

# Environmental Assessment

## Gypsy Moth Eradication Program

Jackson County

March 21, 2008

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Cooperating agency	USDA, Animal and Plant Health Inspection Service
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## A. Purpose and need for action

### 1. Decisions to be made and scope of analysis

#### Decisions

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The Oregon Department of Agriculture (ODA), in cooperation with USDA, Animal and Plant Health Inspection Service (APHIS), proposes to eradicate a gypsy moth infestation in Jackson County, Oregon. At this time funding for this program is pending. There is nothing new that we are proposing that has not been analyzed in the 1995 final Environmental Impact Statement (EIS) for Gypsy Moth Management in the United States. A supplement to the EIS is near completion. The supplemental EIS includes new information on additional treatment options and up-to-date risk assessments for the bacterial insecticide *Bacillus thuringiensis* var. *kurstaki*. Therefore, no new EIS programmatic analysis other than that found in the EIS and its supplements need to be conducted. The proposed action to eradicate isolated gypsy moth infestations in Oregon conforms to integrated pest management principles required by Oregon law, ORS 635.655. The need for this proposed action is based on the potential ecological and economic impacts of gypsy moth infestations on the surrounding areas, the entire state of Oregon, and indeed, the entire western United States.

#### Tiering

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This Environmental Assessment is tiered to the USDA's 1995 final EIS for Gypsy Moth Management in the United States and its supplement (in the process of being printed). Copies of the EIS are available for inspection at the Oregon Department of Agriculture in Salem. The preferred alternative in the 1995 EIS is Alternative 6: Suppression, Eradication, and Slow the Spread. Under this alternative, we propose eradication because of the isolated nature of gypsy moth infestations in Oregon. This site-specific Environmental Assessment is designed to examine the environmental consequences of a range of treatment options under Alternative 6 that may accomplish the program's goals.

#### Biology of gypsy moth

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Gypsy moth, *Lymantria dispar* L., is one of the most damaging pests of trees in the United States. It was originally imported into Massachusetts from Europe in 1869 for silk production experiments. Some moths were accidentally released and became established. The gypsy moth has spread relentlessly and now covers the entire northeastern part of the United States from Maine south to North Carolina and west to Illinois and Wisconsin. Outbreaks of gypsy moth caterpillars can alter ecosystems. Defoliation of trees and plants as a result of caterpillar feeding can alter wildlife habitat, change water quality, reduce property and esthetic values, and reduce the recreational value of forests. Heavy gypsy moth infestations not only cause defoliation and mortality, but defoliated trees are more susceptible to attack by other insects and diseases that may kill them. When present in large numbers, gypsy moth caterpillars can be a hazard to human health and safety and disrupt people's lives, as well as be a nuisance (USDA 1995, EIS pp. 1-4).

Gypsy moths are notorious hitchhikers. Egg masses and pupae can be transported on nursery stock and Christmas trees, but can also be attached to other substrates such as vehicles, camping equipment, and outdoor household articles that people bring with them when they come to Oregon. The wide host plant range of gypsy moth would allow it to establish throughout western Oregon and where hosts

occur in eastern Oregon. Gypsy moths were first detected in Oregon in 1979 and have been detected every year since then in many different isolated locations. These have been primarily in western Oregon, but recently it was found east of the Cascades mountain range in Bend (Deschutes County), Wasco (Sherman County), and Baker City (Baker County).

Two strains of gypsy moth now threaten Oregon. Gypsy moths introduced into Oregon from eastern North America are referred to simply as gypsy moths in this document. Asian gypsy moths are a strain of the same species that come from eastern Russia and Asia. The two strains look very similar; they cannot be reliably separated by visual examination. Scientists have developed genetic tests to distinguish one strain from the other (Garner and Slavicek 1996). However, the Asian gene markers in these tests are also present at low frequencies in established gypsy moth populations in eastern North America (Bogdanowicz et al. 1997). These genetic results indicate that hybridization between the two strains is likely and that the hybrids may pose an equal threat to Oregon.

Female Asian gypsy moths differ from European and North American females because they can fly long distances, whereas European and North American females cannot fly. The Asian strain also feeds on a more extensive range of host trees, including some (e.g., larch) that are not favored by the European and North American strain. Asian gypsy moth caterpillars also develop more quickly and are larger than their North American counterparts.

Asian gypsy moth egg masses have been transported to Oregon on ships. As trade with east Asia continues to expand, containers and products from that part of the world will present an ever increasing risk of introduction. Asian gypsy moths may also reach Oregon via Europe. They have recently become established in Germany and other European countries where they are hybridizing with European gypsy moths.

A sobering example of how easily these pests can be introduced took place in 1993 in North Carolina. A ship carrying military cargo from Germany was infested with large numbers of gypsy moths, including flying female moths typical of the Asian strain. The ship was sent back out to sea and the cargo was fumigated, but not before large numbers of moths were seen headed for shore. Hundreds of male moths were trapped near the port facilities, along the shore, and up to 25 miles inland. Genetic testing indicated that both European and Asian strain moths were present as well as some that were apparently hybrids (North Carolina Department of Agriculture 1994).

The Oregon Department of Agriculture and the US Department of Agriculture cooperate to eradicate gypsy moth infestations whenever they are detected in Oregon. A brief history of the major infestations and eradication programs follows.

### **History of gypsy moth infestations in Oregon**

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The first gypsy moth in Oregon was trapped in 1979 in Lake Oswego, Clackamas County. Follow-up trapping indicated that the infestation did not become established. However, in the early 1980s detection programs revealed established gypsy moth infestations in Salem, Corvallis, Portland, and Gresham. Effective eradication programs were implemented using various insecticides [acephate, carbaryl and *Bacillus thuringiensis* (*B.t.k.*)].

The largest infestation ever found in the western United States was discovered in 1984 in Lane County. Traps in Eugene and Lowell caught large numbers of male moths in the summer of that year. Trapping densities were then increased and over 19,000 male gypsy moths were collected from a 355 square mile area. In the spring of 1985, 226,405 acres of Lane County were sprayed with *B.t.k.* in the first phase of an eradication program. In 1986, 189,011 acres were sprayed, followed by 7,135 acres in 1987, and 2,995 acres in 1988—all with *B.t.k.* Aerial treatments consisted of three applications each year. Following the 1988 spring treatment, delimitation trapping caught only 1 moth. The total cost of detection, eradication, and trapping for Lane County from 1984 to 1989 was estimated to be \$18 million.

Two moths were subsequently caught in the Eugene/Springfield area in 1989 and 1990 and one moth was caught in 1991. Follow-up delimitation trapping indicated these were new introductions that did not become established. No gypsy moths were caught in Lane County in 1992 and no eradication programs were required from 1989 through 1994. However, in 1995 an 80-acre aerial spray program using *B.t.k.* was conducted to eradicate a breeding population in Veneta (Lane County). The program was a success. In 1995 three moths were trapped at another site near Dorena Lake and Schwarz Park (in Lane County) and 34 moths were trapped in 1996. This resulted in the smallest gypsy moth aerial spray program ever conducted in Oregon. Seventy acres were aeri ally sprayed with *B.t.k.* in the spring of 1997. In 2004, 183 acres were treated by air with *B.t.k.* in the south hills of Eugene to eradicate an infestation. Subsequent trapping indicated that the eradication effort was a success.

Several eradication programs have been conducted in the Portland metropolitan area. An infestation of gypsy moths was detected in east Portland in 1985. In 1986 a new eradication technique developed by USDA-APHIS (Induced Inherited Sterility Technique) was implemented. The area was inundated with sterile insects in an attempt to disrupt normal mating. Results of post-release monitoring indicated that the program was unsuccessful; a residual gypsy moth population remained. Treatment with *B.t.k.* eliminated the infestation in 1988. Small four-acre areas were treated with ground applications of *B.t.k.* in Lake Oswego in 1989 and 1991.

Another large eradication program in the state was completed in 1992 on 8,388 acres in North Portland. Ships that had visited Russian ports brought the Asian gypsy moth to Oregon via the Columbia River. *B.t.k.*, applied by helicopter, was used to eradicate the subsequent infestation. A second Asian gypsy moth infestation was successfully eradicated in 2001 in Portland's Forest Park. This treatment consisted of an aerial application of *B.t.k.* over 910 acres. More recently, 640 acres were treated in the spring of 2007 in St. Helens (west of Portland) for a single, large Asian gypsy moth that was caught in the summer of 2006. No Asian gypsy moths were caught in the summer of 2007.

Eradication programs for the North American gypsy moth were also carried out at eight sites in 1993, 1994, 1996, 1998, and 1999 in the Portland metropolitan area. The 1996 eradication program was conducted on a 10-acre area in Gresham and SE Portland. In 1998, two eradication programs were conducted in suburbs of Portland, one in Beaverton on a 22-acre area and the other in Lake Oswego on a 13-acre area. The Beaverton site was re-treated in 1999, although the eradication boundary was shifted slightly. Additional trap catches of 19 gypsy moths in the summer of 1998 on both sides of the eastern spray boundary indicated

that another treatment was necessary. All of these programs utilized ground applications of *B.t.k.* (because of the small areas and easy access) followed by mass trapping. In 2004, a gypsy moth infestation was found at a commercial nursery in Eagle Creek, Clackamas County. Infested spruce nursery stocks had been imported from Ontario, Canada. Three aerial applications of *B.t.k.* over 268 acres successfully eradicated this infestation in 2005.

Infestations have also been eradicated in other parts of the state. Gypsy moth was successfully eradicated in Josephine County in 1988 and 1992 at two small sites. Other eradication programs were successfully conducted in Benton County in 1993 (440 acres near Philomath), Clackamas County in 1994 (270 acres near Carver), and Lincoln County in 2003 (706 acres near Fisher). All of the treatments included the use of helicopters to apply *B.t.k.* Another small infestation in Jackson County in 1995 was ground-sprayed with *B.t.k.* The most recent eradication program in Jackson County occurred in 2001 in Ashland (160 acres treated by an aerial application of *B.t.k.*).

The first central Oregon eradication program was carried out in Deschutes County in spring 2007. Three aerial treatments of *B.t.k.* were applied to 533 acres in Bend. The source of this gypsy moth infestation was an eBay purchase of Chevy car parts (vintage 1967) that were shipped from Connecticut to Bend in January 2005. No additional moths were caught within the eradication area in 2007.

For a review of gypsy moth detection and eradication programs in Oregon from 1979 through 1988, see Oregon Department of Agriculture (1989) and Oregon Department of Agriculture Plant Division Annual Reports (1989-2006). Hitchhiking gypsy moths will continue to be introduced into Oregon and other non-infested western states. With continual introductions via commercial trade and a mobile human population, the probability of gypsy moths becoming permanently established in Oregon and in the West is increasing. However, until that happens eradication of all isolated infestations that result from accidental introductions will continue to be the goal of the US Department of Agriculture and the Oregon Department of Agriculture.

## 2. Proposed action

### Proposed action: Eradication

The proposed action is eradication, which conforms to the EIS recommendation to eradicate isolated infestations found in the western United States. The EIS proposes alternative actions that include eradication, slow the spread, suppression, and no action. These alternatives are based on the known geographical distribution of the gypsy moth in the continental United States.

Gypsy moth distribution and abundance in the continental United States is described as follows: a) the area of the United States where the European strain of the gypsy moth is established is called the **generally infested area** b) a 50–100 mile band adjacent to this area is called the **transition area**, where the gypsy moth is spreading from the generally infested area c) the area where the gypsy moth is not established is called the **uninfested area**. Isolated infestations resulting from accidental spread of the gypsy moth are found in this area. Different management strategies are carried out in each of these three areas: suppression in the generally infested area, slow- the-spread in the transition area, and eradication of isolated infestations in the uninfested area. If the Asian strain is detected, an eradication program may be conducted in all areas, including the generally infested area.



Our proposed action for Jackson County in 2008 is based on trapping results from 2007 and the previous two years. In 2005, two gypsy moths were caught in a single trap at an RV park in Shady Cove. Delimitation trapping in 2006 (49 traps per square mile around the positive 2005 catch and 25 traps per square mile for an additional five square miles) resulted in two positive catches in 2006; one near the positive site from 2005 and another only 0.1 mile away. In 2007, 30 acres that included all positive catches from 2005 and 2006 were intensively trapped at three traps per acre. Delimitation trapping around both positive sites from 2005 and 2006 yielded a new positive site. Six gypsy moths were caught in a single trap in Shady Cove near the site where three moths were caught in the previous two years. One of the gypsy moths caught in 2007 had a distinctive DNA pattern that was different from the other moths. The DNA analysis (provided by the USDA Otis Pest Survey, Detection and Exclusion Laboratory) indicates that the moths in the trap came from at least two different egg masses.

A detailed investigation in fall 2007 that included interviews in the surrounding neighborhood and egg mass searches revealed at least one source of introduction. Two local residents had taken a camping trailer to Pennsylvania in June 2007 for a family reunion. While in Pennsylvania, they noticed an abundant number of caterpillars crawling all over their truck and trailer and everything else in the area. Upon their return to Oregon, they parked the trailer at their residence. The trailer was inspected and found to have a viable egg mass, empty pupal cases (indicating successful adult emergence), larval exuviae, and a dead, dried female moth. The timing for emergence of adult gypsy moths from the pupal cases attached to the trailer was in synchrony with ODA's trapping program. It is likely that other adult moths may have emerged that were not caught (including females that do not fly) and egg masses may be present that have not been found. In addition, this source does not explain the presence of the gypsy moths caught in 2005 and 2006. There are an abundance of host plants in the area, including white oak, maple, birch, apple, willow, and alder. The information available to date indicates that the Shady Cove site has a breeding population of gypsy moths.

### **Alternatives considered**

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Six alternatives were considered in detail in the 1995 EIS:

- 1) No action. The US Department of Agriculture would do nothing to reduce the adverse effects of the gypsy moth in the United States. No suppression, no eradication and no slow the spread would occur. Implementation of alternative 1 would not reduce damage, prevent establishment, or slow the spread of the gypsy moth.
- 2) Suppression. The US Department of Agriculture would reduce the adverse effects of the gypsy moth only in the generally infested area. Implementation of alternative 2 would help reduce damage caused by the gypsy moth in the generally infested area of the continent.
- 3) Eradication. The US Department of Agriculture would reduce the potential adverse effects of the gypsy moth only in the uninfested area, and of the Asian strain anywhere in the United States. It would not slow the spread in the transition area. Implementation of alternative 3 would prevent the establishment of gypsy moth populations in the uninfested area and the Asian strain would be eradicated wherever it is found.
- 4) Suppression and Eradication. This combines alternatives 2 and 3. The US Department of Agriculture would reduce the potential adverse effects of the

gypsy moth in both the generally infested and uninfested areas, and of the Asian strain anywhere in the United States. Alternative 4 represents no change from the current program.

- 5) **Eradication and Slow the Spread.** The US Department of Agriculture would reduce the potential adverse effects of the gypsy moth in both the uninfested and transition areas, and of the Asian strain anywhere in the United States. Implementation of alternative 5 would prevent the establishment of gypsy moth populations in the uninfested area and slow the natural spread of the insect in the transition area. The Asian strain would be eradicated wherever it is found, including the generally infested area when the source of the introduction is known.
- 6) **Suppression, Eradication, and Slow the Spread.** The US Department of Agriculture would fully pursue its goal of reducing adverse effects of the gypsy moth (including the Asian strain) anywhere in the United States. A full range of strategies would be available nationwide to manage affected ecosystems. This is the preferred alternative. Implementation of alternative 6 would help reduce damage in the generally infested area, prevent the establishment of the gypsy moth in the uninfested area, and slow the natural spread of the insect in the transition area. The Asian strain would be eradicated wherever it is found, including the generally infested area when the source of the introduction is known.

### Treatment options

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Treatment options available under the 1995 EIS are:

- 1) *B.t.k.* This biological insecticide contains a bacterium, *Bacillus thuringiensis* var. *kurstaki*. The insecticide is specifically effective against caterpillars of many species of moths and butterflies, and is without significant risk to healthy humans, wildlife, and the environment.
- 2) Diflubenzuron (Dimilin). This insect growth regulator interferes with the growth of some immature insects.
- 3) Gypsy moth virus. The nucleopolyhedrosis virus, which occurs naturally, is specific to the gypsy moth. Gypchek is an insecticide product made from the gypsy moth nucleopolyhedrosis virus.
- 4) Mass trapping. Large numbers of pheromone traps are used to attract male gypsy moths and prevent them from mating with females, thereby causing a population reduction. An effective trap density for mating disruption is nine or more traps per acre.
- 5) Mating disruption. Tiny plastic flakes or beads embedded with synthetic gypsy moth sex pheromone are disseminated aerially. The pheromone may confuse male moths and prevent them from locating and mating with females.
- 6) Sterile insect releases. Large numbers of radiation-sterilized gypsy moth eggs or pupae are released in a treatment area and develop into adults. Subsequent mating between sterile and fertile adults prevents the development of viable offspring. If the program is successful, the population will be reduced and eventually eliminated.



The preferred option proposed for this eradication project is option 1) *B.t.k.* Mass trapping (option 4) at a density of up to three to nine traps per acre will be employed after the eradication program to determine its success. Mass trapping can also remove any remnant gypsy moths that were not killed by the *B.t.k.* treatment.

### 3. Need for action

#### Goals and objectives

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##### Goal

Eradicate the gypsy moth infestation from Shady Cove, Jackson County in order to avoid economic and ecological impacts described under Need for Action.

##### Objective 1

Apply the biological insecticide *B.t.k.* to 336 acres centered on the Shady Cove site where 6 gypsy moths were caught in one trap in 2007 on Park Lane (see the Shady Cove map on page 18). *B.t.k.* will be applied three times by air at a rate of 24 billion international units (i.e., 24 billion cabbage looper units, aka, B.I.U.) per acre about 7-14 days apart starting in late April or May; exact timing depends on weather. Ideally, the *B.t.k.* application should target early instar stages of gypsy moth. It is likely that a small buffer area surrounding the eradication area will receive some *B.t.k.* but in quantities much less than in the eradication area.

##### Objective 2

Delimit and intensively trap treated and surrounding areas using gypsy moth pheromone traps to determine the effectiveness of the *B.t.k.* treatment and to pinpoint any remnant gypsy moths or populations. Trap densities in the core area will be three to nine traps per acre. If more moths are caught, additional egg mass searches and treatments will be considered. If only one or two moths are caught after the treatment, the area will be intensively trapped each year until no moths are caught for two consecutive years. Two years of negative trapping results indicate that the gypsy moth is eradicated.

#### Need for action

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The gypsy moth has been a non-native destructive insect pest of trees and shrubs in the eastern United States and its native Eurasia for many years. Gypsy moth larvae emerge from overwintering egg masses in the spring and can feed and develop on leaves of more than 500 species of trees and shrubs. An average of four million acres is defoliated each year in the eastern United States (EIS 1995). In Oregon, adults typically emerge from mid-July through August. Detection and delimitation trapping is conducted during these peak flight times. After mating, females lay egg masses that contain up to 1000 eggs. Oregon has many species of host plants that would be damaged by gypsy moth, including those in forested and natural areas, agricultural lands, and urban areas. The gypsy moth would negatively affect the economy, natural resources, environmental quality, and potentially human health in Oregon should it become established.

### Economic impacts

An established population of any gypsy moth strain in Oregon would have very serious economic impacts for some residents and industries in the state. Although it is expected that the Asian strain would spread more quickly than the North American strain (because of female flight ability and the broader host range), the economic impacts of quarantines resulting from any non-suppressed gypsy moth population are expected to be immediate.

### Quarantines

Eradication of gypsy moth infestations in Oregon is essential to the health of agricultural, horticultural, and forestry enterprises of the State. These Oregon industries are economically viable only when their products can be marketed in other states and countries. As an exporter of plant products, Oregon must comply with plant pest and disease regulations of market states and countries.

In 1984 the Lane County gypsy moth infestation led California, the most important market state for Oregon, to place an embargo on all forest products and live plant material originating from that county. Although this embargo was soon replaced with a more reasonable USDA “high hazard” gypsy moth quarantine, the disruption of normal marketing relationships remained. Christmas tree growers near the more intense infestation sites were required to fumigate their trees before interstate movement and were subject to loss of export markets. Individual growers claimed losses as high as 80 percent from the cost of the fumigation process, with some claims as high as \$200,000. For the following five years (until 1989), all Christmas tree growers inside the quarantine area were required to apply chemical insecticides to obtain certification for interstate movement; thus, their production costs and pesticide usage in the area increased.

