47° 17' 30.3306	W114° 10' 14.5368	Lake Co. – Ravalli	La03	09/09/09

LIDA	CALU	N47° 17' 51.9669	W114° 8' 37.4538	Lake Co. – RT 28 Elms	La05	09/09/09
LIDA		N46° 37' 0.2877	W111° 57' 31.5679	Lewis & Clark Co. – E. of Helena HW 430	Lc6	09/03/09
LIDA		N48° 45' 53.3204	W114° 53' 54.5681	Lincoln Co. – Fortine roadside river park	Fortine	07/30/09
LIDA		N47° 1' 4.8490	W114° 44' 13.0739	Mineral Co. – Tarkis Rd	Min2	08/13/09
LIDA	MEJA	N46° 52' 41.2894	W113° 58' 35.9204	Missoula Co. – Missoula Greenough Park	Miss3	06/30/09
LIDA		N46° 45' 11.1858	W113° 56' 33.6488	Missoula Co. – S. access Mt Jumbo	MissLd002	09/24/09
LIDA	MEJA	N46° 49' 15.7353	W113° 48' 18.5613	Missoula Co. – Turah fishing access	Mis3	08/13/09
LIDA	BRPU CALU	N45° 28' 59.7882	W110° 37' 16.3874	Park Co. – Mallards Rest Fishing Access	Mallards Rest	07/14/09
LIDA	GYAN	N47° 34' 34.2672	W115° 15' 9.3708	Sanders Co. – Airport Rd near Thompson Falls	San03	09/09/09
LIDA	MEJA	N47° 19' 32.0477	W114° 12' 23.0467	Sanders Co. - Bison Range	Agrilus002	06/18/09
LIDA		N47° 1' 20.5275	W114° 6' 40.2375	Yellowstone Co. – Pryor creek Rd	YellTv002	09/19/09
LIVU	GYAN	N48° 10' 40.4504	W114° 57' 56.9676	Flathead Co. – Lost Trail Refuge	Lost	08/18/09
LIVU	GYAN	N46° 39' 40.4469	W113° 8' 52.6476	Granite Co. – Drummond Fishing Access	Gran1	08/13/09
LIVU	BRPU GYAN	N45° 49' 56.6424	W112° 21' 55.1497	Jefferson Co. – Pipestone Pass	Pipestone2	07/17/09
LIVU	GYAN	N46° 29' 53.1105	W112° 44' 27.7033	Powell Co. – Kohrs Bend Fishing Access	Pow2	08/12/09
LIVU2		N45° 47' 37.9708	W112° 54' 4.7556	Beaverhead Co. – Jerry Creek Rd	Bvd3	09/11/09
LIVU2	GYAN	N45° 36' 55.2463	W108° 47' 15.8984	Carbon Co. – S. of Red Lodge Bull Spring Fishing Access	CarbLv001	09/20/09
LIVU2	GYAN	N46° 1' 58.8319	W112° 44' 25.3670	Deer Lodge Co. - Galen	DL3	08/11/09
LIVU2	GYAN	N45° 42' 55.0968	W110° 27' 53.8485	Deer Lodge Co. – Hwy 1 near Silver Lake	DeerLv002	09/23/09
LIVU2	GYAN	N46° 5' 30.9495	W112° 48' 27.4787	Deer Lodge Co. – Near Opportunity	Deer01	09/08/09
LIVU2		N48° 19' 7.5710	W113° 21' 3.3588	Flathead Co. – Marias Pass CG	FlatLv003	09/11/09
LIVU2	GYAN	N48° 25' 46.7047	W114° 28' 15.6239	Flathead Co. – Stillwater State for Hyw 93	Still2	07/30/09
LIVU2	GYAN	N45° 39' 24.8855	W110° 56' 46.6008	Gallatin Co. – E. of Bozeman	Galla1	09/02/09
LIVU2	BRPU GYAN CALU	N45° 40' 0.1506	W110° 49' 2.7287	Gallatin Co. – E. of Jackson Creek Rd	Toad1	07/14/09
LIVU2		N46° 39' 40.4469	W113° 8' 52.6476	Granite Co. – Drummond Fishing Access	Gran1	08/13/09
LIVU2	BRPU CALU	N46° 9' 55.8126	W113° 19' 43.3597	Granite Co. - Phillipsburg	GranLv002	09/23/09