Oregon is the number one producer of Christmas trees in the US and failure to eradicate the gypsy moth would have led to an increasingly negative impact on the industry. Approximately 90 percent of the Christmas trees grown in Oregon are exported and the industry value in 2007 is estimated at \$120 million. Similarly, about 85 percent of the nursery stock grown in Oregon is exported to other states and countries. The value in 2007 of this industry is estimated at \$966 million (McAninch, pers. comm.). Greenhouse and nursery products have been Oregon’s most economically valuable commodities since 1994. The Christmas tree industry has also increased steadily during the last several years. Oregon’s most lucrative markets are states that are geographically the closest and that are also free from the gypsy moth. There would be serious quarantine restrictions on nursery stock in infested areas should Oregon fail to exclude the gypsy moth.

State and federal quarantines imposed on wood products industries during the Lane County infestation did not seriously affect these businesses. Nevertheless, limitations imposed by compliance agreements with the Oregon Department of Agriculture affected product movement and handling procedures. If the new gypsy moth infestation in Jackson County is allowed to spread, similar embargoes and quarantines would be implemented and most likely become increasingly restrictive and expensive.

The potential impact of gypsy moth quarantines on Oregon would be similar to those outlined in a risk assessment of European gypsy moth for British Columbia (B.C.) (Carlson et. al. 1994). It concludes: “The commitment by western States to preserve their export markets by excluding gypsy moth compels B.C. to follow suit. If B.C. were to allow gypsy moth to become established, trade and

quarantine sanctions would be imposed by all the western states.” Further, “costs [of trade sanctions] would likely exceed the current detection and eradication strategy costs by a factor of at least ten to one. The threat of trade barriers through quarantine restrictions in the western states ... presents a significant incentive for continued detection and eradication. B.C. could conceivably be denied access to its most important markets. The social and economic impacts resulting from these barriers to trade would likely be unacceptable for most British Columbians.” In fact, both the USDA and Canadian Food Inspection Agency enforced a quarantine in response to a large gypsy moth infestation in Vancouver Island in B.C. between 1998 and 1999.

### **Reforestation**

The immediate economic threat of gypsy moth to the forest products industry is quarantine, but the long-term impact on reforestation projects may be just as important. Douglas fir and western hemlock have proven to be viable hosts for gypsy moth caterpillar development in laboratory studies (Miller et al. 1991a, 1991b). Some defoliation of Douglas fir was observed in heavily infested areas of Lane County in 1984. Young conifers that are important timber species may suffer reduced growth or mortality when they are defoliated. Historically, hardwoods have not been considered of economic importance to the timber industry, but now they are receiving greater scrutiny from researchers and foresters. Gypsy moth infestations in Oregon would decrease the economic potential of hardwoods that presently cover 2-3 million acres in Oregon. Some companies are working specifically with hardwoods as they become more economically important in the western US.

### **Tourism**

Oregon ranks fourth in the nation in the number of visitors to state parks and natural recreation areas. Native hardwood species that are good hosts for gypsy moths contribute significantly to the scenic beauty of Oregon. If the gypsy moth became established in Oregon and defoliated areas where these species occur, visitors to the state would lose full use of the parks and campgrounds. Caterpillar feeding can create unwanted droppings on all types of outdoor equipment and caterpillar hairs can be irritating to humans. Areas known for their scenic beauty could be negatively affected and use of facilities by tourists could be decreased. May and June are important tourism months in Oregon. The value of tourism to Oregon in 2007 was about \$7.9 billion. A significant proportion of visitors come from states that are also concerned about the gypsy moth. If the gypsy moth established in Oregon, it is expected that these states would impose serious limitations on recreational vehicles returning from Oregon.

### **Ecological impacts**

Keeping the gypsy moth out of Oregon is also essential to protect the state from adverse ecological effects. One of these effects is that gypsy moth feeding can lead to changes in forest stand composition. Oaks, alder, willow, hazelnut, and other deciduous hosts are preferred by gypsy moths and can suffer mortality from repeated defoliation. Oak trees in the East have been killed by repeated defoliation and have been replaced by other vegetation. The number of acres defoliated by gypsy moth in eastern states has fluctuated over the past five years: 408,000 acres (2002), 250,000 acres (2003), 175,000 acres (2004), 798,000 acres (2005), and 1.3 million acres (2006)(GMDigest 2007). It is estimated that 1.45 million acres

were defoliated in 2007 (GM Digest 2007). This level of defoliation can severely impact watershed function.

Ecological consequences of large-scale defoliation include negative impacts on wildlife. Animals feeding on acorns from oak trees would be directly affected. Nesting sites and cover would be reduced. Defoliation of riparian areas would cause increased short-term, but reduced long-term water output and increased air and water temperatures. Salmon, trout, and other aquatic species might leave affected areas or die. A study of stream water quality in gypsy moth-defoliated watersheds in the East found increased nitrate levels and decreased acid neutralizing capacity; thus, gypsy moth defoliation of trees and shrubs in riparian areas could exacerbate the effects of acid rain (Downey 1991). Defoliation of riparian, watershed, and other critical areas and of specific plant species could jeopardize threatened or endangered species or species of concern (plant, insect, or certain wildlife species). Sample *et al.* (1993) found that gypsy moth defoliation reduced both the abundance and species richness of Lepidoptera (butterflies and moths) in the affected area. In short, the ecological effects of gypsy moth becoming established in the West are expected to be substantial.

Specifically, defoliation of riparian and other critical areas by the gypsy moth in Shady Cove could expose the Rogue River area and its watershed to more direct sunlight and increase the water temperature (through loss of shade), which could negatively impact the threatened salmon and other fish species in the area. Other threatened and endangered species or species of concern may also be negatively affected due to gypsy moth defoliation and its resulting habitat modification. For example, streams and riparian areas could become contaminated with excessive excrement from caterpillar feeding and increased nitrate levels.

### **Environmental quality**

While it is difficult to predict the extent of environmental damage that the gypsy moth will cause by defoliation, it is not difficult to predict that pesticide use will increase when it is established. Even at relatively low levels of infestation, pressure is increased to use chemical sprays to certify certain plant products, including Christmas trees, nursery stock, and forest products, for interstate marketing. Storage sites for these products would likely receive more pesticide treatments, as would residential areas within urban and suburban settings. Parks and campgrounds would also require treatments to make forested areas fully usable. Every year, thousands of acres of trees are treated to control gypsy moth in the East; 191,700 acres were treated to suppress populations in the generally infested area and 385,211 acres were treated in the transition (slow the spread) area in 2007 (GMDigest 2007).

### **Human health**

Some people are allergic to the tiny hairs on gypsy moth caterpillars (Tuthill et al. 1984). These people could suffer minor allergic reactions, primarily rashes, if the gypsy moth becomes established in Oregon. During gypsy moth outbreak years, caterpillars crawl over sidewalks, patios, lawn furniture, etc. They may even invade houses. In heavily infested areas, large numbers of caterpillars limit some people's enjoyment of the outdoors.

#### 4. Authorizing laws and policies

The US Department of Agriculture has broad discretionary statutory authority to conduct gypsy moth management activities. The following is a list of authorizing laws and policies.

##### Federal

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*The Plant Protection Act of 2000 (7 CFR 401-442) and Cooperative Forestry Assistance Act of 1978 as amended (16 USC 2101-2105).* These statutes authorize, among other things, the development of USDA activities for the regulation of the artificial spread of the gypsy moth from the quarantined area, and the eradication of isolated gypsy moth infestations outside this area.

*7CFR 301.45.* This regulation establishes a federal gypsy moth quarantine covering infested areas of the US.

*1988 Memorandum of Understanding between the USDA Forest Service and USDA Animal and Plant Health Inspection Service for Management of the Gypsy Moth.*

##### State

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*ORS 570.305.* This statute gives broad enabling authority to eradicate dangerous insect pests and plant diseases. It states that “the director [State Department of Agriculture], and the chief of the division of plant industry, are authorized and directed to use such methods as may be necessary to prevent the introduction into the state of dangerous insect pests and plant diseases, and to apply methods necessary to prevent the spread, and to establish control and accomplish the eradication of such pests and diseases, which may seriously endanger agricultural and horticultural interests of the state, which may be established or may be introduced, whenever in their opinion such control or eradication is possible and practicable.”

*ORS 634.655.* This law requires that state agencies with pest control responsibilities follow the principles of integrated pest management (IPM). IPM is defined as “a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency pest management objectives.”

*ORS 634, State Pesticide Control Act.* This law regulates the formulation, distribution, storage, transportation, application, and use of pesticides in Oregon.

#### 5. Environmental laws and their relationship to this analysis

*Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 USC 136).* This Act requires that all insecticides used in suppression or eradication projects be registered with the Environmental Protection Agency and that application requirements be followed.

*National Environmental Policy Act of 1969 (P. L. 91-190 42 USC 4321 et. seq.).* This Act requires detailed and documented environmental analysis of proposed federal actions that may affect the quality of the human environment. The courts regard as federal actions any state actions for which federal funds are granted.

*Endangered Species Act of 1973 (16 USC 1531 et. seq.).* This Act prohibits federal actions from jeopardizing the existence of federally listed threatened or endangered species or adversely affecting designated critical habitat. Federal agencies must consult with the US Fish and Wildlife Service to determine the

potential for adverse effects from any federal action. Federal agencies are also responsible for improving the status of listed species.

## B. Public involvement and issues

Efforts were made to address issues and concerns among individuals and organizations that will be affected by the proposed gypsy moth eradication project. A public information meeting notice was sent to property residents in the proposed eradication area and adjacent properties in Shady Cove via the city newsletter on February 1, 2008 and to Jackson County government offices on January 25, 2008. In addition to sending letters with the dates and locations of the meeting to residents, concerned parties, and other individuals, such information was also published four times in the local newspaper before the meeting. A copy of the meeting notice appearing in the local newspaper is included in Appendix A. The public information meeting notice also included information on the gypsy moth situation, ODA's eradication proposal, and the availability of the draft Environmental Assessment. Letters indicating ODA's proposal and a draft copy of the Environmental Assessment were also mailed to interested individuals and parties on January 25, 2008. Copies of the public information meeting letter, draft Environmental Assessment, and other information were also placed on the ODA website.

ODA scheduled the public information meeting for Shady Cove on February 21, 2008 at the Upper Rogue Community Center, 22465 Highway 62, Shady Cove, OR 97539 at 7:00 p.m. The comment period on the draft Environmental Assessment ended on March 3, 2008.

Twenty-seven people from the public, including three from the press, attended the public information meeting in Shady Cove. Three representatives from ODA presented information and/or answered questions about the eradication proposal. In addition, representatives from other agencies and organizations were in attendance. These included one from USDA APHIS PPQ, one from USDA Forest Service, one from Oregon State University Extension Service, two from Jackson County Environmental Health, and one from the Public Health Division, Oregon Department of Human Services (Portland).

The audience asked the following questions at the meeting:

- What if it rains on the day of the application?
- What if it rains on the day of the second application? Will an extended time interval affect the spray effectiveness?
- Will gypsy moth traps be placed outside of the eradication area?
- Why are the previous two years' positive catches related to the trap catch from 2007?
- What results trigger a program? (asked by USDA APHIS representative to explain the rationale for the eradication project)
- Is the spray area shown on the map?
- How does the spray affect other insects and animals?
- What if the area is sprayed, and then it rains? Will the spray still be effective?
- Is *B.t.k.* a living bacteria? How long does it live?



- Is there anything we can put on our own trees to make them less desirable to gypsy moths?
- So, this pesticide has a history of being effective?
- What if the spray lands on school grounds? Does playground equipment need to be washed?
- How caustic is the spray to car paint?
- If we have a visitor or notice a visitor in an RV from another infested state, is there any immediate action we should take?
- If we are outside the spray area, may we get a gypsy moth trap from you?
- Are bark beetles killing the pines in this area?
- Is *B.t.k.* or Foray 48B organic?

All questions were answered by staff from the ODA, USDA APHIS PPQ, or the representative from the Public Health Division, Oregon Department of Human Services. In addition, three telephone calls were received regarding the proposed eradication project. The phone calls were all concerned about the effects of *B.t.k.* on domestic animals and pets. No written comments were received from the public regarding the draft EA by the end of the comment period. None of the questions from the meeting or telephone calls raised issues that were not addressed in the 1995 EIS or the Environmental Assessment. It is recommended that readers consult both of these documents.

General concerns that have been brought up in previous gypsy moth eradication programs in Oregon include:

1. **Human health.** Concern has been expressed about direct or indirect human exposure to insecticides (especially for children, pregnant women, and people with severe immune disorders). Monitoring of human health during the application process is an additional concern. Concerns have been expressed regarding the aerial application of biological insecticides (*B.t.k.*) to urban and rural areas, especially in relation to direct or indirect contamination of drinking water, watersheds, wells, garden crops, and organic produce certification. Some people have been concerned that inert ingredients are not subject to disclosure. Some of the inert ingredients are approved for use in foods. Concerns were expressed about developing an organic formulation of *B.t.k.* product for gypsy moth eradication projects. This may reduce people's anxiety over undisclosed inert ingredients. Concern has also been expressed about human allergic reactions to caterpillars if gypsy moth infestations are not eradicated.
2. **Public education.** A need for increased public education about the gypsy moth problem and the possible effects of eradication measures has been expressed.
3. **Public involvement and notification.** Concern has been expressed about adequate public involvement in the decision-making process concerning eradication procedures and methods, and about adequate notification of treatment dates, areas, cancellation, reschedule dates, and plans to ensure public safety.
4. **Environmental effects.** Concern has been expressed about the possible effects of insecticides, including biological insecticides, on non-target organisms,

such as natural enemies of the gypsy moth, wildlife, honeybees, locally farmed livestock, pets, fish ponds on private properties, aquatic insects, and other Lepidoptera (moths and butterflies). Concern has also been expressed about the possible adverse effects of gypsy moth defoliation on wildlife, water quality, timber value, and other forest resources in affected areas.

5. **Alternatives to eradication programs.** Concern has been expressed about a need for research on the behavior of the gypsy moth in Oregon to determine which natural enemies might maintain populations at low levels. Concern has been expressed about the viability of an eradication approach and the need for long range planning and research for an integrated pest management approach to suppression.
6. **Gypsy moth quarantine.** During the earlier Lane County infestation, a need was expressed for a rapid reduction in the population of gypsy moths to reduce or eliminate the gypsy moth quarantines imposed on the infested portions of that county. During the last several years, concerns have been also expressed about how to prevent introduction of the gypsy moth or Asian gypsy moth from infested states or countries through quarantine or other methods, especially when the pathway is known.
7. **Economic effect.** Concern has been expressed about the possible negative impact of the gypsy moth on the forest and nursery industries if infestations are allowed to expand unchecked. Concern has also been expressed by Christmas tree growers, in particular about the negative impact of the gypsy moth on their markets. Concern has been expressed by landowners about the possible negative effects of a continued gypsy moth infestation on property values.
8. **Compliance with state law.** Concern has been expressed about ODA's authority in eradicating the gypsy moth. State laws (ORS 570.305 and ORS 634.655) apply to gypsy moth eradication projects (see previous section A 4).

Similar concerns were documented in the 1995 final EIS Appendix C, page C4-C10, All of these issues and concerns were considered when reviewing the range of treatment options available to accomplish the goal of eradication of the current gypsy moth infestation in Oregon. The 1995 EIS addressed three principal issues in detail:

- 1) How does the presence of gypsy moth affect people and the environment?
- 2) How do insecticidal treatments applied affect people and the environment?
- 3) How do noninsecticidal treatments applied affect people and the environment?

Most of the concerns and issues raised in gypsy moth eradication programs in Oregon fall into one of the three categories addressed in the 1995 EIS and its supplement. Readers are encouraged to consult the 1995 final EIS and the supplemental EIS for details.

Citizens and organizations were urged to write to the Insect Pest Prevention and Management Program Supervisor of the Plant Division of the Oregon Department of Agriculture with their concerns about the gypsy moth problems and the proposal to employ an eradication IPM program. The postal address, email address, and telephone numbers were provided to the public and concerned parties and individuals in all mailings. Concerns expressed are summarized and presented to the Director of the Oregon Department of Agriculture for evaluation

prior to her decision regarding implementation of the Department's proposal or another alternative. Written comments from concerned parties and individuals on the draft EA are included in the final EA.

## C. Affected environment

### Location

The eradication area consists of approximately 336 acres in Shady Cove, Jackson County that will be aurally treated with *B.t.k.* It is likely that a small buffer area surrounding the eradication area will receive some *B.t.k.*, but in quantities much less than inside the eradication area. Movement of *B.t.k.* beyond the eradication area is likely to be affected by conditions such as temperature, humidity, wind direction, wind speed, and terrain. Standard buffer areas used around control areas in gypsy moth suppression programs in the eastern US are typically 200 to 500 feet.

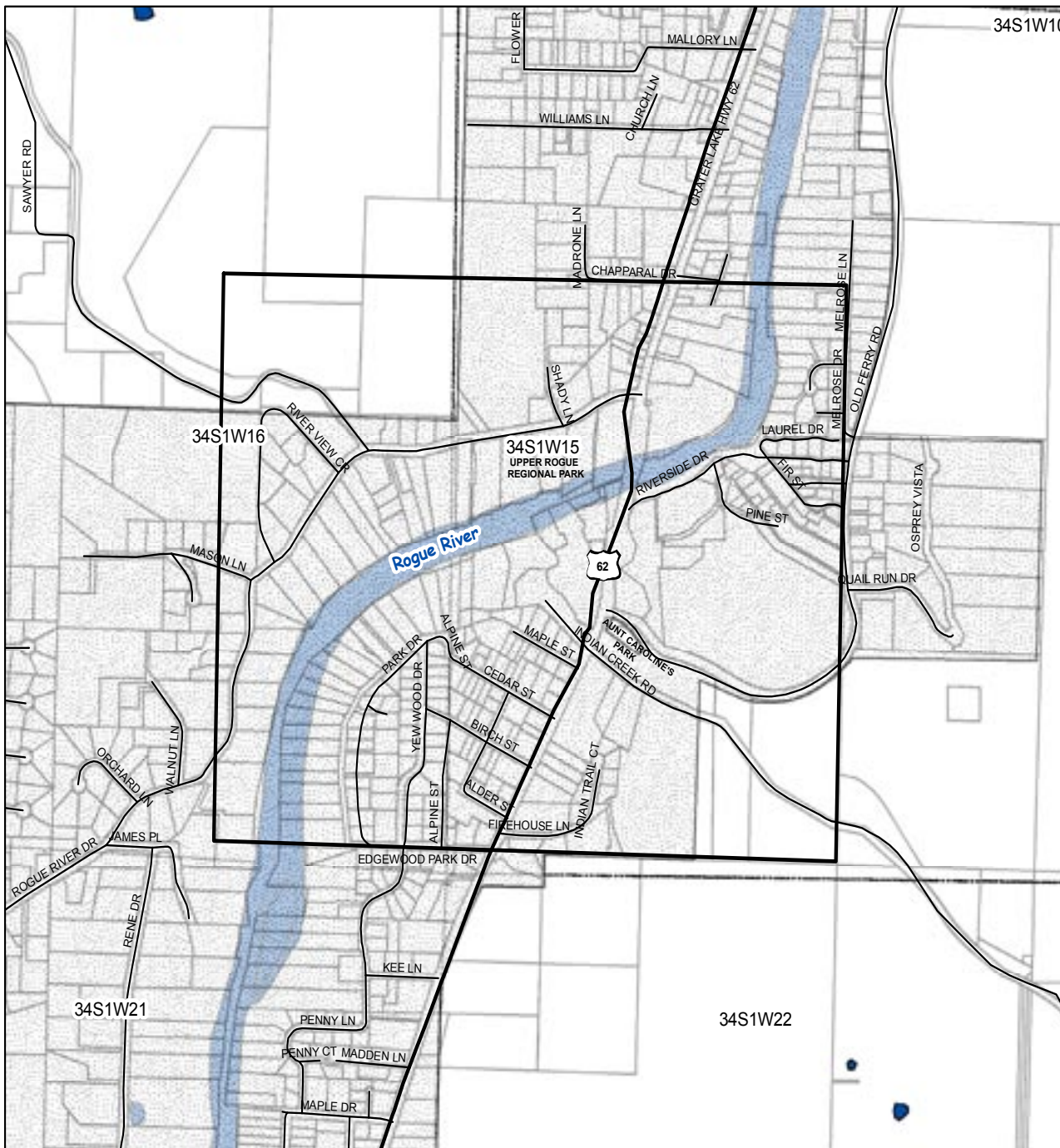
The proposed gypsy moth eradication area encompasses the 2007 site where six gypsy moths were caught in one trap and three gypsy moth catch sites from 2005 and 2006. Inspections of a trailer parked on a residential property east of the trap site revealed a source for the 2007 catches. The trailer had a viable egg mass, numerous pupal cases, larval exuviae, and a dried female moth. The eradication area includes residential areas west and east of Highway 62 and a commercial area with businesses along Highway 62. Within the eradication area is the Flycasters RV Park, where gypsy moths were caught in 2005 and 2006, the Rogue River RV Park, and Johnson Cemetery. The Upper Rogue Regional Park and Aunt Caroline's Park are also within the boundary. Most of the eradication area is within the Shady Cove city limits, but there are two small areas to the southeast and northwest of the eradication block that are not within city limits. The exact location is within T34S R1W S16 and T34S R1W S15. The Rogue River runs from the northeast corner to the southwest corner of the eradication area, effectively dividing it into a northern and southern part. The northwest corner of the boundary begins at N 42.61685, W 122.82242 (GPS readings of the latitude and longitude), approximately 760 feet north of Sawyer Rd. The boundary proceeds due east along Chapparral Dr. approximately 4200 feet to Melrose Lane at N 42.61700, W 122.80687. From this point it turns 90 degrees south and proceeds 3482 feet to a point south of Indian Creek Rd. at N 42.60733, W 122.80672. The boundary continues due west and along Edgewood Park Dr. for 4184 feet to a point at N 42.60733, W 122.82226. From this point the boundary turns 90 degrees north and continues for 3482 feet to the starting point (see map of Shady Cove, next page).