LIVU2	GYAN BRPU	N45° 51' 19.5138	W111° 57' 2.1302	Jefferson Co. – I-90 Mulligan Canyon exit	J3	08/11/09
LIVU2	CALU	N47° 10' 8.5604	W114° 4' 51.9037	Lake Co. – Jacko River Fish Hatchery	La01	09/09/09
LIVU2		N46° 36' 43.7392	W112° 4' 27.9777	Lewis & Clark Co. – Helena Spring Meadows SP	Lc5	09/03/09
LIVU2	GYAN	N48° 40' 1.7671	W114° 45' 11.9817	Lincoln Co. – Stillwater State for Hyw 93	Still	07/30/09
LIVU2		N45° 34' 13.9144	W111° 41' 32.3141	Madison Co. – Sterling Rd w of Norris	Mad2	08/05/09
LIVU2	GYAN	N45° 17' 5.1395	W111° 53' 24.0359	Madison Co. – Virginia City Pass	Mad4	08/05/09
LIVU2	GYAN	N47° 0'	W114° 44'	Mineral Co. – Tarkis Rd	Min3	08/13/09

	MEJA	45.1702	4.3636			
LIVU2	GYAN BRPU CALU	N47° 2' 44.5552	W113° 7' 56.9332	Powell Co. – Brown Lake Rd	Ad7	07/22/09
LIVU2	GYAN	N46° 22' 43.5216	W112° 44' 10.6399	Powell Co. – Deer Lodge exit Arrowstone Park	Pow1	08/11/09
LIVU2	GYAN	N46° 35' 9.5788	W114° 4' 13.2795	Ravalli Co. – Poker Joe's Fishing Access	Rav1	08/12/09
LIVU2	GYAN BRPU	N46° 35' 7.8694	W114° 4' 47.6602	Ravalli Co. – S. of Stevensville	Rav3	08/12/09
LIVU2	GYAN BRPU CALU	N46° 18' 0.6496	W114° 6' 48.4958	Ravalli Co. – Woodside Bridge Fishing Access	RavaLv002	09/25/09
LIVU2	GYAN BRPU CALU	N46° 1' 58.4671	W112° 44' 25.3636	Silver Bow Co. – Craddock Rd near exit 211	Sb4	08/11/09
LIVU2	GYAN	N45° 58' 34.7281	W112° 28' 34.5953	Silver Bow Co. – I-90 Exit 227 frontage Rd	Sb1	08/11/09
LIVU2	GYAN BRPU CALU	N45° 56' 58.3029	W112° 28' 3.5341	Silver Bow Co. – Near Winter Sports Complex	Butte1	07/17/09
MRRIO		N45° 44' 18.0971	W108° 32' 20.1877	Yellowstone Co. – Billings Riverfront Park W. side	YellMs001	09/18/09
MYRIO		N46° 20' 4.3762	W111° 31' 45.3165	Broadwater Co. – Indian Road CG	Ad 4	07/22/09
MYRIO	EULE	N46° 7' 18.8017	W111° 24' 13.8694	Broadwater Co. – Toston Dam	BW01	08/25/09
MYRIO		N47° 9' 14.1742	W111° 50' 23.3602	Cascade Co. – Missouri River Mountain Place	Cas2	09/03/09
MYRIO		N45° 44' 14.6712	W108° 32' 25.4734	Glacier Co. – Hy2 Blackfoot	GlacEa001	09/11/09
MYRIO	Weevil	N46° 9' 44.3448	W113° 5' 45.1693	Granite Co. – Georgetown lake Comers Point Fishing Access	GranEa001	09/23/09
MYRIO		N48° 53' 35.9350	W115° 7' 16.6483	Lincoln Co. – Solfie Lake	Eureka1 003	07/29/09
MYRIO	No weed	N48° 28' 59.1319	W115° 16' 13.6911	Lincoln Co. – Lake Koocanusa Cripple Horse boat ramp	Lake1	07/30/09
MYRIO	No weed	N48° 39' 5.3553	W115° 18' 44.2383	Lincoln Co. – Lake Koocanusa Rocky Gorge CG	Lake2	07/30/09
MYRIO	Weevil	N48° 14' 51.4410	W114° 58' 15.0870	Lincoln Co. - Island Lake	Isl	08/18/09