There are about 300 residences and 50 businesses within the 336-acre eradication area. Residential properties are to the east and west side of Highway 62 and are single-family residences. Businesses generally border the highway. There are three motels and two RV parks along the highway. No schools or medical centers are within the eradication area. There is a boat launch at the Upper Rogue Regional Park on the north side of the river within the eradication area. Most of the eradication area is within the city limits of Shady Cove, except the northwest corner and southeast corner. The elevation along the river is approximately 1385 feet. Terrain west of Highway 62 is relatively flat with good road access. A hill primarily covered with white oak is east of the highway. The elevation at the top of the hill is approximately 1565 feet. A few residences are up a steep gravel road

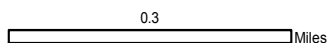
### Proposed 2008 Gypsy Moth Eradication Program Shady Cove, Jackson County

Proposed 336 acre eradication area

It is likely that a small buffer area surrounding the eradication area will receive some B.t.k. but in quantities much less than inside the eradication area.



- Legend**
- eradication area
  - tax lots
  - city limits
  - rivers, water



Prepared By: d.kimberling  
 Printing Date: December 12, 2007  
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 Datum: North American 1983  
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on the hill that continues east of the eradication area.

The Rogue River divides the eradication area into two parts, one that is northwest of the river and the other that is southeast of the river. Trees present include a mixture of hardwoods and softwoods, primarily oak and Ponderosa pine. Dominant trees include: Ponderosa pine, white oak, Douglas fir, incense cedar, spruce, maple, alder, ash, and birch. Other common shrubs in the residential areas include photinea, roses, grapes, lilac, juniper, madrone, butterfly bush, pyracantha, and sumac. Many of the trees on the south side of the river near the positive catch are over 100 feet tall.

## Environmental factors

### Federally listed threatened and endangered species

There are no federally listed endangered animal species, but there are three federally listed endangered plant species (big-flowered wooly meadowfoam *Limnanthes floccosa* ssp. *grandiflora*, Gentner mission-bells *Fritillaria gentneri*, and Cook's lomatium *Lomatium cookii*) that may occur within a two-mile radius of the eradication area or within Jackson County. Pollinators are not well-known for big-flowered wooly meadowfoam, but the plant is capable of self-pollinating (Currin et al. 2004). *F. gentneri* reproduces clonally and *L. cookii* is partially self-pollinating (US Fish and Wildlife Service 2003; Currin et al. 2004). *B.t.k.* affects only the early developmental stages (e.g., caterpillar) within the order Lepidoptera (butterflies and moths) and does not affect other insect species or plants. Thus, the proposed action will have no effect on these endangered plant species.

Three federally listed threatened species may occur within a two-mile radius of the eradication area or within Jackson County; these include the Northern spotted owl *Strix occidentalis caurina*, coho salmon *Oncorhynchus kisutch*, and vernal pool fairy shrimp *Branchinecta lynchi*. The main prey animals of the northern spotted owl are rodents, including red tree voles and northern flying squirrels in the forest. The owls' critical nesting period is between March and July. No spotted owls have been documented since 1995 (Oregon Natural Heritage Information Center 2007, Appendix B) and the last sighting is two and a half miles from the nearest boundary of the proposed eradication area. The habitat in the spray area is urban and near urban. A helicopter will be landing and taking off from a private airstrip that is almost four miles from the old nest site. Private planes regularly use the same airstrip. In consultation with the US Department of the Interior Fish and Wildlife Service, we determined that the treatment is not likely to adversely affect the owl, its food source, or its designated critical habitat.

The Rogue River is designated as critical habitat for threatened coho salmon. Critical habitat includes the water, substrate, and adjacent riparian zone on either side of the river. The Rogue River is also designated as essential fish habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA)(PL 104-297). The proposed treatment program will not alter the physical, chemical, or biological components of the river or substrate and will not result in loss or injury to benthic organisms, prey species, and their habitat, and other ecosystem components.

The vernal pool fairy shrimp are only found in the Agate Desert on Lower Table Rock in Jackson County. Because these ephemeral pools are over 20 miles from Shady Cove, the proposed action will have no effect on these fairy shrimp.

Thus, the proposed action in Shady Cove will have no effect on threatened or endangered species or their designated critical habitats.

### Species of concern, candidate species, and state listed sensitive species

Five species of concern occur within a two-mile radius: the Foothill yellow-legged frog *Rana boylei*, two bats, Yuma myotis *Myotis yumanensis* and fringed myotis *Myotis thysanodes*, the Northern Pacific pond turtle *Actinemys marmorata marmorata*, and a plant, Clustered lady's slipper *Cypripedium fasciculatum*. Species of concern are those taxa whose conservation status is of concern to the US Fish and Wildlife Service, but for which further information is still needed. The proposed action will not affect the frog or turtle species because they are omnivorous with a preference for invertebrates and *B.t.k.* will not affect aquatic invertebrates. The bats are insectivores; the Yuma myotis feeds primarily on aquatic species and the fringed myotis feeds on beetles, crickets, and moths. The eradication area is relatively small and will not have an impact on the food supply of these bats. Although the clustered lady's slipper is insect pollinated, the pollinator is not a moth (Knecht 1996) and the proposed action will have no effect on this plant species.

Candidate species have no protection under the Endangered Species Act, but are included here in case they become listed before the eradication project is completed. There are five candidate species that may occur in Jackson County and the eradication area: a mammal, the Pacific fisher *Martes pennanti pacifica*, a bird, the streaked horned lark *Eremophila alpestris strigata*, an amphibian, the Oregon spotted frog *Rana pretiosa*, an invertebrate, the mardon skipper (butterfly) *Polites mardon*, and one plant species, the Siskiyou mariposa lily *Calochortus persistens*. The only species that could be affected by the treatment is the mardon skipper butterfly, but this species is dependent on fescue-dominated grasslands (that are not within the eradication area), and adult emergence generally occurs from May to July (Xerces Society 2006). The caterpillar stage of the life cycle, in general, will occur well after the proposed eradication program.

There are 35 animal species of concern and 21 plant species of concern (not mentioned above) that may occur in Jackson County and hence, Shady Cove and the eradication area. These include seven mammals: the pallid bat *Antrozous pallidus pacificus*, red tree vole *Arborimus longicaudus*, Pacific western big-eared bat *Corynorhinus townsendii townsendii*, California wolverine *Gulo gulo luteus*, silver-haired bat *Lasionycteris noctivagans*, long-eared myotis *Myotis evotis*, and long-legged myotis *Myotis volans*; ten birds: the Northern goshawk *Accipiter gentilis*, band-tailed pigeon *Columba fasciata*, olive-sided flycatcher *Contopus cooperi*, yellow-breasted chat *Icteria virens*, Acorn woodpecker *Melanerpes formicivorus*, Lewis' woodpecker *Melanerpes lewis*, Mountain quail *Oreortyx pictus*, white-headed woodpecker *Picoides albolarvatus*, Oregon vesper sparrow *Pooecetes gramineus affinis*, and purple martin *Progne subis*; seven amphibians and reptiles: the tailed frog *Ascaphus truei*, common kingsnake *Lampropeltis getula*, California mountain kingsnake *Lampropeltis zonata*, Del Norte salamander *Plethodon elongates*, Siskiyou Mountains salamander *Plethodon stormi*, Northern red-legged frog *Rana aurora aurora*, and the Cascades frog *Rana cascadae*; three fishes: the Jenny Creek sucker *Catostomus rimiculus* ssp., Pacific lamprey *Lampetra tridentata*, and coastal cutthroat trout (S. OR/CA Coast) *Oncorhynchus clarki clarki*; and eight invertebrates: Denning's agapetus caddisfly *Agapetus denningi*, Franklin's bumblebee *Bombus franklini*, Siskiyou choealtis grasshopper *Chloaeltis aspasma*, Green Springs Mountain farulan caddisfly *Farula davisii*, Sagehen Creek goeracean



caddisfly *Goeracea oregana*, Schuh's homoplectran caddisfly *Homoplectra schubi*, caddisfly (no common name) *Moseleyana comosa*, and Siskiyou carabid beetle *Nebria gebleri siskiyouensis*.

The plant species of concern that occur in Jackson county are: Henderson's bentgrass *Agrostis hendersonii*, Rogue Canyon rockcress *Arabis modesta*, Crater Lake rock cress *Arabis suffrutescens* var. *horizontalis*, Wayside aster *Aster vialis*, crenulate grape-fern *Botrychium crenulatum*, Greene's mariposa-lily *Calochortus greenei*, broad-fruit mariposa-lily *Calochortus nitidus*, Umpqua mariposa-lily *Calochortus umpquaensis*, Howell's camassia *Camassia howellii*, Baker's cypress *Cupressus bakeri*, Siskiyou willow herb *Epilobium siskiyouense*, shaggy horkelia *Horkelia congesta* ssp. *congesta*, Henderson's horkelia *Horkelia hendersonii*, Bellinger's meadowfoam *Limnanthes floccosa* spp. *bellingermaniana*, Dwarf wooly meadowfoam *Limnanthes floccosa* ssp. *pumila*, Ashland lupine *Lupinus lepidus* var. *ashlandensis*, white meconella *Meconella oregana*, Detling's microseris *Microseris laciniata* spp. *detlingii*, coral seeded allocarya *Plagiobothrys figuratus* var. *corallicarpus*, Howell's tauschia *Tauschia howellii*, and small-flowered death camas *Zigadenus fontanus*. Pollination of these plants may occur via wind or insects. Some of the insect pollinators may be Lepidoptera. Any effects from *B.t.k.* are expected to be temporary as recolonization from adjacent areas will occur after the treatment.

In addition to these federally listed species, there are a few species that the Oregon Department of Fish and Wildlife has listed as sensitive-vulnerable (SV) or sensitive critical (SC). The western toad *Bufo boreas* (SV) has been sited within a two-mile radius of the eradication area, but no observations have been made since 1982. Chinook salmon *Oncorhynchus tshawytscha* (SC) and Steelhead (Klamath Mountains Province, ESU, summer run and winter run) (SV) also occur within this area. *B.t.k.* effects are specific to immature Lepidoptera and have no adverse effects on aquatic insects, fish, or amphibians.

The proposed project will have no effect on any of the federally listed species of concern or state listed sensitive species in Jackson County.

## Human factors

There are relatively few unusual hazards known in the proposed gypsy moth eradication area in Shady Cove. The town has fewer than 3,000 residents and is an attraction for visitors to Oregon. It also has a high percentage of retirees. The main businesses in Shady Cove are associated with tourism and recreation, but real estate development is also on the rise. It is considered to be the gateway to Crater Lake and a haven for Rogue River boating and fishing. Many broadleaf (e.g., white oak, alder, ash, willow, etc.) and conifer (e.g., Ponderosa pine, Douglas fir, etc.) trees provide aesthetic appeal in the area and along the river corridor. Extensive defoliation by the gypsy moth would decrease the attractiveness of this scenic area.

There are no schools within the eradication area, but a school bus travels on Highway 62 to take intermediate and high school students to Eagle Point. There is one school (grades 3-8) that is north of the spray area. There is one licensed day care center within the eradication area.

Effects of alternatives on the human environment (including minority and low-income populations) are expected to be similar for all human populations regardless of nationality, gender, race, or income. No disproportionately high and

adverse human health or environmental effects on minority populations and low-income populations are expected as a result of implementing actions described for the preferred alternative.

## D. Alternatives

### Pesticide application: ground vs. air

If a chosen alternative includes pesticide sprays, the pesticide can be applied from either ground (i.e., truck or trailer mounted sprayers) or air (i.e., helicopter or airplane mounted sprayers). Ground sprays are preferred for small eradication areas if the road system is adequate to allow access to all parts of the block. If access is restricted or if the area is large, then aerial sprays are usually more practical, less disruptive to residents and wildlife, and more economical.

### 1. Treatment options under the 1995 EIS

The treatment alternatives for the proposed eradication program in Shady Cove are analyzed in the 1995 gypsy moth EIS and its later supplement. These alternatives are considered as treatment options for any gypsy moth eradication programs in the US. Six alternatives are available to carry out an eradication program:

- 1) *Bacillus thuringiensis* var. *kurstaki*
- 2) Diflubenzuron (Dimilin)
- 3) Gypsy moth virus
- 4) Mass trapping
- 5) Mating disruption
- 6) Sterile insect release.

### 2. Alternatives not considered in detail

Treatment alternatives 2, 3, 5, and 6 listed above are not considered for use this year for this gypsy moth eradication program. The rationale follows:

Diflubenzuron (Dimilin) is an insect growth regulator that has a broader non-target host range than *B.t.k.* and it can kill many other insects besides moths and butterfly caterpillars. Its use may adversely affect other insect populations, including beneficial ones.

Gypsy moth virus (Gypchek) is very host specific, but it is not widely available in the market and it is still somewhat experimental for eradication programs. The effectiveness of gypcheck has been variable.

Mating disruption is still an experimental method and its effect on gypsy moth infestations is variable. This alternative has been used more frequently in recent years in slow-the-spread programs in eastern states but has not been used for eradication in western states.

Sterile insect releases are also experimental and their effect on gypsy moth suppression is variable.

These alternatives are not considered in detail because the probability that they are able to achieve the program goal of eradication has been judged to be too low or cannot be determined.

### 3. Alternatives considered in detail

#### Proposed action

Options considered for use under the proposed action's eradication program are *B.t.k.* and mass/intensive trapping. The two options meet state and federal gypsy moth program goals and adhere to USDA's EIS guidelines. In our opinion, *B.t.k.* is the best option for gypsy moth control because it has proven effective as an eradication treatment. Application of *B.t.k.* poses little risk to human health or the environment. The host range of *B.t.k.* is limited to lepidopteran (moth and butterfly) caterpillars. There are no threatened or endangered species of Lepidoptera in or near the proposed eradication area in Shady Cove. Mass trapping removes male moths from the environment, thus reducing the probability of males finding females for mating. It can be an effective control tool when a gypsy moth infestation is small, but its effectiveness is variable when gypsy moth populations are large. Mass/intensive trapping can be an excellent monitoring tool to detect the presence of gypsy moth adult males, and is best used to determine the effectiveness of *B.t.k.* applications after an eradication program.

#### *B.t.k.*

The biological pesticide, *B.t.k.*, is now commonly the material of choice for gypsy moth eradication programs in the United States. In the past decades, improved formulations and more concentrated applications of *B.t.k.* have increased gypsy moth larval mortality and have provided more consistent foliage protection where it has been used. Aqueous *B.t.k.* formulations do not affect aquatic organisms and can be applied over open water. *B.t.k.* is relatively expensive because three applications (two in ground programs) are usually required to ensure eradication.

Oregon has had over 20 years of experience using *B.t.k.* to eradicate the gypsy moth. Two applications of *B.t.k.* by ground or three applications by air during late April and May have proven effective in eradication programs. Other western states, including California, Idaho, Utah, and Washington, have experienced similar success with the use of *B.t.k.* in their eradication programs (USDA APHIS1994). A review of eradication options for British Columbia also supports the use of *B.t.k.*; it concludes: "multiple applications of *Bacillus thuringiensis* var. *kurstaki* (*B.T.K*) should be the primary choice for eradication (Surgeoner 1994).

#### **Trapping**

Mass/intensive trapping involves the placement of gypsy moth pheromone traps at very high densities (up to 9 traps/acre). These traps attract male gypsy moths and are the same ones used for annual state-wide detection surveys. Mass trapping has been tested as an eradication tool, but results have been unreliable. This method, however, is very useful when used in combination with other methods. Not only are captured male moths removed from the breeding population, but mass trapping can be used to evaluate the success of treatments and delimit any residual populations.

#### **No action**

The no-action alternative is required by Council of Environmental Quality regulations (40 CFR 1502.14(d)). The no-action alternative forms the basis for a comparison between meeting the project needs and not meeting the project needs. This alternative provides baseline information for understanding changes associated with the action alternative and expected environmental responses to an

introduced species. Selecting this alternative would allow existing environmental conditions, including those associated with an established gypsy moth population, to continue on a natural course.

#### 4. Preferred action alternative

The preferred alternative is to use the biological pesticide *B.t.k.* in conjunction with mass/intensive trapping. Shady Cove is suitable for aerial applications because of the size of the area (number of acres) and variable terrain. Three aerial applications of *B.t.k.* at a rate of 24 B.I.U.s per acre would be applied to a 336-acre eradication area in Shady Cove in 2008. The three treatments are planned to begin in late April about 7-14 days apart. Exact timing depends on weather conditions. It is likely that a small buffer area surrounding the eradication area will receive some *B.t.k.* but in quantities much less than in the eradication area.

Following *B.t.k.* treatments, an intensive/mass trapping program will be used to monitor the effectiveness of the *B.t.k.* applications and to delimit the location of any remaining populations. Trap densities in the core area will range from three to nine traps per acre.

## E. Environmental consequences

This section will address the effects of the preferred action alternative on the affected environment for the proposed eradication site. Two areas of effects, human health and environment, were analyzed in detail in the 1995 gypsy moth programmatic EIS and its later supplement and are hereby incorporated by reference.

### *Bacillus thuringiensis var. kurstaki*

*B.t.k.* is a naturally occurring soil bacterium. It is toxic to most caterpillars (larvae of butterflies and moths) when it is sprayed on foliage and ingested by them. Other insects and vertebrates are not affected by this bacterium. Human health risks from use of *B.t.k.* in a gypsy moth eradication program are believed to be extremely low. Modern aqueous formulations of *B.t.k.* contain no organic solvents. None of the inert ingredients in these formulations are on EPA list 1 (Inerts of Toxicological Concern) or list 2 (Potentially Toxic Inerts). In addition, all of the inert ingredients are FDA approved for use in foods or in food processing. *B.t.k.* products are exempt from residue tolerances by EPA. This means that there are no limitations on the amount of material allowed on food items. *B.t.k.* can be used on food crops up to and including the day these products are harvested, as well as on stored food products. Some genetically modified crops such as corn now have *B.t.k.* genes permanently incorporated in them. The World Health Organization (WHO) reviewed and established environmental health criteria for *Bacillus thuringiensis* and published a book on the topic (WHO 1999). The book concluded "owing to their specific mode of action, *Bt* products are unlikely to pose any hazard to humans or other vertebrates or to the great majority of non-target invertebrates." Glare & O'Callaghan (2000) conducted an exhaustive world literature review of *B.t.* They concluded in their book *Bacillus thuringiensis: Biology, Ecology and Safety* that "the wealth of data currently available and experience of many years of broad-scale applications would suggest that *Bt* is one of the safest pesticides currently available... We view *Bt*-based products used at recommended field rates as safe to use, in terms of minimal non-target impacts, little residual activity and lack of mammalian

toxicity.” A review of the environmental impacts of *Bacillus thuringiensis* by Canadian scientists (Joung & Cote, 2000) produced similar conclusions. Syracuse Environmental Research Associates, Inc. submitted a more recent and extensive review to the USDA Forest Service (2004). This review, “Control/Eradication Agents for the Gypsy Moth—Human Health and Ecological Risk Assessment for *Bacillus thuringiensis* var. *kurstaki* (*B.t.k.*) Final Report,” concluded that “Sensitive terrestrial insects are the only organisms likely to be seriously affected by exposure to *B.t.k.* or its formulations. All sensitive terrestrial insects are Lepidoptera and include some species of butterfly, like the endangered Karner blue and some swallowtail butterflies and promethea moths. At the application rates used to control gypsy moth populations, mortality rates among sensitive terrestrial insects are likely to range from approximately 80 percent to 94 percent or more. The risk characterization for other wildlife species is unambiguous: under foreseeable conditions of exposure, adverse effects are unlikely to be observed.” Further, “In terms of potential human health effects, formulations of *B.t.k.* are likely to cause irritation to the skin, eyes, and respiratory tract; however, serious adverse health effects are implausible. For members of the general public, exposure levels are estimated to be below the functional human NOAEL for serious adverse effects by factors of about 28,000 to 4,000,000 [4 million]. At the extreme upper range of exposure in ground workers, exposure levels are estimated to be below the functional human NOAEL for serious effects by a factor of 25. This assessment is based on reasonably good monitoring data, conservative exposure assumptions, and an aggressive and protective use of the available toxicity data.”

### ***B.t.k.* and human health**

If directly exposed to *B.t.k.* spray, some individuals (most likely project workers) may develop minor irritation of the skin, eyes, or respiratory tract. These effects are relatively mild and transient. Pathogenic effects are not likely, even in individuals with impaired immune systems. Allergic responses to *B.t.k.* are conceivable, but have not been documented. The most thorough human health studies of *B.t.k.* applications in populated areas have been reported by Green *et al.* (1990), Noble *et al.* (1992), USDA (1993), Aer’ aqua Medicine Limited (2000) and Capital Health Region (1999). All five studies were carried out during large-scale gypsy moth eradication programs. No significant health effects attributable to the *B.t.k.* treatments were found. Table 9-4 and figure 9-1 from appendix F of the 1995 EIS (USDA, 1995) clearly and concisely show human risks due to gypsy moth and all treatment alternatives including *B.t.k.*.

Green *et al.* (1990) monitored human health in Lane County, Oregon in 1985 & 86 when *B.t.k.* was sprayed by helicopter over areas with a population of approximately 120,000 people. Three applications of Dipel® 8L were made in 1985. In 1986, three applications of either Dipel® 8L or Dipel® 6AF were used. Their conclusions were:

- 1) Telephone complaints to the Lane County Health Department from members of the public did not reveal any pattern of predominance of any one symptom complex or of involvement of any single organ system. Symptoms were those common to any community, e.g., nausea, headache/dysphoria, rash, angioedema.
- 2) Fifty-five cultures from patients, obtained for routine clinical purposes, were positive for *B.t.k.* Of these, 52 were assessed to be probable contaminants.

The other three patients had preexisting medical problems, but *B.t.k.* could neither be ruled in nor out as a pathogen.

- 3) The level of risk for *B.t.k.* and other existing or future microbial pesticides in immunocompromised hosts deserves further study.

Noble *et al.* (1992) studied the human health effects of a 44,478-acre Asian gypsy moth eradication program using *B.t.k.* in Vancouver, British Columbia. Three applications of Foray® 48B were made with large airplanes, helicopters, and trucks. They found no significant effect of *B.t.k.* on human health.

USDA (1993) reported on health monitoring programs in Washington and Oregon during large *B.t.k.* eradications for Asian gypsy moth in 1992. Combined, these eradications covered approximately 124,000 acres in urban residential neighborhoods in Tacoma, Washington and Portland, Oregon. Between the two states, over 300 complaints of human illness were received primarily via telephone “hotlines.” No cases of infection were confirmed although many people did report symptoms including allergic rhinitis (hayfever), viral gastroenteritis (intestinal flu), and skin rashes. The occurrence, frequency, and type of symptoms were indistinguishable from background illnesses that occurred in both *B.t.k.*-treated and non-treated areas.

Aer’ aqua Medicine Ltd (2000) reported on methods and results of a health surveillance program during a two-year eradication spray program against the white-spotted tussock moth (*Orgyia thyellina*) in Auckland, New Zealand. The eradication program, carried out in the eastern suburbs of Auckland, used aerial and ground treatments of *B.t.k.*. The report concluded that there was no evidence of a causal association between *B.t.k.* spray and human health effects or significant health problems during or after the spray treatment.

In 1999, The Capital Health Region of Victoria, British Columbia, coordinated a human health study of possible short-term health effects from aerial spraying of Foray® 48B on south Vancouver Island. The study was performed as a necessary condition for the spray program to take place under a provincial order-in-council. The study included a survey of the health of asthmatic children in the region; a survey of the general health of the population; monitoring and analysis of visits to doctors’ offices and hospital emergency departments; laboratory surveillance of clinical samples which contained *B.t.k.*; measurement of environmental levels of *B.t.k.*; and a review of self-reported complaints of health symptoms made to telephone information and support hotlines. The study’s conclusions were:

“The results of this project did not show a relationship between aerial spraying of Foray 48B and short-term human health effects. Although some people self-reported health problems that they attributed to the spray program, the research and surveillance methods used in this project did not detect any change in health status that could be linked to the spray program. Our results showed that many of the health complaints people reported during the spray were as common in people before the spray as they were shortly after the spray. This conclusion is consistent with those of previous studies of the possible health effects of *B.t.k.*-based pesticide spray programs.”

Due to advances in scientific knowledge, the law requires that pesticides registered before November 1, 1984 must be reregistered to ensure that they meet current standards. In 1998 the United States Environmental Protection Agency (EPA)



published a Reregistration Eligibility Decision *Bacillus thuringiensis* (EPA 1998) in which the agency concluded:

“Based on the reviews of the generic data for the active ingredient *Bacillus thuringiensis*, the Agency has sufficient information on the health effects of *Bacillus thuringiensis* and on its potential for causing adverse effects in fish and wildlife and the environment. The Agency has determined that *Bacillus thuringiensis* products, manufactured, labeled and used as specified in this Reregistration Eligibility Decision, will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, the Agency concludes that products containing *Bacillus thuringiensis* for all uses are eligible for reregistration”.

The Oregon Health Services (2003) has developed its recommendations for people affected by the proposed spray program. These recommendations are:

“Even though the spray is considered safe for humans, we recommend that people stay indoors during spraying, unless it is essential to be outdoors. You should be advised in advance by the Department of Agriculture when spraying will occur, so you may plan accordingly. This is general advice for the public. If you or someone in your home has a medical problem that they believe may be made worse by the spraying, talk to your health care provider.

If your drinking water source is from open surface water (e.g., creeks, streams, springs) and you are concerned about potential exposure, you may wish to shut off the intake during the spray and until you are satisfied that any water exposed to the spray has moved downstream of your intake. Alternative water sources in the interim might include previously stored and covered water on site, bottled water, or water from a neighbor outside the sprayed area.

To avoid exposure, we recommend:

- Staying indoors during and for at least 30 minutes after spraying to allow droplets to settle.
- Waiting until the spray has dried before touching grass or shrubs. Cover playground equipment, sandboxes, benches, and lawn chairs before the spray or hose them off afterward.
- Washing exposed skin with soap and water if direct contact with the spray droplets occurs. If the material should get into your eyes, flush with water for 15 minutes.

Although we don't have evidence that *B.t.k.* will affect any given group of people, individuals with leukemia, AIDS, or any other physician-diagnosed causes of severe immune disorders, may consider leaving the spray area during the actual spraying. If you or someone in your home has one of these conditions, ask your doctor for advice about avoiding exposure before the spray project begins.

The *B.t.k.* product contains residues of grains and other foods used to help the bacteria grow. If you have serious allergies to foods or food preservatives, your health care provider may consult with the manufacturer of Foray® 48B, about the exact ingredients (Valent Biosciences: 847-968-4700, after hours 877-315-9819).”

This information will be sent to residents in the proposed eradication area in spray notices. Included in the spray notices are two Oregon Poison Center phone numbers for residents who are exposed to *B.t.k* and have health-related questions. A phone number for Oregon Health Services is also provided for physicians with questions about specific patients. Oregon State University's National Pesticide Information Center website address and toll-free phone numbers are also listed. Oregon Health Services will be available to consult with physicians about *B.t.k.*, inert ingredients, and any possible health effects.

### ***B.t.k.* and environment**

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#### ***B.t.k.* and non-target Lepidoptera**

Some non-target lepidopteran larvae (caterpillars) present in the proposed spray area will likely be killed by the application of *B.t.k*. In turn, animals dependent on caterpillars for food may be affected. Sometimes, even non-target Lepidoptera near the treatment area will be impacted due to drift (Whaley *et al.* 1998). However, depressions in caterpillar populations are expected to be temporary because recolonization from adjacent areas will occur and most insects have a high reproductive capacity. There have been several studies that have examined these effects.

During the 1986-87 gypsy moth program in Oregon, a study assessed the direct impact of *B.t.k.* on non-target Lepidoptera in the canopy of Oregon white oak (Miller 1990). The study found a significant reduction in the number of caterpillars collected in *B.t.k.* treated areas in the spring and early summer following treatment. By mid-August, no significant differences in numbers of caterpillars could be detected, but species richness was reduced in the treated blocks. Sampling conducted in the study areas a year after application (1987) revealed that Lepidoptera populations were continuing to recover. Two years after the spray (1988), there were no significant differences between the number of caterpillars collected in treated and untreated plots and the number of species collected in treated blocks was not significantly different from pre-treatment levels in those blocks. However, a comparison of treated and untreated plots indicated that the number of species was still significantly less in treated plots (Miller 1990). Recovery of non-target Lepidoptera populations begins the same season after *B.t.k.* application, but some effects may linger for at least three years. Another study of *B.t.k.* effects on non-target butterfly communities in western Oregon showed similar impacts (Severns 2002). Species richness and density were negatively affected for two years following *B.t.k.* sprays in a gypsy moth eradication program. However, in the third year both indexes rebounded to the pre-spray levels.

Results from a study in West Virginia confirm that *B.t.k.*'s immediate effects are limited to immature Lepidoptera. Other insects, including most beneficial types, are not affected by *B.t.k.* applications (Sample *et al.* 1992). While the effects of *B.t.k.* application are most evident among larval Lepidoptera in the same year as the treatment, some effects on adults may not be observed until the year following treatment. Lepidopteran species with early season larval development experience the greatest impacts (Sample *et al.* 1993).

#### ***B.t.k.* and aquatic insects**

Some aquatic insects are susceptible to different strains of *B.t.* (e.g., *B.t.* var. *israelensis* is used to control mosquitoes and black flies), but *B.t.* var. *kurstaki*,

the strain used for gypsy moth control, is harmless to aquatic insects when it is applied at concentrations used in aerial treatments (Edit 1985, Kreutzweiser *et. al.* 1992). The Rogue River transects the gypsy moth eradication area in Shady Cove and flows southwest to the Pacific Ocean. When *B.t.k.* is used for gypsy moth suppression or eradication in blocks with open water, fish and other animals dependent on aquatic insects for food should not be affected by the *B.t.k.* treatments.

#### ***B.t.k.* and birds**

A study in Oregon examined the indirect effects of *B.t.k.* on the reproductive success of insectivorous birds. The hypothesis was that food supply for the nestlings might be reduced. The study reported no significant differences between treated and untreated areas in numbers of eggs hatched and in nestling growth and development. When caterpillars were not available, the birds switched to other available prey (Gaddis and Corkran 1986, Gaddis 1987). Preliminary results from a study in Arkansas are similar: *B.t.k.* treatments did not have a significant effect on the breeding success of the Hooded Warbler (Lih *et. al.* 1994).

#### ***B.t.k.* and bats**

Some bats, including those species of concern listed in the section of Environmental Factors, feed primarily on moths. These bats might be affected by a decrease in available food in *B.t.k.* treated areas. Perkins and Peterson (1994), however, failed to find any significant differences in total bat activity or species diversity in *B.t.k.*-treated sites within a small aerial spray block when compared to non-treated control sites.

#### ***B.t.k.* and natural enemies**

Field studies suggest that *B.t.k.* may indirectly affect gypsy moth parasitoids. At least two parasitoid species, *Cotesia melanoscelus* and *Rogas lymantriae*, had increased rates of parasitism in areas that were sprayed with *B.t.k.* (Wallner *et. al.* 1983, Webb *et. al.* 1989). Field studies of insects other than Lepidoptera and their natural enemies have found little effect on other species or groups.

#### ***B.t.k.* and water quality, soil condition, and microclimate**

Water quality and soil condition should not be directly affected by *B.t.k.*. *B.t.k.* is not likely to affect most aquatic organisms and is naturally present in soils worldwide. Since *B.t.k.* can reduce the amount of defoliation by leaf-eating caterpillars, it may also help to preserve microclimate conditions.

#### ***B.t.k.* and recreation and agriculture**

The proposed application of *B.t.k.* should have a positive effect on tourism, recreation, forestry, and agriculture. Eradication of the gypsy moth will prevent defoliation of trees and other plants in the area and protect the economic and aesthetic value of these industries.

#### ***B.t.k.* and domestic/farm animals**

Domestic animals (e.g., dogs and cats) and farm animals (e.g., cattle and horses) should not be affected by the *B.t.k.* applications proposed in this program. Although there are no known studies on direct exposure to *B.t.k.* and its effect on these animals, other studies have been conducted. There were no differences between untreated laboratory or wild animals and exposed animals (either

through injection or ingestion). Species included mice, rabbits, sheep, rodents, and shrew (WHO 1999).

### **Intensive/mass trapping using disparlure**

Disparlure is a chemical sex attractant that attracts male gypsy moths. Intensive/mass trapping involves use of large numbers of disparlure-baited pheromone traps—up to nine traps per acre. Section 5 from appendix G of the 1995 EIS thoroughly discusses the ecological effects of disparlure, *B.t.k.*, and other treatment options on the environment.

### **Disparlure and human health**

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Data are not sufficient for a quantitative risk assessment. By analogy to other insect pheromones, risks of toxic effects, if any, are likely to be slight for the general public and workers. Disparlure is very persistent on and in the body. Individuals exposed to disparlure may attract adult male moths for prolonged periods of time (for two to three years). This may be a considerable nuisance in gypsy moth infested areas such as the eastern United States. In uninfested Oregon, however, no impact is expected. The level of exposure required to cause the attractant effect cannot be characterized, although the likelihood of this effect would most likely be greater for workers than for the general public.

### **Disparlure and environment**

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In acute toxicity tests, disparlure was not toxic to mammals (IBT 1972), birds (USDI Fish & Wildlife Service 1975), or fish (USDI Fish & Wildlife Service 1972). One field study showed no effect of disparlure on the level of parasitization by the wasp *Ooencyrtus kuvanae*, an egg parasitoid of gypsy moth (Brown & Cameron 1979). No studies were found in the published literature on the effects, if any, of disparlure on aquatic ecosystems. Pheromone traps do catch small numbers of non-target organisms. These incidental catches are unlikely to have significant environmental consequences.

### **Cumulative impacts**

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agencies (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7, p. 28). Cumulative impacts resulting from an eradication program can be caused by 1) multiple treatments of the same area in the same season (e.g., three applications of *B.t.k.* in this program), 2) combining treatment types (e.g., *B.t.k.* and disparlure in this program) within the same project area and 3) retreatment of the same project area in the following season. Cumulative impacts may be additive resulting in a greater effect than the sum of the individual effects. The cumulative impacts in the proposed program in Shady Cove may be the three *B.t.k.* applications that extend the time of potential exposure and risk to a greater number of non-target Lepidoptera. However, because the proposed eradication area is relatively small, the opportunity for recolonization from the surrounding area is great. Another possible cumulative impact will be if the treatment needs to be conducted again in 2009 if the gypsy moth infestation is larger than expected. For example, if the gypsy moth spreads

to areas larger than the 2008 eradication area, i.e., larger than 336 acres in Shady Cove, then a larger area may be sprayed in 2009. If that happens, the cumulative impacts of the treatments over two consecutive years will extend the time of potential exposure and risk to a greater number of non-target Lepidoptera.

Mass trapping and delimitation using disparlure pose little or no risk to non-target organisms and do not produce cumulative effects. The risk of cumulative impacts from using disparlure after *B.t.k.* treatment is none to minimal. No or minimal effects on water quality, microclimate, or soil productivity are likely from *B.t.k.* or disparlure use and the risk of cumulative effects is none to minimal.

## Summary

Alternative	Preferred	Human effect	Environmental effect	Program objectives
<i>B.t.k.</i>	Yes	Short-term minor effects are possible, but no long-term cumulative effects are anticipated.	Short-term effects on nontarget caterpillars are likely. Cumulative effects on nontarget species are not anticipated; recolonization will occur. No effects on water quality or forest and soil health.	Yes
Gypchek®	No	No effects.	No effects.	No
Diflubenzuron	No	No long or short-term effects anticipated at low exposure.	Effects are anticipated on nontarget insects and possibly aquatic arthropods. May affect soil health through impacts on arthropods that alter soil composition and structure	No
Mass trapping	Yes	No effects.	No effects.	Yes
Mating disruption	No	No effects.	No effects.	No
Sterile insect release	No	No effects.	No effects	No

## Monitoring

A program using pheromone traps will be used to monitor the infestation and determine the success of the eradication project. Intensive trapping will continue until negative trapping results have been achieved for two years. This type of programmatic monitoring following *B.t.k.* treatment has been conducted in Oregon during the last two decades for all of the eradication programs.

## Mitigation

The following standard operating procedures will be observed to safeguard human health and minimize effects on the environment. Procedures pertaining to both ground and aerial treatments are listed. Because we are proposing an aerial eradication project, the procedures for aerial treatments are applicable to this year's project.

### Ground and aerial treatments

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- The Oregon Department of Agriculture will work with Health Services of the Department of Human Services on measures that may be required to safeguard human health. They will provide the public with accurate information on potential risks from *B.t.k.* applications and any recommended personal protection measures.
- The *B.t.k.* insecticide will be applied according to label instructions.
- The public and other selected groups or organizations will be notified by project officials by letter, radio, television, newspaper, or other means of spray dates and places, as appropriate.
- Special emphasis will be placed on avoiding the spraying of areas outside designated eradication areas.
- Transportation of the *B.t.k.* insecticide will be supervised by project personnel to, within, and from the project areas.
- A safety, spill, and emergency response plan will be prepared.
- Species of concern and areas may be buffered as needed.

### Aerial treatments

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- No *B.t.k.* will be applied aerially when:
  - Wind velocity is zero or exceeds 10 miles per hour.
  - Air temperature exceeds 80o F or is less than 38o F.
  - Rain is predicted (>50 percent probability) to occur before adequate drying time has elapsed, i.e., within six hours of application.
  - Foliage is wet such that drops of water are present on needle or leaf ends or can be shaken from branches. *B.t.k.* will be applied only when the target foliage has dried sufficiently.
  - There is fog or poor visibility on the spray block or helispot.
  - Relative humidity is less than 50 percent.
  - The air turbulence (thermal updrafts, etc.) is so great as to affect normal application seriously.
  - Temperature inversions are present with no air movement and are sufficient to interrupt the proper settling and penetration of material through the canopy.
- Aerial *B.t.k.* application will be suspended whenever the *B.t.k.* does not appear to be settling in the target area.
- Aerial *B.t.k.* applications (using a rotary atomizer as a spray device) will be made by a helicopter or fixed wing aircraft flying at or in excess of 50 feet above the tree canopy. The project pilots and aircraft will adhere to all FAA requirements.
- In order to control aerial *B.t.k.* application in large blocks, application aircraft may be accompanied by observation aircraft staffed with a fully qualified observer. Observers and application pilots will fly each spray block



for familiarization prior to spraying. Small aerial projects may not require an observation aircraft.