MYRIO		N48° 44' 59.4497	W114° 53' 19.1446	Lincoln Co. – Ranger Station Murphy Lake	Dickey 002	07/30/09
MYRIO	EULE	N48° 51' 38.3098	W114° 55' 46.8181	Lincoln Co. – Therriault Road	Therri	07/30/09
MYRIO		N45° 26' 35.7870	W111° 42' 21.4633	Madison Co. – Meadow Lake Fishing Access	Mad3	08/05/09
MYRIO		N45° 17' 40.0935	W111° 57' 32.7624	Madison Co. – Virginia City	Mad5	08/05/09
MYRIO	CARU	N47° 1' 18.0082	W113° 22' 49.4374	Missoula Co. – Harpers Lake	Ad8	07/22/09 07/30/09
MYRIO		N46° 39' 38.4970	W114° 4' 23.1935	Missoula Co. – Chief Looking Glass Rd	Mis2	08/12/09
MYRIO		N47° 42' 5.3662	W114° 40' 15.1235	Sanders Co. – Dry Fork Reservoir	San2	09/09/09
MYRIO		N47° 57' 37.2455	W112° 24' 17.6956	Teton Co. – Byrum Reservoir	Ad19	07/23/09
MYRIO	Weevil	N47° 31' 42.2243	W111° 14' 16.1081	Teton Co. – Eyraud Lakes	Teton01	09/04/09
MYRIO		N45° 48' 31.8393	W108° 27' 41.3333	Yellowstone Co. – Voyagers Rest Fishing Access	YellEa002	09/21/09
MYRO		N44° 59' 39.5529	W112° 51' 14.8001	Beaverhead Co. – Clark Reservoir	Clark	07/22/09
MYRO		N44° 59' 21.0199	W112° 51' 5.3499	Beaverhead Co. – Clark Reservoir	Clark 002	07/22/09
MYRO	No	N46° 39'	W113° 8'	Granite Co. – Drummond Fairgrounds	Gran2	08/13/09

	weed	35.4078	48.2504			
MYRO	No weed	N46° 39' 35.4078	W113° 8' 48.2504	Granite Co. – Drummond Fairgrounds	Gran2	08/13/09
CABOM		N47° 1' 14.2995	W113° 22' 50.2627	Missoula Co. – Blanchard Lake	Ad9	07/22/09
MYSP2		N47° 50' 29.24	W115° 35' 46.71	Sanders Co. – Noxan Reservoir Trout Creek	San5	09/16/09
CABOM		N48° 14' 50.6478	W112° 46' 15.7730	Pondera Co. – Lake Frances	PondEa001	09/12/09
CABOM		N48° 36' 7.2924	W112° 15' 7.4259	Pondera Co. – Spotted Eagle Rd	PondEa002	09/12/09
CABOM		N46° 18' 49.5327	W114° 8' 37.1265	Ravalli Co. – Sleeping Child Rd	RavaEa001	09/25/09
POTAM CEDE4		N45° 36' 17.7007	W110° 55' 36.8573	Gallatin Co. – Bear Canyon New World Tr	Galla2	09/02/09
POTAM CABOM		N46° 36' 43.7392	W112° 4' 27.9777	Lewis & Clark Co. – Helena Spring Meadows SP	Lc5	09/03/09
POTAM		N47° 42' 5.7211	W114° 40' 14.2944	Sanders Co. – Dry Fork Reservoir	San1	09/09/09
TRPE21		N46° 5' 38.4347	W112° 48' 25.6492	Missoula Co. – Hwy 95 n. of Missoula	Mis01	09/08/09
TRPE21		N46° 53' 56.3397	W113° 58' 40.2225	Missoula Co. - Hwy 93 n. Missoula	MissAa001	09/24/09
TRPE21		N48° 16' 17.2141	W112° 53' 48.2309	Pondera Co. – Spotted Eagle Rd	PondAa001	09/12/09
TRPE21		N47° 42' 5.7211	W114° 40' 14.2944	Sanders Co. – Dry Fork Reservoir	San1	09/09/09
TRPE21	OMOH ?	N48° 50' 52.3056	W113° 25' 15.0440	Toole Co. - Shelby	ToolAa001	09/15/09
TRPE21	Stem miner	N45° 16' 41.0154	W109° 12' 30.1102	Toole Co. - Shelby	ToolCn002	09/15/09