- Helispot managers and other contract administrators can exercise shutdown authority when they observe aircraft safety or application violations.
- Spray deposition cards will be utilized to monitor droplet size and coverage.
- To prevent accidental release of insecticide due to faulty emergency release mechanisms, spray systems will be inspected to ensure that a positive locking mechanism is in place which will not trip accidentally, but only in response to pilot activation during an emergency. Application equipment will be monitored for leaks and equipment failures.
- School bus routes will not be directly sprayed when children are present.

## F. Recommendation of the Oregon Department of Agriculture

The Oregon Department of Agriculture, Insect Pest Prevention & Management Section recommends that the gypsy moth infestation in Shady Cove be eradicated. The recommended strategy is to use the biological pesticide *Bacillus thuringiensis* var. *kurstaki* (*B.t.k.*) in conjunction with mass/intensive trapping. The *B.t.k.* product used would be Foray® 48B (Appendix C). This is an aqueous formulation that has been used in previous gypsy moth eradication and control programs in rural and urban areas of Oregon and other states. We propose three aerial applications of *B.t.k.* at a rate of 0.5 gallon per acre (equivalent to 24 billion cabbage looper units per acre) in a 336-acre eradication area in Shady Cove. The three treatments will begin in late April in Shady Cove, about 7-14 days apart. Exact timing depends on weather. Mitigation measures described in the 2008 Environmental Assessment for aerial applications will be followed. It is likely that a small buffer area surrounding the eradication will receive some *B.t.k.* but in quantities much less than inside the eradication area.

Following *B.t.k.* treatments, intensive/mass trapping programs will be used to monitor the effectiveness of the *B.t.k.* applications and to delimit the location of any remaining populations in Shady Cove. Trap density will be three to nine traps per acre. If more moths are caught, additional egg mass searches and treatments will be considered for 2009. Two years of negative trapping results following the treatments will indicate the infestation has been eradicated.

## G. Conclusion

The environmental analysis conducted by ODA has determined that the proposed gypsy moth eradication program using the bacterial insecticide, *Bacillus thuringiensis* var. *kurstaki* (*B.t.k.*) and mass/intensive trapping, will have no significant impact on humans and the environment. This finding is based on the following facts.

- 1) *B.t.k.* is a naturally occurring soil bacterium. *B.t.k.* has been used extensively for gypsy moth suppression and eradication programs throughout the United States. In Oregon, *B.t.k.* has been used in gypsy moth eradication programs since 1984.
- 2) *B.t.k.* is not harmful to healthy humans, pets, domestic animals, birds, wildlife, or aquatic organisms. Beneficial insects including predators, parasites, and honeybees are not harmed by *B.t.k.* Some non-target butterfly

and moth larvae (caterpillars) will be killed by the proposed eradication, but these species should recolonize the eradication block from the surrounding untreated area. No long-term, irreversible effects to non-target butterflies or moths are expected.

- 3) Human health studies during five large eradication programs using *B.t.k.* in populated areas have found no significant health problems attributable to the treatments.
- 4) Aqueous formulations of *B.t.k.* contain no organic solvents. None of the inert ingredients of the formulations being considered are on EPA list 1 (Inerts of Toxicological Concern) or list 2 (Potentially Toxic Inerts). The *B.t.k.* product (including the inert ingredients) being considered has been certified by EPA and OMRI (Organic Materials Review Institute) for organic production.
- 5) Six federally listed threatened or endangered species may occur near the proposed gypsy moth eradication area in Shady Cove: big-flowered woolly meadowfoam, Cook's lomatium, Gentner mission-bells, coho salmon, Northern spotted owl, and vernal pool fairy shrimp. The proposed action will have no effect on threatened or endangered species or their designated critical habitats within or near the eradication areas.

## H. Agencies and persons consulted

National Marine Fisheries Service (Kenneth Phippen) Habitat Roseburg Office Roseburg, OR 97470 (541) 957-3385	For information on threatened and endangered fish species.
Oregon Natural Heritage Information Center Oregon State University (Cliff Alton) 1322 SE Morrison Street Portland, OR 97214 (503) 731-3070 ext 103	For information on threatened and endangered fish species.
Oregon Dept. of Agriculture (Bob Meinke) 635 Capitol St. NE Salem, OR 97301 (541) 737-2317	For information on concerned plant species.
Oregon Department of Forestry (Rob Flowers) 2600 State St. Salem, OR 97301 (503) 945-7396	For review and comment.
Oregon Department of Human Services, Health Services (Justin Walz) 800 NE Oregon Street, Suite 827 Portland, OR 97232-2162 (503) 731-4573	For assistance on measures to safeguard human health, and for review and comment.
Oregon Health Sciences University/Oregon Poison Center (Zane Horowitz, M.D.) Mail Code CB550 3181 SW Sam Jackson Park Rd. Portland, OR 97201 (503) 494-8968	For assistance on measures to safeguard human health, and for review and comment.
Oregon State University (Paul Jepson) Integrated Plant Protection Center, Cordley Hall Corvallis, OR 97331	For review and comment.
Oregon State University (Rick Hilton) Southern Oregon Research/Jackson County Extension 569 Hanley Rd. Central Point, OR 97502 (541) 772-5165	For site specific information in Shady Cove and review, comment.
Paul Hammond 2435 E. Applegate Philomath, OR 97370 (541) 929-3894	For information on threatened or endangered Lepidoptera.
USDA Forest Service (Kathy Sheehan) P.O. Box 3623 333 SW First Ave Portland, OR 97208 (503) 808-2666	For review, comment and aerial application issues.
US. Fish & Wildlife Service (Kevin Maurice) 2600 S.E. 98th Ave., Suite 100 Portland, OR 97266 (503) 231-6179	For information on threatened and endangered species, and to ensure compliance with the Endangered Species Act.

## I. List of preparers and reviewers

### Preparers

Barry Bai and Diana Kimberling  
Oregon Department of Agriculture, Salem, OR 97301.

### Reviewers

Dan Hilburn and Richard Worth  
Oregon Department of Agriculture, Salem, OR 97301.

Rhonda Solomon and Tracy Horner  
USDA, APHIS, 4700 River Road, Riverdale, MD 20737.

## J. References

- Aer'aqua Medicine Limited 2000. Health surveillance following operation ever green: a program to eradicate the white-spotted tussock moth from the eastern suburbs of Auckland; report to the Ministry of Agriculture and Forestry. 60pp.
- Bogdanowicz, S.M., V.C. Mastro, D.C. Prasher, and R.G. Harrison. 1997. Microsatellite DNA variation among Asian and North American gypsy moths (Lepidoptera: Lymantriidae). *Ann. Ent. Soc. Amer.* 90:768-775.
- Brown, M.W. and E.A. Cameron. 1979. Effects of disparlure and egg mass size on parasitism by the gypsy moth egg parasite, *Ooencyrtus kuwanai*. *Environmental Entomology*. 8: 77-80.
- Capital Health Region 1999. Human health surveillance during the aerial spraying for control of north American gypsy moth on southern Vancouver Island, British Columbia, 1999—a report to the administrator, Pesticide Control Act, Ministry of Environment, Lands and Parks, Province of British Columbia. 36 pp.
- Carlson, J., M. Stemeroff, S. Lindgren, A. Hunter, G. Cushon, R. Setter, L. Charleson, and R. Hawe. 1994. A Risk Assessment of European Gypsy Moth in British Columbia. Phero Tech Inc. and Deloitte & Touche Management Consultants. Available from: Agriculture Canada, #202 - 620 Royal Ave., P.O. Box 2523, New Westminster, B.C., Canada V3L 5A8. 73 pp.
- Currin, R.E., K. Amsberry, and R.J. Meinke. 2004. Developing biologically based population introduction protocols for at-risk plant species of the interior valleys of southwestern Oregon. Report to the US Fish and Wildlife Service, Portland, OR. Native Plant Conservation Program, Oregon Department of Agriculture, Salem, OR. 51 pp.
- Downey, D.M. 1991. Do gypsy moths impact stream water chemistry? *Demonstration Project News*. Appalachian Integrated Pest Management Project. Vol. 4 (9): 1-3.
- Edit, D.C. 1985. Toxicity of *Bacillus thuringiensis* var. *kurstaki* to aquatic insects. *Canadian Entomologist*. 117:829-837.
- Forest Service. 1994. Gypsy Moth News. USDA, Forest Service, Northeastern Area, State and Private Forestry. June, 1994. 35:1-2.

- Gaddis, P.K. 1987. Secondary effects of *B.t.k.* spray on avian predators; the reproductive success of chickadees. Final report, on file: Oregon Department of Agriculture, Plant Division, Salem, Oregon. 21 pp.
- Gaddis, P.K. and C.C. Corkran. 1986. Secondary effects of *B.t.k.* spray on avian predators; the reproductive success of chestnut-backed chickadees. Final Report, on file: Oregon Department of Agriculture, Plant Division, Salem, Oregon. 20 pp.
- Garner, K.J. and J.M. Slavicek. 1996. Identification and characterization of a RAPD-PCR marker for distinguishing Asian and North American gypsy moths. *Insect Molecular Biology* 5:81-91.
- Glare, T. R. and O'Callaghan M. 2000. *Bacillus thuringiensis*: Biology, Ecology and Safety. John Wiley & Sons, Ltd, Chichester, UK. 350 pp.
- GM Digest. 2007. an historical database containing information (acres and dollars) associated with the USDA cooperative gypsy moth suppression, eradication, and defoliation surveys. On line web page address: <http://na.fs.fed.us/wv/gmdigest/>.
- Green, M., M. Heumann, R. Sokolow, L.R. Foster, R. Bryant, M. Skeels. 1990. Public health implications of the microbial pesticide, *Bacillus thuringiensis*: an epidemiological study, Oregon, 1985-86. *American Journal of Public Health*. 80(7):848-852.
- IBT (Industrial Bio-Test Laboratories, Inc). 1972. Acute toxicity studies with Disparlure. IBT No. A 1958. Northbrook, IL; 26p.
- Joung, K.B. and J.C. Cote. 2000. A review of the environmental impacts of the microbial insecticide *Bacillus thuringiensis*. Technical Bulletin No. 29, Horticultural Research and Development Center, Agriculture and Agri-Food Canada , QP, Canada. 16 pp.
- Knecht, D. 1996. The reproductive and population ecology of *Cypripedium fasciculatum* (Orchidaceae) throughout the Cascade Range. MSc Thesis. Ellensburg, Central Washington University. 64 pp.
- Kreutzweiser, D.P., S.B. Holmes, S.S. Capell, and D.C. Eichenberg. 1992. Lethal and sublethal effects of *Bacillus thuringiensis* var. *kurstaki* on aquatic insects in laboratory bioassays and outdoor stream channels. *Bulletin of Environmental Contamination and Toxicology*. 49:252-258.
- Lih, M.P., F.M. Stephen, K.G. Smith, L.R. Nagy, and G.W. Wallis. 1995. Effects of a gypsy moth eradication program on nontarget forest canopy insects and their bird predators. pgs 193-198 in Proceedings of the 1994 Annual Gypsy Moth Review. 1994 October 30 - November 2; Portland, OR. National Gypsy Moth Management Board. 375 pp.
- McAnanich, G. 2007. Pers. comm. Oregon Department of Agriculture, Nursery and Christmas Tree Program Manager.
- Miller, J.C. 1990. Field Assessment of the Effects of a Microbial Pest Control Agent on Nontarget Lepidoptera. *American Entomologist*. 37:135-139.
- Miller, J.C. 1990. Effects of a microbial insecticide, *Bacillus thuringiensis* *kurstaki*, on nontarget Lepidoptera in a spruce budworm-infested forest. *Journal of Research on the Lepidoptera*. 29(4):267-276.

- Miller, J.C., P.E. Hanson, and D.N. Kimberling. 1991a. Development of the gypsy moth on Douglas-fir foliage. *Journal of Economic Entomology* 84:461-645.
- Miller, J.C., P.E. Hanson, and D.N. Kimberling. 1991b. Development of the gypsy moth (Lepidoptera: Lymantriidae) on Garry oak and red alder in western North America. *Environmental Entomology* 20:1097-1101.
- Noble, M.A., P.D. Riben, and G.J. Cook. 1992. Microbiological and epidemiological surveillance programme to monitor the health effects of Foray 48B *B.t.k* spray. Report Submitted to: The Ministry of Forests, Province of British Columbia, Sept. 30, 1992.
- North Carolina Department of Agriculture. 1994. Environmental Assessment for Bladen, Brunswick, Columbus, New Hanover, and Pender Counties, Gypsy Moth Eradication Project 1994. North Carolina Department of Agriculture, Raleigh, N.C.
- Oregon Department of Agriculture. 1989. The Gypsy Moth in Oregon. Oregon Department of Agriculture, Plant Division, Salem, Oregon. 17 pp.
- Oregon Department of Agriculture. Plant Division Annual Report(s). 1989-2006. Salem, OR.
- Oregon Health Services. 2003. Questions and Answers about Gypsy Moth Spraying and Your Health—Oregon Health Services 2003 *B.t.k*. Fact Sheet. March 10, 2003. Oregon Health Services, Portland, Oregon. 5 pp.
- Perkins, M. and J. R. Peterson. 1994. Impacts of *Bacillus thuringiensis* on resident bat populations, Carver, Oregon. Final report, on file: Oregon Department of Agriculture, Plant Division, Salem, Oregon. 13 pp.
- Sample, B.E., L. Butler, R.C. Whitmore. 1992. The impacts of *Bacillus thuringiensis* applications on non-target arthropods: preliminary results. Appalachian Gypsy Moth Integrated Pest Management Demonstration Project News. 5(7):1-4.
- Sample, B.E., L. Butler, C. Zivkovich, and R.C. Whitmore. 1993. Evaluation of *Bacillus thuringiensis* and defoliation effects on native Lepidoptera. USDA, Forest Service. AIPM Technology Transfer, NA-TP-10-93. 12 pp.
- Severns, P. 2002 Evidence for the negative effects of BT (*Bacillus thuringiensis* var. *kurstaki*) on a non-target butterfly community in western Oregon, USA. *Journal of the Lepidopterists' Society*. 56:166-170.
- Surgeoner, G.A. 1994. Eradication Options for the European Strain of Gypsy Moth in British Columbia. Department of Environmental Biology, University of Guelph, Guelph, Ontario N1G 2W1. 78 pp.
- Syracuse Environmental Research Associates, Inc. 2004. Control/Eradiation Agents for the Gypsy Moth—Human Health and Ecological Risk Assessment for *Bacillus thuringiensis* var. *kurstaki* (*B.t.k.*) Final Report. 152 pp.
- Tuthill, R.W., A.T. Canada, K. Wilcock, P.H. Etkind, T.M. O'Dell, and S.K. Shama. 1984. An epidemiologic study of gypsy moth rash. *American Journal of Public Health*. 74(8):799-803.



- USDA. 1995. Gypsy Moth Management in the United States, A Cooperative Approach. Final Environmental Impact Statement. USDA Forest Service, Northeastern Area State and Private Forestry, Radnor, PA.
- USDA. Animal and Plant Health Inspection Service. 1994. Gypsy Moth Eradication Database, maintained at Plant Protection and Quarantine, Riverdale, MD.
- USDI Fish and Wildlife Service. 2003. Recovery plan for *Fritillaria gentneri* (Gentner's fritillary). US Fish and Wildlife Service, Portland, OR. vii + 89 pp.
- US Environmental Protection Agency. 1998. Reregistration Eligibility Decision (RED) *Bacillus thuringiensis* EPA738-R-98-004, March 1998. 151pp.
- Wallner, W. E., N.R. Dubois and P.S. Grinberg. 1983. Alteration of parasitism by *Rogas lymantriae* (Hymenoptera: Braconidae) in *Bacillus thuringiensis*-stressed gypsy moth (Lepidoptera: Lymantriidae) hosts. *Journal of Economic Entomology*. 76:275-277.
- Webb, R.E., M. Shapiro, J.D. Podgwaite, R.C. Reardon, K.M. Tatman, L. Venables and D.M. Kolodny-Hirsch. 1989. Effects of aerial spraying with Dimilin, Dipel, or Gypcheck on two natural enemies of the gypsy moth (Lepidoptera: Lymantriidae). *Journal of Economic Entomology*. 82: 1695-1701.
- Whaley, W. H., J. Anhold and G.B. Schaalje. 1998. Canyon drift and dispersion of *Bacillus thuringiensis* and its effects on select nontarget lepidopterans in Utah. *Environmental Entomology*. 27:539-548.
- World Health Organization. 1999. Environmental Health Criteria 217 *Bacillus thuringiensis*. WHO, Geneva 105 pp.
- Xerces Society. 2006. The Butterfly Conservation Initiative. Mardon Skipper Butterfly. [www.butterflyrecovery.org/species\\_profiles/mardon\\_skipper/](http://www.butterflyrecovery.org/species_profiles/mardon_skipper/)

## Appendix A: Public information meeting notice published in the local newspaper

Published in the Upper Rogue Independent, Eagle Point, Oregon, January 29, February 5, 12, 19, 2008

Public Information Meeting  
**“The Gypsy Moth Problem”**

Thursday, February 21, 2008  
7:00 - 9:00 pm  
Upper Rogue Community Center  
22465 Highway 62  
Shady Cove, OR 97539

The Oregon Department of Agriculture is proposing an eradication program for a gypsy moth infestation detected in the city of Shady Cove. The department proposes three applications of the biological insecticide *Bacillus thuringiensis* var. *kurstaki*, applied by helicopter from late-April to mid-May 2008, to eradicate gypsy moth from the area. An intensive pheromone trapping program would follow. The proposed eradication area is a rectangular block of about 336 acres, roughly centered just west of Highway 62, on the south/east side of the Rogue River.

You are invited to attend this public information meeting to learn more about the gypsy moth and the proposed eradication program. For more information contact the **Oregon Department of Agriculture: Barry Bai 1-800-525-0137, Bruce Pokarney 503-986-4559, or by email at [gypsymoth@oda.state.or.us](mailto:gypsymoth@oda.state.or.us)**. Please check your local phone book for TTY/TDD telecommunications service.

Individuals with disabilities requiring accommodations at the public information meeting should contact Barry Bai as soon as possible at the number above.

## Appendix B: Letters concerning threatened and endangered species



### United States Department of the Interior



#### FISH AND WILDLIFE SERVICE

Oregon Fish and Wildlife Office  
2600 SE 98<sup>th</sup> Avenue, Suite 100  
Portland, Oregon 97266

Phone: (503)231-6179 FAX: (503)231-6195

Reply To: 8330.SP12(08)

December 10, 2007

Barry Bai  
Oregon Department of Agriculture  
635 Capitol Street, NE  
Salem, OR 97301-2532

Subject: European Gypsy Moth Erradication/Jackson County Project  
USFWS Reference # E5ACAD618121B799882573AD007CC0B5

Dear Dr. Barry Bai:

This is in response to your request, dated December 10, 2007, requesting information on listed and proposed endangered and threatened species that may be present within the area of the European Gypsy Moth Erradication/Jackson County Project in Jackson County(s). The Fish and Wildlife Service (Service) received your correspondence on December 10, 2007.

We have attached a list (Enclosure A) of threatened and endangered species that may occur within the area of the European Gypsy Moth Erradication/Jackson County Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Oregon Department of Agriculture requirements under the Act are outlined in Enclosure B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, the Oregon Department of Agriculture is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Enclosure B, as well as 50 CFR 402.12.

If the Oregon Department of Agriculture determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, the Oregon Department of Agriculture is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Enclosure A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published September 12, 2006, in the Federal Register (Vol. 71, No. 176, 53756) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be

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listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, the Oregon Department of Agriculture is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends minimizing impacts to these species to the extent possible in order to prevent potential future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, the Oregon Department of Agriculture may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages the Oregon Department of Agriculture to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Kevin Maurice at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead trout, please contact NOAA Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

For future species list requests, please visit our website (<http://www.fws.gov/oregonfwo/Species/default.asp>) for instructions on how to make requests.