VEHT		N48° 53' 18.4511	W113° 12' 50.9772	Glacier Co. – S. of Babbs	GlacVt002	09/12/09
VETH		N47° 19' 43.3535	W115° 1' 20.0667	Beaverhead Co. – Rt 43 Powerhouse	Bvhd01	09/11/09
VETH		N46° 15' 3.2068	W111° 40' 20.3049	Broadwater Co. – Crow Creek CG N. of Raidersburg	BW03	08/25/09
VETH		N46° 7' 35.4812	W111° 23' 39.7905	Broadwater Co. – Road to Toston Dam	BW05	08/25/09
VETH	GYTE	N45° 27' 6.8952	W109° 12' 36.2475	Carbon Co. – Cooney Dam Rd Boyd	CarbTv001	09/20/09
VETH		N45° 20' 9.1412	W109° 10' 53.8057	Carbon Co. – S. of Red Lodge Bull Spring Fishing Access	CarbTv002	09/20/09
VETH		N47° 9' 43.8484	W111° 49' 19.9068	Cascade Co. – Great Falls Big Springs SP	Cas3	09/04/09
VETH		N46° 37' 25.9683	W111° 58' 50.9578	Cascade Co. – I-15 exit 244	Cas1	09/03/09
VETH	GYTE	N46° 12' 5.5803	W113° 10' 6.4086	Deer Lodge Co. – Hwy 1	DeerTv002	09/23/09
VETH		N46° 11' 40.2325	W112° 58' 11.0492	Deer Lodge Co. – Road to Lost Creek SP	DI2	08/11/09
VETH		N48° 11' 59.0236	W114° 58' 47.8484	Flathead Co. – Lynch Lake	FlatH01	08/19/09
VETH		N45° 41' 58.0063	W111° 3' 28.8571	Gallatin Co. – Bozeman N 19th	P2	07/16/09
VETH	GYTE	N45° 53' 56.9537	W111° 32' 0.3787	Gallatin Co. – Three Forks Ponds	3forks ponds	07/17/09
VETH		N48° 34' 35.1735	W112° 51' 48.6877	Glacier Co. – HY 2 Blackfoot	GlacVt001	09/11/09
VETH		N46° 39' 35.4078	W113° 8' 48.2504	Granite Co. – Drummond Fairgrounds	Gran2	08/13/09
VETH		N46° 39' 35.4078	W113° 8' 48.2504	Granite Co. – Drummond Fairgrounds	Gran2	08/13/09
VETH		N46° 10' 51.5699	W113° 19' 0.4246	Granite Co. – FR 672 & 406	GranTv002	09/23/09
VETH		N45° 51'	W111° 57'	Jefferson Co. - Cardwell	Card	07/17/09

		13.9014	0.0657			
VETH	GYTE	N45° 49' 21.1008	W111° 51' 6.9333	Jefferson Co. – Lewis & Clark Caverns	L&c cavern	07/17/09
VETH		N45° 49' 6.0392	W111° 42' 49.4812	Jefferson Co. – Near Willow Creek	Willow creek	07/17/09
VETH	GYTE	N48° 2' 11.6692	W113° 57' 41.4940	Lake Co. – Hwy 83 & Red Owl Rd/ Kelley Rd	Ad21	07/27/09
VETH		N47° 10' 8.5604	W114° 4' 51.9037	Lake Co. – Jacko River Fish Hatchery	La01	09/09/09
VETH		N47° 17' 51.8656	W114° 8' 37.4538	Lake Co. - N. Polson	La04	09/09/09
VETH		N46° 36' 43.7392	W112° 4' 27.9777	Lewis & Clark Co. – Helena Spring Meadows SP	Lc5	09/03/09
VETH		N47° 15' 9.2164	W112° 3' 49.4070	Lewis & Clark Co. – RT 287 mile post 14 N	Lc2	08/07/09
VETH		N48° 29' 53.2632	W111° 50' 55.5814	Liberty Co. – Tiber Dam	LibeVt001	09/15/09
VETH		N48° 10' 5.8609	W115° 36' 15.6920	Lincoln Co. – Bear Creek Rd	Mul	07/28/09
VETH		N48° 53' 35.9345	W115° 7' 16.6509	Lincoln Co. – Eureka Black Lake Rd & RT 37	Eureka1 003	07/29/09