#### Enclosures

EnclosureA: Jackson COUNTY.PDF

EnclosureB: EnclosureB\_Federal\_Agencies\_Responsibilities.PDF

## ENCLOSURE A

**FEDERALLY LISTED THREATENED, ENDANGERED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN WHICH MAY OCCUR WITHIN JACKSON COUNTY, OREGON**

LISTED SPECIES<sup>1/</sup>Birds

Northern spotted owl <sup>2/</sup>	<i>Strix occidentalis caurina</i>	CH T
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Fish

Coho salmon (S. OR/N. CA Coast) <sup>3/</sup>	<i>Oncorhynchus kisutch</i>	CH T*
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Invertebrates

Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	CH T
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Plants

Gentner mission-bells <sup>4/</sup>	<i>Fritillaria gentneri</i>	E
Large-flowered wooly meadowfoam <sup>5/</sup>	<i>Limnanthes floccosa</i> ssp. <i>grandiflora</i>	E
Cook's lomatium <sup>6/</sup>	<i>Lomatium cookii</i>	E

PROPOSED SPECIES

None

CANDIDATE SPECIES<sup>7/</sup>Mammals

Pacific fisher <sup>8/</sup>	<i>Martes pennanti pacifica</i>	
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Birds

Streaked horned lark	<i>Eremophila alpestris strigata</i>	
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Amphibians and Reptiles

Oregon spotted frog	<i>Rana pretiosa</i>	
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Invertebrates

Mardon skipper (butterfly)	<i>Polites mardon</i>	
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Plants

Siskiyou mariposa lily	<i>Calochortus persistens</i>	
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SPECIES OF CONCERNMammals

Pallid bat (west of Cascade crest)	<i>Antrozous pallidus pacificus</i>
Red tree vole	<i>Arborimus longicaudus</i>
Pacific western big-eared bat	<i>Corynorhinus townsendii townsendii</i>
California wolverine	<i>Gulo gulo luteus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Long-eared myotis (bat)	<i>Myotis evotis</i>
Fringed myotis (bat)	<i>Myotis thysanodes</i>
Long-legged myotis (bat)	<i>Myotis volans</i>
Yuma myotis (bat)	<i>Myotis yumanensis</i>

Birds

Northern goshawk  
 Band-tailed pigeon  
 Olive-sided flycatcher  
 Yellow-breasted chat  
 Acorn woodpecker  
 Lewis' woodpecker  
 Mountain quail  
 White-headed woodpecker  
 Oregon vesper sparrow  
 Purple martin

*Accipiter gentilis*  
*Columba fasciata*  
*Contopus cooperi*  
*Icteria virens*  
*Melanerpes formicivorus*  
*Melanerpes lewis*  
*Oreortyx pictus*  
*Picoides albolarvatus*  
*Pooecetes gramineus affinis*  
*Progne subis*

#### Amphibians and Reptiles

Tailed frog  
 Northwestern pond turtle  
 Common kingsnake  
 California mountain kingsnake  
 Del Norte salamander  
 Siskiyou Mountains salamander  
 Northern red-legged frog  
 Foothill yellow-legged frog  
 Cascades frog

*Ascaphus truei*  
*Emys marmorata marmorata*  
*Lampropeltis getula*  
*Lampropeltis zonata*  
*Plethodon elongatus*  
*Plethodon stormi*  
*Rana aurora aurora*  
*Rana boylei*  
*Rana cascadae*

#### Fishes

Jenny Creek sucker  
 Pacific lamprey  
 Coastal cutthroat trout (S. OR/CA Coast)

*Catostomus rimiculus* ssp.  
*Lampetra tridentata*  
*Oncorhynchus clarki clarki*

#### Invertebrates

Denning's agapetus caddisfly  
 Franklin's bumblebee  
 Siskiyou chloaeltis grasshopper  
 Green Springs Mountain farulan caddisfly  
 Sagehen Creek goeracean caddisfly  
 Schuh's homoplectran caddisfly  
 caddisfly (no common name)  
 Siskiyou carabid beetle

*Agapetus denningi*  
*Bombus franklini*  
*Chloaeltis aspasma*  
*Farula davisii*  
*Goeracea oregana*  
*Homoplectra schuhi*  
*Moselyana comosa*  
*Nebria gebleri siskiyouensis*

#### Plants

Henderson's bentgrass  
 Rogue Canyon rockcress  
 Crater Lake rock cress  
 Wayside aster  
 Crenulate grape-fern  
 Greene's mariposa-lily  
 Broad-fruit mariposa-lily  
 Umpqua mariposa-lily  
 Howell's camassia  
 Baker's cypress  
 Clustered lady's-slipper  
 Siskiyou willow herb  
 Shaggy horkelia  
 Henderson's horkelia  
 Bellinger's meadowfoam  
 Dwarf woolly meadowfoam  
 Ashland lupine  
 White meconella  
 Detling's microseris

*Agrostis hendersonii*  
*Arabis modesta*  
*Arabis suffrutescens* var. *horizontalis*  
*Aster vialis*  
*Botrychium crenulatum*  
*Calochortus greenei*  
*Calochortus nitidus*  
*Calochortus umpquaensis*  
*Camassia howellii*  
*Cupressus bakeri*  
*Cypripedium fasciculatum*  
*Epilobium siskiyouense*  
*Horkelia congesta* ssp. *congesta*  
*Horkelia hendersonii*  
*Limnanthes floccosa* ssp. *bellingieriana*  
*Limnanthes floccosa* ssp. *pumila*  
*Lupinus lepidus* var. *ashlandensis*  
*Meconella oregana*  
*Microseris laciniata* ssp. *detlingii*



Coral seeded allocarya  
 Howell's tauschia  
 Small-flowered death camas

*Plagiobothrys figuratus* var. *corallicarpus*  
*Tauschia howellii*  
*Zigadenus fontanus*

(E) - Listed Endangered

(T) - Listed Threatened

(CH) - Critical Habitat has been designated for this species

(PE) - Proposed Endangered

(PT) - Proposed Threatened

(PCH) - Critical Habitat has been proposed for this species

*Species of Concern* - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

\* Consultation with NOAA's National Marine Fisheries Service may be required.

<sup>11</sup> U.S. Department of Interior, Fish and Wildlife Service, October 31, 2000, *Endangered and Threatened Wildlife and Plants*, 50 CFR 17.11 and 17.12

<sup>21</sup> Federal Register Vol. 57, No. 10, January 15, 1992, Final Rule - Critical Habitat for the Northern Spotted Owl

<sup>31</sup> Federal Register Vol. 62, No. 87, May 6, 1997, Final Rule - Coho Salmon

<sup>41</sup> Federal Register Vol. 64, No. 237, December 10, 1999, Final Rule - *Fritillaria gentneri*

<sup>51</sup> Federal Register Vol. 67, No. 216, November 7, 2002, Final Rule - *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*

<sup>61</sup> Federal Register Vol. 67, No. 216, November 7, 2002, Final Rule - *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*

<sup>71</sup> Federal Register Vol. 69, No. 86, May 4, 2004, Notice of Review - Candidate or Proposed Animals and Plants

<sup>81</sup> Federal Register Vol. 69, No. 68, April 8, 2004, 12-Month Finding for a Petition to List the West Coast Distinct Population Segment of the Fisher

ENCLOSURE B

FEDERAL AGENCIES RESPONSIBILITIES UNDER SECTION 7(a) and (c)  
OF THE ENDANGERED SPECIES ACT

**SECTION 7(a)-Consultation/Conference**

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or Threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat. The process is initiated by the Federal agency after they have determined if their action may affect (adversely or beneficially) a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed Critical Habitat.

**SECTION 7(c)-Biological Assessment for Major Construction Projects<sup>1</sup>**

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify proposed and/or listed species which are/is likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an on-site inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if any species are present and whether suitable habitat exists for either expanding existing populations or for potential reintroduction of species; (2) review literature and scientific data to determine species distribution(s), habitat needs, and other biological requirements; (3) interview experts including those within FWS, National Marine Fisheries Service, State conservation departments, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species present in terms of effects to individuals and populations, including consideration of cumulative effects to the species and habitat; (5) analyze alternative actions that may provide conservation measures and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not any listed species will be affected. Upon completion, the report should be forwarded to our Portland Office at 2600 SE 98<sup>th</sup> Ave., Suite 100, Portland, Oregon, 97266.

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<sup>1</sup>A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c). On projects other than construction, it is suggested that a biological evaluation similar to the biological assessment be undertaken to conserve species influenced by the Endangered Species Act.

# OREGON NATURAL HERITAGE INFORMATION CENTER

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*Institute for Natural Resources*  
1322 SE Morrison Street  
Portland, Oregon 97214-2423  
503.731.3070  
<http://oregonstate.edu/ornhic>

December 19, 2007

Barry Bai, Ph.D.  
Department of Agriculture  
635 Capitol Street NE  
Salem, OR 97301-2532

Dear Dr. Bai:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your 2008 Gypsy Moth Project in Township 34 South, Range 1 West, Section 15 and 16, W.M.

Twenty-five (25) records were noted within a two-mile radius of your project and are included on the enclosed computer printout. A key to the fields is also included.

Please remember that the lack of rare element information from a given area does not mean that there are no significant elements there, only that there is no information known to us from the site. To assure that there are no important elements present, you should inventory the site, at the appropriate season.

This data is confidential and for the specific purposes of your project and is **not to be distributed**.

If you need additional information or have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Cliff Alton", with a long horizontal flourish extending to the right.

Cliff Alton  
Conservation Information Assistant

encl.: invoice (H-121907-CWA1)  
computer printout and data key

Oregon Natural Heritage Information Center - December 2007

Sensitive Data - Do Not Distribute

Scientific Name: ***Bufo boreas***  
 Common Name: **Western toad**

Federal Status: No Status	GRANK: G4	NHP List: 4	Category: Vertebrate Animal
State Status: SV	SRANK: S3	HP Track: N	ELCODE: AAABB01030
EO ID: 22603	First Obs: 1982	Last Obs: 1982	Confirmed:

Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>
Jackson	KM	Point [Areal - Estimated ( 1500 m)]

<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
[REDACTED]	[REDACTED]	[REDACTED]	42122-F7	Trail	1710030706 - TRAIL CREEK

<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
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EO Type: Minimum Elev.(m): 469 Annual Observations  
 EO Data: 1982: SPECIES OBSERVED  
 EO Comments:  
 Protection:  
 Management:  
 General: OBSERVER: ALAN ST. JOHN

Scientific Name: ***Rana boylei***  
 Common Name: **Foothill yellow-legged frog**

Federal Status: SOC	GRANK: G3	NHP List: 2	Category: Vertebrate Animal
State Status: SV	SRANK: S2S3	HP Track: Y	ELCODE: AAABH01050
EO ID: 3726	First Obs:	Last Obs: 1982-PRE	Confirmed:

Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>
Jackson	KM	Point [Areal - Estimated ( 1500 m)]

<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
[REDACTED]	[REDACTED]	[REDACTED]	42122-E7	Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE

<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
FEDERAL		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA

EO Type: Minimum Elev.(m): 488 Annual Observations  
 EO Data: UNKNOWN NUMBER OBSERVED, DATE NOT GIVEN.  
 EO Comments:  
 Protection:  
 Management:  
 General:

Scientific Name: ***Strix occidentalis caurina***  
 Common Name: **Northern spotted owl**

Federal Status: LT	GRANK: G3T3	NHP List: 1	Category: Vertebrate Animal
State Status: LT	SRANK: S3	HP Track: Y	ELCODE: ABNSB12011
EO ID: 14463	First Obs: 1992	Last Obs: 1995	Confirmed:

Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>
Jackson	KM	Point [Areal - Estimated ( 100 m)]

<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
[REDACTED]	[REDACTED]	[REDACTED]	42122-F7	Trail	1710030707 - ROGUE RIVER-SHADY COVE

<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
FEDERAL		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA

EO Type: Minimum Elev.(m): 573 Annual Observations  
 EO Data: SPOTTED OWL HABITAT AREA, SEE ANNOBS.  
 EO Comments:  
 Protection:  
 Management:  
 General:  
 • 1998 - NOT SURVEYED  
 • 1997 - 0 OWLS SEEN  
 • 1996 - 0 OWLS SEEN  
 • 1995 - 1 OWL SEEN DURING 1 VISIT ONLY  
 • 1994 - 2 OWLS SEEN 1 PAIR  
 • 1993 - 2 OWLS SEEN 1 PAIR  
 • 1992 - 2 OWLS SEEN 1 MALE AND 1 FEMALE

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Sensitive Data - Do Not Distribute

EO Comments:

Protection:

Management:

General: MSNO=3382

Scientific Name: *Archilochus alexandri*

Common Name: Black-chinned hummingbird

Federal Status: GRANK: G5

State Status: SRANK: S4B

EO ID: 489 First Obs: 1968

Directions:

NHP List:

HP Track: N

Last Obs: 1970-07-25

Category: Vertebrate Animal

ELCODE: ABNUC45020

Confirmed:

County Name

Jackson

Ecoregion

KM

Source Feature (Uncertainty Type (Distance))

Point (Areal - Estimated ( 1500 m))

Town-Range Sec Note

QuadCode QuadName

42122-E7 Shady Cove

Watershed

1710030707 - ROGUE RIVER-SHADY COVE

Owner Name/Type

Owner Comments

Managed Area Name

EO Type: Minimum Elev.(m): 427

Annual Observations

EO Data: SEVERAL PAIRS RECORDED JUNE, 1970, YOUNG MALE 25 JULY 1970. CONSIDERED AN UNCOMMON REGULAR SUMMER VISITOR BY BROWNING. EARLIEST ARRIVAL - 26 MARCH; LATEST OCCURRENCE - 15 AUGUST

EO Comments:

Protection:

Management:

General:

Scientific Name: *Oncorhynchus kisutch* pop. 2

Common Name: Coho salmon (Southern Oregon/Northern California Coasts ESU)

Federal Status: LT GRANK: G4T2Q

State Status: SC SRANK: S2

EO ID: 9889 First Obs:

Directions:

NHP List: 1

HP Track: Y

Last Obs: 2001-PRE

Category: Vertebrate Animal

ELCODE: AFCHA02032

Confirmed:

County Name

Jackson

Ecoregion

KM

Source Feature (Uncertainty Type (Distance))

Data currently not available.

Town-Range Sec Note

QuadCode QuadName

42122-E7 Shady Cove

Watershed

1710030707 - ROGUE RIVER-SHADY COVE

Owner Name/Type

PRIVATE & FEDERAL

Owner Comments

Managed Area Name

MEDFORD BLM DISTRICT  
BUTTE FALLS RESOURCE AREA

EO Type: SPAWNING & REARING - fish Minimum Elev.(m):

Annual Observations

EO Data: ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE. ODFW SALMONID DISTRIBUTION DOCUMENTATION 1985: INDIAN CREEK, 1951: INDIAN CREEK.

EO Comments:

Protection:

Management:

General: DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF COHO IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: *Oncorhynchus kisutch* pop. 2

Common Name: Coho salmon (Southern Oregon/Northern California Coasts ESU)

Federal Status: LT GRANK: G4T2Q

State Status: SC SRANK: S2

EO ID: 11265 First Obs:

Directions:

NHP List: 1

HP Track: Y

Last Obs: 2001-PRE

Category: Vertebrate Animal

ELCODE: AFCHA02032

Confirmed:

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Sensitive Data - Do Not Distribute

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>			
Jackson	KM	Data currently not available.			
<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-F7	Trail	17100307 - Upper Rogue
			42122-F8	Cleveland Ridge	
<u>Owner Name/Type</u>	<u>Owner Comments</u>		<u>Managed Area Name</u>		
PRIVATE & FEDERAL			MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA		
EO Type: SPAWNING & REARING - fish		Minimum Elev.(m):	<u>Annual Observations</u>		
EO Data: ODFW DISTRIBUTION MAPS USED TO CREATE THE 124,000 COVERAGE. ODFW SALMONID DISTRIBUTION DOCUMENTATION 2000. W. FK. TRAIL CREEK. 1998: W. FK. TRAIL CREEK. 1995: W. FK. TRAIL CREEK, ROMINE CREEK, WALL CREEK, CANYON CREEK.					
EO Comments:					
Protection:					
Management:					
General: DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF COHO IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.					

Scientific Name: *Oncorhynchus kisutch* pop. 2  
 Common Name: Coho salmon (Southern Oregon/Northern California Coasts ESU)  
 Federal Status: LT GRANK: G4T20 NHP List: 1 Category: Vertebrate Animal  
 State Status: SC SRANK: S2 HP Tract: Y ELCODE: AFCHA00032  
 EO ID: 13498 First Obs: Last Obs: 1998-PRE Confirmed:  
 Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>			
Jackson	KM	Data currently not available.			
<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-D7	Eagle Point	17100307 - Upper Rogue
			42122-D8	Sans Valley	
			42122-E7	Shady Cove	
			42122-F6	McLeod	
			42122-F7	Trail	
<u>Owner Name/Type</u>	<u>Owner Comments</u>		<u>Managed Area Name</u>		
PRIVATE & FEDERAL			GLENDALE RESOURCE AREA BUTTE FALLS RESOURCE AREA		
EO Type: REARING & MIGRATION - fish		Minimum Elev.(m):	<u>Annual Observations</u>		
EO Data: ODFW DISTRIBUTION MAPS USED TO CREATE THE 124,000 COVERAGE.					
EO Comments:					
Protection:					
Management:					
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF COHO IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT. COLE M RIVERS FISH HATCHERY IS LOCATED ON THE ROGUE RIVER BELOW LOGT CREEK LAKE.					

Scientific Name: *Oncorhynchus tshawytscha* pop. 26  
 Common Name: Chinook salmon (Southern Oregon/Northern California Coast ESU, fall run)  
 Federal Status: GRANK: G5T3Q NHP List: 2 Category: Vertebrate Animal  
 State Status: SC SRANK: S2 HP Tract: Y ELCODE: AFCHA0005E  
 EO ID: 16215 First Obs: Last Obs: 1998-PRE Confirmed:  
 Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature [Uncertainty Type (Distance)]</u>
Jackson		Data currently not available.



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<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-D7	Eagle Point	17100307 - Upper Rogue
			42122-D8	Sams Valley	
			42122-E7	Shady Cove	
			42122-F6	McLeod	
			42122-F7	Trail	
			42122-G6	Sugarpine Creek	

<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
EO Type: SPAWNING & REARING - fish	Minimum Elev.(m):	<u>Annual Observations</u>
EO Data: FALL RUN, ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE, ODFW SALMONID DISTRIBUTION DOCUMENTATION 1993, ELK CREEK, 1954, ELK CREEK.		
EO Comments:		
Protection:		
Management:		
General:	DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF CHINOOK IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT. COLE M RIVERS FISH HATCHERY LOCATED ON ROGUE RIVER BELOW LOST CREEK LAKE.	

Scientific Name: *Oncorhynchus mykiss pop. 24*  
 Common Name: Steelhead (Klamath Mountains Province ESU, summer run)  
 Federal Status: GRANK: G5T2T3Q NHP List: 2 Category: Vertebrate Animal  
 State Status: SV SRANK: S2S3 HP Trade: Y ELCODE: AFCHA00094  
 EO ID: 15426 First Obs: Last Obs: 2001-PRE Confirmed:  
 Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson		Data currently not available.

<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-F7	Trail	17100307 - Upper Rogue
			42122-F8	Cleveland Ridge	

<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
EO Type: SPAWNING & REARING - fish	Minimum Elev.(m):	<u>Annual Observations</u>
EO Data: SUMMER RUN, ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE, ODFW SALMONID DISTRIBUTION DOCUMENTATION 2000, W. FK. TRAIL CREEK, 1995, CANYON CREEK, 1971, CANYON CREEK.		
EO Comments:		
Protection:		
Management:		
General:	DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.	

Scientific Name: *Oncorhynchus mykiss pop. 24*  
 Common Name: Steelhead (Klamath Mountains Province ESU, summer run)  
 Federal Status: GRANK: G5T2T3Q NHP List: 2 Category: Vertebrate Animal  
 State Status: SV SRANK: S2S3 HP Trade: Y ELCODE: AFCHA00094  
 EO ID: 15769 First Obs: Last Obs: 1996-PRE Confirmed:  
 Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson		Data currently not available.

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<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-E7	Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>		<u>Owner Comments</u>			<u>Managed Area Name</u>
EO Type: SPAWNING & REARING - fish		Minimum Elev.(m):			<u>Annual Observations</u>
EO Data: SUMMER RUN. ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE. ODFW SALMONID DISTRIBUTION DOCUMENTATION 1952: LONG BRANCH #2.					
EO Comments:					
Protection:					
Management:					
General: DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.					

Scientific Name: *Oncorhynchus mykiss pop. 24*  
 Common Name: Steelhead (Klamath Mountains Province ESU, summer run)  
 Federal Status: GRANK: G5T2T3Q NHP List: 2 Category: Vertebrate Animal  
 State Status: SV SRANK: S2S3 HP Track: Y ELCODE: AFCHA00094  
 EO ID: 20390 First Obs: Last Obs: 1998-PRE Confirmed:

Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>			
Jackson		Data currently not available.			
<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-F7	Trail	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>		<u>Owner Comments</u>			<u>Managed Area Name</u>
EO Type: SPAWNING & REARING - fish		Minimum Elev.(m):			<u>Annual Observations</u>
EO Data: SUMMER RUN. ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.					
EO Comments:					
Protection:					
Management:					
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.					

Scientific Name: *Oncorhynchus mykiss pop. 24*  
 Common Name: Steelhead (Klamath Mountains Province ESU, summer run)  
 Federal Status: GRANK: G5T2T3Q NHP List: 2 Category: Vertebrate Animal  
 State Status: SV SRANK: S2S3 HP Track: Y ELCODE: AFCHA00094  
 EO ID: 20391 First Obs: Last Obs: 1998-PRE Confirmed:

Directions: [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>			
Jackson		Data currently not available.			
<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-F7	Trail	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>		<u>Owner Comments</u>			<u>Managed Area Name</u>
EO Type: SPAWNING & REARING - fish		Minimum Elev.(m):			<u>Annual Observations</u>
EO Data: SUMMER RUN. ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.					
EO Comments:					
Protection:					
Management:					

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**General:** DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

**Scientific Name:** *Oncorhynchus mykiss pop. 24*  
**Common Name:** Steelhead (Klamath Mountains Province ESU, summer run)  
**Federal Status:** GRANK: G5T2T3Q NHP List: 2 **Category:** Vertebrate Animal  
**State Status:** SV SRANK: S2S3 HP Track: Y **ELOODE:** AFCHA00094  
**EO ID:** 22071 **First Obs:** **Last Obs:** 1995-PRE **Confirmed:**  
**Directions:** [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson		Data currently not available.
<u>Town-Range</u> <u>Sec</u> <u>Note</u>	<u>QuadCode</u> <u>QuadName</u>	<u>Watershed</u>
	42122-E7 Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>

**EO Type:** SPAWNING & REARING - fish **Minimum Elev.(m):** **Annual Observations**  
**EO Data:** SUMMER RUN. ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE. ODFW SALMONID DISTRIBUTION DOCUMENTATION 1998: INDIAN CREEK #2. 1997: INDIAN CREEK #2. 1985: INDIAN CREEK #2. 1954: INDIAN CREEK #2.

**EO Comments:**

**Protection:**

**Management:**

**General:** DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE ODFW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

**Scientific Name:** *Oncorhynchus mykiss pop. 24*  
**Common Name:** Steelhead (Klamath Mountains Province ESU, summer run)  
**Federal Status:** GRANK: G5T2T3Q NHP List: 2 **Category:** Vertebrate Animal  
**State Status:** SV SRANK: S2S3 HP Track: Y **ELOODE:** AFCHA00094  
**EO ID:** 24129 **First Obs:** **Last Obs:** 2000-PRE **Confirmed:**  
**Directions:** [REDACTED]

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson		Data currently not available.
<u>Town-Range</u> <u>Sec</u> <u>Note</u>	<u>QuadCode</u> <u>QuadName</u>	<u>Watershed</u>
	42122-D5 Lakecreek	17100307 - Upper Rogue
	42122-D6 Brownsboro	
	42122-D7 Eagle Point	
	42122-D8 Sams Valley	
	42122-E4 Big Butte Springs	
	42122-E5 Butte Falls	
	42122-E6 Obenchain Mountain	
	42122-E7 Shady Cove	
	42122-F6 McLeod	
	42122-F7 Trail	
<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>

**EO Type:** REARING & MIGRATION - fish **Minimum Elev.(m):** **Annual Observations**  
**EO Data:** SUMMER RUN. ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE. ODFW SALMONID DISTRIBUTION DOCUMENTATION 1999: BIG BUTTE CREEK, LITTLE BUTTE CREEK. 1998: LITTLE BUTTE CREEK. 1954: BIG BUTTE CREEK.

**EO Comments:**

**Protection:**



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**Management:**

**General:** DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE COPW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM COPW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY COPW'S DISTRICT FISHERIES BIOLOGIST. THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT. COLE M RIVERS FISH HATCHERY IS LOCATED ON THE ROGUE RIVER BELOW LOST CREEK LAKE, BUTTE FALLS FISH HATCHERY IS LOCATED ON S. FK. BIG BUTTE CREEK ABOVE BUTTE FALLS NEAR THE TOWN OF BUTTE FALLS.

**Scientific Name:** *Oncorhynchus mykiss pop. 25*

**Common Name:** Steelhead (Klamath Mountains Province ESU, winter run)

<b>Federal Status:</b>	GRANK: G5T3Q	NHP List: 2	<b>Category:</b> Vertebrate Animal
<b>State Status:</b> SV	SRANK: S253	HP Track: Y	<b>ELCODE:</b> AFCHA02095
<b>EO ID:</b> 1108	<b>First Obs:</b>	<b>Last Obs:</b> 2001-PRE	<b>Confirmed:</b>

**Directions:** [REDACTED]

<b>County Name</b>	<b>Ecoregion</b>	<b>Source Feature (Uncertainty Type (Distance))</b>
Jackson		Data currently not available.

<u>Town-Range</u>	<u>Sec</u>	<u>Note</u>	<u>QuadCode</u>	<u>QuadName</u>	<u>Watershed</u>
			42122-C4	Robinson Butte	17100307 - Upper Rogue
			42122-C5	Grizzly Peak	
			42122-D4	Willow Lake	
			42122-D5	Lakecreek	
			42122-D6	Brownboro	
			42122-D7	Eagle Point	
			42122-D8	Sams Valley	
			42122-E4	Big Butte Springs	
			42122-E5	Butte Falls	
			42122-E6	Oberchain Mountain	
			42122-E7	Shady Cove	
			42122-F6	McLeod	
			42122-F7	Trail	
			42122-F8	Cleveland Ridge	
			42122-G5	Whetstone Point	
			42122-G6	Sugarpine Creek	

<b>Owner Name/Type</b>	<b>Owner Comments</b>	<b>Managed Area Name</b>
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**EO Type:** SPAWNING & REARING - fish      **Minimum Elev.(m):**      **Annual Observations**

**EO Data:** WINTER RUN. COPW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE. COPW SALMONID DISTRIBUTION DOCUMENTATION 1999: BIG BUTTE CREEK, N. FK. BIG BUTTE CREEK, S. FK. BIG BUTTE CREEK, LITTLE BUTTE CREEK, JACKASS CREEK, 1998: LITTLE BUTTE CREEK, S. FK. LITTLE BUTTE CREEK, 1997: N. FK. BIG BUTTE CREEK, N. FK. LITTLE BUTTE CREEK, 1996: ELK CREEK, W. FK. TRAIL CREEK, 1995: SUGARPINE CREEK, W. BRANCH ELK CREEK, 1993: ELK CREEK, 1990: SUGARPINE CREEK, BITTER LICK CREEK #2, 1981: ELK CREEK, 1959: S. FK. LITTLE BUTTE CREEK, 1965: SUGARPINE CREEK, FLAT CREEK, 1953: SUGARPINE CREEK, FLAT CREEK, 1952: N. FK. LITTLE BUTTE CREEK.

**EO Comments:**

**Protection:**

**Management:**

**General:** DOCUMENTATION INFORMATION USED IN THIS EOR WAS DERIVED FROM THE COPW SALMONID DISTRIBUTION DOCUMENTATION DIGITAL DATABASE DISTRIBUTED IN 2001. DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM COPW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY COPW'S DISTRICT FISHERIES BIOLOGIST. THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT. COLE M RIVERS FISH HATCHERY IS LOCATED ON THE ROGUE RIVER BELOW LOST CREEK LAKE, BUTTE FALLS FISH HATCHERY IS LOCATED ON S. FK. BIG BUTTE CREEK ABOVE BUTTE FALLS NEAR THE TOWN OF BUTTE FALLS.

Oregon Natural Heritage Information Center - December 2007

Sensitive Data - Do Not Distribute

**Scientific Name:** *Myotis yumanensis*  
**Common Name:** Yuma myotis  
**Federal Status:** SOC **GRANK:** G5 **NHP List:** 4 **Category:** Vertebrate Animal  
**State Status:** SRANK: S3 **HP Track:** N **ELOCODE:** AMACC01020  
**EO ID:** 23270 **First Obs:** 1975-07-07 **Last Obs:** 1975-07-07 **Confirmed:**  
**Directions:** ██████████

<b>County Name</b>	<b>Ecoregion</b>	<b>Source Feature [Uncertainty Type (Distance)]</b>
Jackson	KM	Point [Areal - Estimated ( 1500 m)]
<b>Town-Range Sec Note</b>	<b>QuadCode QuadName</b>	<b>Watershed</b>
██████████	42122-E7 Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<b>Owner Name/Type</b>	<b>Owner Comments</b>	<b>Managed Area Name</b>
PRIVATE		
<b>EO Type:</b>	<b>Minimum Elev.(m):</b> 485	<b>Annual Observations</b>
<b>EO Data:</b> 1976: 1 MALE MIST NETTED 5/28, 3 FEMALES ON 7/7.		
<b>EO Comments:</b> CREEK, 90% FORESTED, 10% NATURAL CLEARING.		
<b>Protection:</b>		
<b>Management:</b>		
<b>General:</b> OBSERVER: S.P. CROSS & STUDENTS, 906C		

**Scientific Name:** *Myotis thysanodes*  
**Common Name:** Fringed myotis  
**Federal Status:** SOC **GRANK:** G4Q5 **NHP List:** 2 **Category:** Vertebrate Animal  
**State Status:** SV **SRANK:** S2 **HP Track:** Y **ELOCODE:** AMACC01090  
**EO ID:** 22740 **First Obs:** 1975-07-07 **Last Obs:** 1975-07-07 **Confirmed:**  
**Directions:** ██████████

<b>County Name</b>	<b>Ecoregion</b>	<b>Source Feature [Uncertainty Type (Distance)]</b>
Jackson	KM	Point [Areal - Estimated ( 800 m)]
<b>Town-Range Sec Note</b>	<b>QuadCode QuadName</b>	<b>Watershed</b>
██████████	42122-E7 Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<b>Owner Name/Type</b>	<b>Owner Comments</b>	<b>Managed Area Name</b>
PRIVATE		
<b>EO Type:</b>	<b>Minimum Elev.(m):</b> 488	<b>Annual Observations</b>
<b>EO Data:</b> 1976: 4 FEMALES CAPTURED IN MIST NET.		
<b>EO Comments:</b> CREEK, 90% FORESTED, 10% NATURAL CLEARING. Associated w/Lasionycteris noctivagans, Lasiurus cinereus, Myotis californicus, M. yumanensis.		
<b>Protection:</b>		
<b>Management:</b>		
<b>General:</b>		

**Scientific Name:** *Actinemys marmorata marmorata*  
**Common Name:** Northern Pacific pond turtle  
**Federal Status:** SOC **GRANK:** G3G4T3Q **NHP List:** 2 **Category:** Vertebrate Animal  
**State Status:** SC **SRANK:** S2 **HP Track:** Y **ELOCODE:** ARAAD02031  
**EO ID:** 9563 **First Obs:** 1982-pre **Last Obs:** 1982-PRE **Confirmed:**  
**Directions:** ██████████

<b>County Name</b>	<b>Ecoregion</b>	<b>Source Feature [Uncertainty Type (Distance)]</b>
Jackson	KM	Point [Areal - Estimated ( 800 m)]
<b>Town-Range Sec Note</b>	<b>QuadCode QuadName</b>	<b>Watershed</b>
██████████	42122-F7 Trail	1710030706 - TRAIL CREEK 1710030707 - ROGUE RIVER-SHADY COVE
<b>Owner Name/Type</b>	<b>Owner Comments</b>	<b>Managed Area Name</b>
FEDERAL		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA
<b>EO Type:</b>	<b>Minimum Elev.(m):</b> 442	<b>Annual Observations</b>
<b>EO Data:</b> Species recorded at this site per SL John, date not specified.		
<b>EO Comments:</b>		
<b>Protection:</b>		

Oregon Natural Heritage Information Center - December 2007

Sensitive Data - Do Not Distribute

Management:  
General:

Scientific Name: *Limnanthes floccosa* ssp. *grandiflora*  
 Common Name: Big-flowered wooly meadow-foam  
 Federal Status: LE GRANK: G4T1 NHP List: 1 Category: Vascular Plant  
 State Status: LE SRANK: S1 HP Track: Y ELCODE: FOLIM02044  
 EO ID: 5070 First Obs: 1982-05-20 Last Obs: 1982-05-20 Confirmed:

Directions:

County Name: Jackson Ecoregion: KM Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated ( 800 m)]  
 Town-Range Sec Note: QuadCode: 42122-E7 QuadName: Shady Cove Watershed: 1710030707 - ROGUE RIVER-SHADY COVE  
 Owner Name/Type: PRIVATE Owner Comments: Managed Area Name:  
 EO Type: Minimum Elev.(m): Annual Observations:  
 EO Data: MOST OF RANCH HAS BEEN LEVELED. POPULATION IS ON A BEAUTIFUL PIECE OF INTACT MOUNDED PRAIRIE ON THE EXTREME NORTHERM PORTION OF THE RANCH.  
 EO Comments: AGATE DESERT MOUNDED PRAIRIE-VERNAL POOLS  
 Protection:  
 Management:  
 General: NSPO AGATE DESERT SURVEY (DATA SHEET); W. ROLLE AND SHELLY TANQUARY, MAY 20, 1982 SURVEY.

Scientific Name: *Carex serratodens*  
 Common Name: Saw-tooth sedge  
 Federal Status: GRANK: G5 NHP List: 2 Category: Vascular Plant  
 State Status: SRANK: S2 HP Track: Y ELCODE: FMCYP03CDD  
 EO ID: 26861 First Obs: 2003-06-19 Last Obs: 2003-06-19 Confirmed:

Directions:

County Name: Jackson Ecoregion: KM Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated ( 25 m)]  
 Town-Range Sec Note: QuadCode: 42122-E7 QuadName: Shady Cove Watershed: 1710030707 - ROGUE RIVER-SHADY COVE  
 Owner Name/Type: Federal Owner Comments: Managed Area Name: MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA  
 EO Type: Minimum Elev.(m): 594 Annual Observations:  
 EO Data: ~50 plants, in fruit, 100% mature, in 150 sq meter area. • 2003 - 50  
 EO Comments: Site occurs in recent burn with heavy hardwood and young conifer loss. The brush growth is dense. Pop occurs in area of springs and seeps. Macrotopography: upper slope; filtered light; moisture regime: moist; aspect 270 degrees, slope 35%; parent material: basalt; soil: Medco-McNull complex. Plant assoc: PSME/dry shrub. Assoc species: Tree: *Pseudotsuga menziesii* (5%), *Pinus ponderosa* (20%), *Calocedrus decurrens* (1%), *Quercus garyana* (5%), *Arbutus menziesii* (15%), *Quercus kelloggii* (T); Shrubs: *Ceanothus intergerimus* (T), *Clematis ligusticifolia* (T), *Rubus ursinus* (T), *Toxicodendron diversiloba* (3%), *Rosa gymnocarpa* (T); Forbs: *Briza minor* (T), *Cymosurus echinatus* (T), *Elymus glaucus* (T), *Equisetum hymnale* (T), *Galium aparine* (T), *Hieracium albiflorum* (T), *Juncus effusus* (T), *MedSa madrioides* (T), *Lotus pinnatus* (T).  
 Protection: Threats: dense regrowth and competition by other strubs and herbs along this moist seep, following moderate to high intensity burn.  
 Management:  
 General: 2003 BLM plant sighting report, Greg Carey reporter.

Scientific Name: *Scirpus pendulus*  
 Common Name: Drooping bulrush  
 Federal Status: GRANK: G5 NHP List: 2 Category: Vascular Plant  
 State Status: SRANK: S1 HP Track: Y ELCODE: FMCYP0Q160  
 EO ID: 2416 First Obs: 1989 Last Obs: 1989 Confirmed:

Directions:

County Name: Jackson Ecoregion: KM Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated ( 1500 m)]



Oregon Natural Heritage Information Center - December 2007

Sensitive Data - Do Not Distribute

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			42122-E7	Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
			42122-F7	Trail	

Owner Name/Type	Owner Comments	Managed Area Name
EO Type:	Minimum Elev.(m):	Annual Observations
EO Data: [NO DATA GIVEN]		
EO Comments: [NO DATA GIVEN]		
Protection:		
Management:		
General: OSU HERBARIUM COLLECTION BY PEGGY STRONG IN 1989. 1999 SEARCH BY BRUCE NEWHOUSE.		

Scientific Name: *Erythronium howellii*  
 Common Name: **Howell's adder's-tongue**  
 Federal Status: GRANK: G3G4 NHP List: 1 Category: Vascular Plant  
 State Status: SRANK: S3 HP Track: Y ELCODE: PMLILO060  
 EO ID: 22410 First Obs: 1931-06-19 Last Obs: 1931-06-19 Confirmed:  
 Directions: [REDACTED]

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Jackson	KM	Point [Areal - Estimated ( 1500 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			42122-F7	Trail	1710030709 - TRAIL CREEK 1710030707 - ROGUE RIVER-SHADY COVE

Owner Name/Type	Owner Comments	Managed Area Name
EO Type:	Minimum Elev.(m):	Annual Observations
EO Data: HERBARIUM COLLECTION.		• 1931 - PRESENT
EO Comments:		
Protection:		
Management:		
General: 1982 OSU SLID REPORT, COLLECTION BY HOWELL, 1931.		

Scientific Name: *Cypripedium fasciculatum*  
 Common Name: **Clustered lady's-slipper**  
 Federal Status: SOC GRANK: G4 NHP List: 2 Category: Vascular Plant  
 State Status: C SRANK: S3 HP Track: Y ELCODE: PMORCO060  
 EO ID: 15293 First Obs: 1994-06-09 Last Obs: 1994-06-09 Confirmed:  
 Directions: [REDACTED]

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Jackson	KM	Point [Areal - Estimated ( 50 m)] Point [Areal - Estimated ( 25 m)] Point [Areal - Estimated ( 50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			42122-E7	Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE

Owner Name/Type	Owner Comments	Managed Area Name
FEDERAL		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA

Oregon Natural Heritage Information Center - December 2007

Sensitive Data - Do Not Distribute

EO Type: Minimum Elev.(m): 671 Annual Observations  
 EO Data: Total of 6 PLANTS  
 EO Comments: SOIL: ORGANIC/DUFF, 313-355 DEG ASPECT, 18-47% SLOPE, ON MIDSLOPE, FILTERED LIGHT, MESIC MOISTURE REGIME.  
 Protection:  
 Management: BFRA SALVAGE SALE  
 General: 1994 BLM SIGHTING REPORT (3 sighting reports), D. JUDITH HENGSEL REPORTER

Scientific Name: *Cypripedium fasciculatum*  
 Common Name: Clustered lady's-slipper  
 Federal Status: SOC GRANK: G4 NHP List: 2 Category: Vascular Plant  
 State Status: C SRANK: S3 HP Track: Y ELCODE: PMORC0060  
 EO ID: 26590 First Obs: 2003-05-10 Last Obs: 2003-05-10 Confirmed:

Directions:

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson	KM	Point (Areal - Estimated ( 25 m))
<u>Town-Range Sec Note</u>	<u>QuadCode QuadName</u>	<u>Watershed</u>
	42122-E7 Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
Federal		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA

EO Type: Minimum Elev.(m): 488 Annual Observations  
 EO Data: 1 plant, in flower, mature, excellent vigor, in 1 sq meter. • 2003 - 1  
 EO Comments: Thicket of sapling and pole sized Douglas fir under late seral/old growth Douglas fir and ponderosa pine. Landform, hill slope; microtopography, lower slope; shaded, moist moisture regime; aspect 20 degrees, slope 65%, parent material, basalt; soil type, loam. Plant assoc: PSME/dry shrub. Assoc species: Trees: *Pseudotsuga menziesii* (T), *Pinus ponderosa* (10%), *Arbutus menziesii* (T); Shrubs: *Symphoricarpos mollis* (T), *Lonicera ciliosa* (T), *Berberis piperiana* (T); Forbs: *Laina nardosmia*, *Disporum hookeri*, *Trientalis latifolia*, *Claytonia perfoliata*, *Moslingia macrophylla*, *Polystichum musatum*, *Tonella tenella*, *Fragaria vesco*, *Aquilegia formosa*, *Cardamine nuttallii nuttallii*.  
 Protection:  
 Management:  
 General: 2003 BLM plant sighting report, Richard Callagan reporter. The plant was in excellent vigor, the largest I have ever seen. 25 cm leaf tip to leaf tip.