VETH	GYTE	N48° 45' 0.1833	W114° 59' 25.8192	Lincoln Co. – Fortine Meadow Creek Rd	Fortine003	07/30/09
VETH	GYTE	N48° 45' 53.3204	W114° 53' 54.5681	Lincoln Co. – Fortine roadside river park	Fortine	07/30/09
VETH	GYTE	N48° 43' 9.0417	W114° 49' 23.8034	Lincoln Co. – Hyw 93 near Dickey Lake	Dickey	07/30/09
VETH		N48° 30' 50.3616	W115° 15' 24.2743	Lincoln Co. – Lake Koocanusa Warland Creek Rd	Lake1 002	07/30/09
VETH		N48° 28' 59.1319	W115° 16' 13.6911	Lincoln Co. – Lake Koocanusa Cripple Horse boat ramp	Lake1	07/30/09
VETH	GYTE	N48° 39' 5.3553	W115° 18' 44.2383	Lincoln Co. – Lake Koocanusa Rocky Gorge CG	Lake2	07/30/09
VETH		N48° 52' 36.7103	W115° 5' 15.2080	Lincoln Co. – W. of Eureka	Eureka1 002	07/29/09
VETH		N45° 18' 37.0182	W111° 58' 22.8367	Madison Co. – Granite Creek Rd	Mad7	08/05/09
VETH		N45° 17' 40.0935	W111° 57' 32.7624	Madison Co. – Virginia City	Mad5	08/05/09
VETH	GYTE	N47° 0' 44.5878	W114° 40' 47.5395	Mineral Co. – I-90 Fish Creek exit (66)	Min1	08/12/09
VETH	GYTE	N47° 0' 45.1702	W114° 44' 4.3636	Mineral Co. – Tarkis Rd	Min3	08/13/09
VETH		N46° 47' 30.1495	W112° 1' 41.2834	Missoula Co. – National Cemetery Rd	Ad 20	07/27/09
VETH		N46° 22' 43.8396	W112° 44' 11.0321	Missoula Co. – S. of Lolo	Mis1	08/12/09
VETH	GYTE	N46° 15' 17.4540	W114° 11' 41.1970	Park Co. – I-90 exit 350	ParkTv002	09/19/09
VETH	GYTE	N45° 28' 59.7882	W110° 37' 16.3874	Park Co. – Mallards Rest Fishing Access	Mallards Rest	07/14/09
VETH		N47° 59' 43.2098	W112° 1' 39.6380	Pondera Co. - Brady	Pon01	09/04/09
VETH	GYTE	N46° 34' 29.1198	W112° 30' 35.1028	Powell Co. - Avon	Ad 5	07/22/09
VETH	GYTE	N46° 48' 9.9956	W112° 48' 29.3727	Powell Co. – Nevada Lake	Nevada	08/18/09
VETH	GYTE	N46° 35' 9.5788	W114° 4' 13.2795	Ravalli Co. – Poker Joe's Fishing Access	Rav1	08/12/09
VETH		N46° 35' 7.8694	W114° 4' 47.6602	Ravalli Co. – S. of Stevensville	Rav3	08/12/09
VETH		N46° 10' 5.2027	W114° 9' 33.3410	Ravalli Co. – Sleeping Child Rd	RavaTv002	09/25/09
VETH		N47° 34' 15.3923	W115° 15' 51.5505	Sanders Co. – Airport Rd near Thompson Falls	San04	09/09/09
VETH		N47° 42'	W114° 40'	Sanders Co. – Dry Fork Reservoir	San1	09/09/09

		5.7211	14.2944			
VETH	GYTE	N45° 58' 34.7281	W112° 28' 34.5953	Silver Bow Co. – I-90 Exit 227 frontage Rd	Sb1	08/11/09
VETH	GYTE	N45° 56' 58.3029	W112° 28' 3.5341	Silver Bow Co. – Near Winter Sports Complex	Butte1	07/17/09
VETH		N48° 55' 42.4374	W111° 11' 12.8386	Yellowstone Co. – Billings Riverfront Park w. side	YellTv001	09/18/09
VETH	GYTE	N47° 1' 20.5275	W114° 6' 40.2375	Yellowstone Co. – Pryor creek Rd	YellTv002	09/19/09