Scientific Name: *Cypripedium fasciculatum*  
 Common Name: Clustered lady's-slipper  
 Federal Status: SOC GRANK: G4 NHP List: 2 Category: Vascular Plant  
 State Status: C SRANK: S3 HP Track: Y ELCODE: PMORC0060  
 EO ID: 26591 First Obs: 2003-05-13 Last Obs: 2003-05-13 Confirmed:

Directions:

<u>County Name</u>	<u>Ecoregion</u>	<u>Source Feature (Uncertainty Type (Distance))</u>
Jackson	KM	Point (Areal - Estimated ( 25 m))
<u>Town-Range Sec Note</u>	<u>QuadCode QuadName</u>	<u>Watershed</u>
	42122-E7 Shady Cove	1710030707 - ROGUE RIVER-SHADY COVE
<u>Owner Name/Type</u>	<u>Owner Comments</u>	<u>Managed Area Name</u>
Federal		MEDFORD BLM DISTRICT BUTTE FALLS RESOURCE AREA

EO Type: Minimum Elev.(m): 759 Annual Observations  
 EO Data: 1 plant, vegetative, mature, poor vigor, in 1 sq meter area. • 2003 - 1  
 EO Comments: Mid-seral dry Douglas fir stand with hardwood understory, light shrub layer, fairly diverse. Moderate forb layer with 10% moss cover. Landform, hill slope; microtopography, upper slope; microtopography, concave; shaded light; moisture regime, moist; aspect 340 degrees, slope 65%, parent material, basalt; soil, McHull loam. Plant assoc: PSME/dry shrub. Assoc species: Trees: *Pseudotsuga menziesii* (80%), *Calocedrus decurrens* (10%), *Arbutus menziesii* (10%), *Quercus kelloggii* (2%); Shrubs: *Toxicodendron diversilobum* (5%), *Symphoricarpos mollis* (T), *Rosa spithamea* (T), *Rubus ursinus* (T); Forbs: *Oemorrhiza chilensis* (T), *Erionus vulgaris* (T), *Polystichum musatum* (T), *Claytonia perfoliata* (T), *Disporum hookeri* (T), *Trientalis latifolia* (T), *Lathyrus polyphyllus* (T), *Lathyrus nevadensis* (T), *Cynoglossum grande* (T), *Goodyera oblongifolia* (T), *Gallium aparine* (T).  
 Protection:  
 Management:  
 General: 2003 BLM plant sighting report, Richard Callagan reporter.

25 records total

## Key to Oregon Natural Heritage Information Center Data

Field Name	Description
Scientific Name	The scientific name of the species.
Common Name	The common name of the species.
Category	Value that indicates the broad biological category for each species.
ELCODE	Unique Heritage Program code for identifying this element. 1st and 2nd byte (PD=Plant dict, PM=Plant monocot, PG=Plant gymnosperm, PP=Plant pteridophyte, AA=amphibian, AB=bird, AF=fish, AM=mammal, AR=reptile, I=invertebrate. 3rd-5th byte (family abbreviation). 6th-7th (genus code). 8th-9th (species). 10th (tie breaker).
Federal Status	US Fish and Wildlife Service or NOAA Fisheries status. LE=listed endangered, LT=listed threatened, PE or PT=proposed endangered or threatened, C=candidate for listing with enough information available for listing. SOC or SC=species of concern, PS=partial status for species.
State Status	For animals, Oregon Department of Fish and Wildlife status; LE=listed endangered, PE=proposed endangered, PT=proposed threatened, SC or C=sensitive-critical, SV or V=sensitive-vulnerable, SP or P=sensitive-peripheral, SU or U=sensitive-undetermined status. For plants, Oregon Department of Agriculture status; LE=listed endangered, LT=listed threatened, C=candidate.
GRANK/SRANK	ORNHIC participates in an international system for ranking rare, threatened and endangered species throughout the world. The system was developed by The Nature Conservancy and is now maintained by NatureServe in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. In this book, the ranks occupy two lines. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. A "Q" at the end of this line indicates the taxon has taxonomic questions. The second line is the State Rank and begins with the letter "S". The ranks are summarized as follows: 1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; 2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; 3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences; 4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences; 5 = Demonstrably widespread, abundant, and secure; H = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered, X = Presumed extirpated or extinct, U = Unknown rank, ? = Not yet ranked, or assigned rank is uncertain.
NHP list	All rare species in Oregon are assigned a list number of 1, 2, 3 or 4, where 1=threatened or endangered throughout range, 2=threatened or endangered in Oregon but more common elsewhere, 3=Review List (more information is needed), 4=Watch List (currently stable). A null value indicates the species is not currently on our rare species list.
HP Track	We currently obtain and computerize locational information for only those elements marked with Y(es). Those species marked with N(o) or W(atch) have incomplete data because we do not actively track them at this time.
EO ID	Unique identifier for the Element Occurrence (EO).
First_obs	First reported sighting date for this occurrence in the form YYYY-MM-DD.
Last_obs	Last reported sighting date, usually in the form YYYY-MM-DD.
Confirmed	Indication of whether taxonomic identification of the Element represented by this occurrence has been confirmed by a reliable individual. Blank=unknown, assumed to be correctly identified. Y=Yes, confident identification. ?=identification questions.
Directions	Site name and/or directions to site.
County	County name(s) in which EO is mapped.
Ecoregion	Physiographic Province in which EO is mapped: CR=Coast Range, WV=Willamette Valley, KM=Klamath Mountains, WC=West slope and crest of the Cascades, EC=East slope of the Cascades, BM=Cochoco, Blue and Willows Mts., BR=Basin and Range, CB=Columbia Basin, SP=Snake River Plains.



**Key to Oregon Natural Heritage Information Center Data**

Field Name	Description
Source Feature	<p>A Source Feature is the initial translation of a discrete unit of observation data as a spatial feature. Creation of a Source Feature requires an interpretive process. The likely location and extent of an observation is determined through consideration of the amount and direction of any variability between the recorded and actual locations of the observation data. In most cases, the Source Feature is delineated to encompass locational uncertainty.</p> <p>A Source Feature can be a point, line, or polygon. The type of Source Feature developed depends on both the preceding conceptual feature type and the locational uncertainty associated with the feature.</p>
Uncertainty Type (Distance)	<p>The recorded location of an observation of an Element may vary from its true location due to many factors, including the level of expertise of the data collector, differences in survey techniques and equipment used, and the amount and type of information obtained. This inaccuracy is characterized as locational uncertainty, and is assessed for Source Feature(s) based on the uncertainty associated with the underlying information on the location of the observation.</p> <p>Four categories of locational uncertainty have been identified, as follows:</p> <p><u>Negligible</u> uncertainty is less than or equal to 6.25 meters in any dimension. Source Features with negligible uncertainty are based on a comprehensive field survey with high quality mapping and a high degree of certainty.</p> <p><u>Linear</u> uncertainty is greater than 6.25 meters, and varies along an axis (e.g., a path, stream, ridgeline). The true location of an observation with linear uncertainty may be visualized as effectively sliding along a line that delineates the uncertainty.</p> <p><u>Areal delimited</u> uncertainty is greater than 6.25 meters, and varies in more than one dimension. The true location of an observation can be visualized as floating within an area with a boundary that can be specifically delimited. Boundaries can be defined using roads, bodies of water, etc.</p> <p><u>Areal estimated</u> uncertainty is greater than 6.25 meters, and varies in more than one dimension. A boundary cannot be specifically delimited based on the observation information, i.e., the actual extent is unknown. The true location of the observation can be visualized as floating within an area for which boundaries cannot be specifically delimited. Source Features with areal estimated uncertainty require that the user specify an estimated uncertainty distance to be used for buffering the feature to incorporate the locational uncertainty.</p>
Town-Range, Sec. and Note	United States rectangular land survey (also known as the Public Land Survey System) legal township, range, and section descriptions that best define the location of the Element Occurrence. Township first (4 bytes), range second (4 bytes). For example: 0049029E = Township 4S, Range 29E. All locations are with reference to the Willamette Meridian. Fractional ranges or townships are indicated in the Note field.
Quadcode	USGS code for the USGS topographic quadrangle map(s) where the record is mapped.
Quadname	Name of the USGS topographic quadrangle map(s) where the record is mapped.
Watershed	Watershed(s), identified according to the U.S. Geological Survey (USGS) Hydrologic Unit Map 10-digit code, within which the Element Occurrence is located.
Owner Name/Type and Comments	Federal, State, Private, etc.
Managed Area Name	BLM District, USFS Forest, Private Preserve
EO Type	For animals, type of occurrence, eg. roost, nest, spawning, etc.
EO Data	Species and population biology - numbers, age, nesting success, vigor, phenology, disease, pollinators, etc.
EO Comments	Habitat information, e.g. aspect, slope, soils, associated species, community type, etc.
Minimum Elevation	Minimum elevation of the area covered by the range of the taxon, in meters. -339 or blank=not determined.
Annual Observation	Summary of yearly observation.
Protection	Comments on protectibility and threats.
Management	Comments on how the site is managed.
General	Miscellaneous comments.



**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service  
Habitat Roseburg Office  
2900 Stewart Parkway NW  
Roseburg, OR 97470

November 20, 2007

Dr. Bary Bai  
Entomologist  
Oregon Department of Agriculture  
635 Capitol Street NE  
Salem, Oregon 97301-2532

Re: Species List Request for the Gypsy Moth aerial eradication in Jackson County,  
Oregon

Dear Dr. Bai:

This letter responds to your November 8, 2007, letter requesting a list of species and habitats under the jurisdiction of the National Marine Fisheries Service (NMFS) in the vicinity of the proposed gypsy moth aerial eradication action near Shady Cove, Jackson County, Oregon. The eradication site includes an area covering approximately 333 acres in Township 34 South, Range 1 West, sections 15 and 16 and occurs on both sides of the Rogue River. This inventory includes only species under the NMFS' jurisdiction that occur in the Pacific Northwest. The U.S. Fish and Wildlife Service should be contacted regarding the presence of species falling under its jurisdiction.

The maps provided indicate the proposed eradication area to receive aerial spraying of *Bacillus thuringiensis kurstoki* including the mainstem of the Rogue River. The Rogue River is inhabited by Southern Oregon and Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*) and is designated critical habitat for that fish species. Critical habitat includes the water, substrate, and adjacent riparian zone on either side of the river. The NMFS listed SONCC coho salmon as threatened under the Endangered Species Act (ESA) on June 28, 2005 (70 FR 37160 (previously listed on May 6, 1997 [62 FR 24588])), critical habitat was designated on May 5, 1999 (64 FR 24049) and protective regulations were issued under section 4(d) of the ESA on June 28, 2005 (70 FR 37160 (previously issued on July 18, 1997 [62 FR 38479])).

The Rogue River is also designated as essential fish habitat (EFH) for Pacific salmon, coho salmon and Chinook salmon, under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (PL 104-297). Section 305(b)(2) of the MSA requires all Federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and



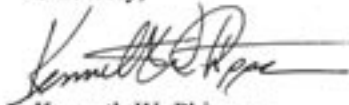
other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH. For all Federal actions, the lead Federal agency determines the potential effects of the proposed action on EFH. If the proposed action may adversely affect EFH, the lead Federal agency must notify NMFS to initiate consultation and provide an EFH assessment. Again, the level of effects of this action on EFH in Elk Creek and Pass Creek is likely to be similar to effects on proposed ESA-listed species and their proposed critical habitat, but NMFS has insufficient information to provide a preliminary assessment for these effects.

To initiate ESA and EFH consultation, the lead Federal Agency must provide a letter, biological assessment and an EFH assessment to Michael Tehan, Oregon State Habitat Director, National Marine Fisheries Service, Habitat Conservation Division, 1201 NE Lloyd Boulevard, Suite 1100, Portland, Oregon 97232-1274. The biological and EFH assessments must include the following information: (1) A description of the proposed action; (2) a description of the action area; (3) an analysis of the effects, including cumulative effects, of the proposed action on EFH, critical habitat, the managed and ESA-listed species, including affected life history stages, and associated species such as major prey species; (4) the Federal agency's determination of the effects of the action; and (5) proposed mitigation, if applicable.

This letter constitutes the required notification of the presence of a Federally-listed, threatened species under NMFS' jurisdiction in the project area.

Questions regarding this letter should be directed to Ken Phippen, branch chief in the Southwest Oregon Habitat Branch of the Oregon State Habitat Office, at 541.957.3385.

Sincerely,



Kenneth W. Phippen  
Branch Chief, Southwest Oregon Habitat Branch  
Oregon State Habitat Office  
Habitat Conservation Division



# Appendix C: Product label

Flowable Concentrate

# Foray® 48B

Biological Insecticide

**For Commercial Forestry and Wide-Area Pest Treatment – Aerial Application Only**

List No. 60181-04



Active Ingredient:  
 Bacillus thuringiensis subsp. kurstaki, Strain ABTS-351,  
 fermentation solids, spores and insecticidal toxins ..... 12.65%  
 Other Ingredients ..... 87.35%  
 Total ..... 100.00%  
 Potency: 10,600 Cabbage Looper Units (CLU) per mg of product  
 (equivalent to 48 billion CLU per gallon).

The percent active ingredient does not indicate product performance and potency measurements are not federally standardized.

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

FIRST AID	
<b>If in eyes</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15 - 20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-315-9819 (24 hours) for emergency medical treatment and/or transport emergency information. For all other information, call 1-800-323-9597.	

**PRECAUTIONARY STATEMENTS  
HAZARDS TO HUMANS AND DOMESTIC ANIMALS  
CAUTION**

Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

**Personal Protective Equipment (PPE)**

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

**Agricultural Use Requirements:**

Mixers/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95 or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

**IMPORTANT:** When reduced PPE is worn because a closed system is being used, handlers must provide all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as spill or equipment breakdown.

**Non-agricultural Use Requirements:**

Mixers/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95 or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

**USER SAFETY RECOMMENDATIONS**

- Users should:
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
  - Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

**Environmental Hazards**

Except under the forest canopy, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

This product must not be applied aerially within 1/4 mile of any habitats of threatened or endangered Lepidoptera.

**DIRECTIONS FOR USE**

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

**AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions For Use section for information about this standard.

Refer to the Directions For Use (below) for further directions.

**STORAGE AND DISPOSAL**

Do not contaminate water, food or feed by storage or disposal.

**Pesticide Storage:** Store in a cool, dry place. Keep containers tightly closed when not in use. Store in temperatures above freezing and below 32 degrees C (90 degrees F).

**Pesticide Disposal:** To avoid wastes, use all material in this container by application according to label directions. If wastes can not be avoided, offer remaining product to a waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

**Container Disposal:** Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances.

**Refillable Container:** Refill this container with pesticide only. Do not use this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

**Warranty and Disclaimer**

To the extent permitted by applicable law, seller makes no warranty, express or implied, of merchantability, fitness or otherwise concerning the use of this product other than as indicated on the label. User assumes all risks of use, storage or handling not in strict accordance with accompanying directions.

**DIRECTIONS FOR USE BOOKLET**

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Apply this product only through aerial application.

**AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard (that involves contact with anything that has been treated, such as plants, soil, or water) is:

- Coveralls
- Waterproof gloves
- Shoes plus socks

**NON-AGRICULTURAL USE REQUIREMENTS**

The requirements in this box apply to uses that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

**APPLICATION**

Apply Foray 48B, undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected, only by aerial equipment. The amount of water needed per acre will depend upon crop size, weather, spray equipment, and local experience.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower/treatment coordinator are responsible for considering all of these factors when making decisions.

**HANDLING & MIXING**

If Foray 48B is applied undiluted, the operator must ensure that the bulk quantity is well agitated and homogenous.

When Foray 48B is shipped by bulk tankers and transferred via a closed-loop mixing/loading system, the material is measured by passing through in-line flow meters directly into the aircraft, minimizing exposure to ground handling personnel.

In a similar manner, smaller containers of Foray 48B are also to be used with a closed-loop mixing/loading system to minimize the potential for accidental spills and exposure of ground handling personnel.

If dilution with water is needed for full crop coverage, fill tank with approximately 3/4 of the water required for dilution. Begin agitation and pump Foray 48B into the water while maintaining continuous agitation. Agitate as necessary to maintain suspension. Do not allow diluted mixture to remain in the tank for more than 72 hours.

When applying a diluted spray mixture, the use of a spreader-sticker approved for use on growing crops will improve the weather-fastness of the spray deposits. Add the spray adjuvant to the tank after the Foray 48B is added, and before the final volume of water is added to complete the mixture. Reduce or momentarily halt tank agitation and then add the required amount of adjuvant to the diluted mix. Use a closed-loop system to siphon the required quantity of adjuvant or pour the adjuvant into the top hatch of the tank. Once added, close tank opening, and resume agitation; add the rest of the water to complete the spray mix.

Combinations with commonly used spray tank adjuvants are generally not deleterious to Foray 48B, if the mix is used promptly. Before mixing in the spray tank, identify possible problems with physical compatibility by mixing all components in a small container in proportionate quantities. Check with an adjuvant supplier for advice on spray adjuvants that are compatible with biological pesticides such as Foray 48B to avoid incompatibilities.

**SPRAY VOLUMES**

**Aerial Application:** Use appropriate amount of Foray 48B, as indicated in the tables that follow, in aerial equipment undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected. In the western U.S., use a normal minimum of 5-10 gallons per acre; in the eastern regions, use a normal minimum of 2-3 gallons. The minimum amount of water needed per acre will depend upon crop size, weather conditions, spray equipment used and local experience.

**GENERAL AGRICULTURAL USE INSTRUCTIONS**

Foray 48B is a biological insecticide for the control of lepidopterous larvae. It contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 48B must be ingested by the larvae to be effective. For consistent control, apply at first sign of newly hatched larvae (1st and 2nd instar larvae). Susceptible larvae that ingest Foray 48B cease feeding within a few hours and die within 2-5 days.

Foray 48B may be applied up to and on the day of harvest.

For maximum effectiveness, follow the instructions listed below:

Monitor fields to detect early infestations.

Apply Foray 48B when eggs start hatching and larvae are small (early instars) and before significant crop damage occurs. Larvae must be actively feeding to be affected.

Repeat applications every 3 to 14 days to maintain control and protect new plant growth. Factors affecting spray interval include rate of plant growth, weather conditions, and reinfestation. Monitor populations of pests and beneficials to determine proper timing of applications.

Under conditions of heavy pest pressures or when large worms are present use the higher rate, shorten the application interval, and/or improve spray coverage to enhance control. When these conditions are present, consider use of contact insecticide to enhance control.

Thorough coverage is essential for optimum performance.

Crop	Pests	Rate <sup>1</sup> (fl. oz./acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Seed Orchards, Ornamental Fruit, Nut & Citrus Trees <sup>2</sup>	Gypsy Moth & Asian Gypsy Moth	21 - 107
	Elm Spanworm	
	Spruce Budworm	21 - 80
	Browntail Moth	
	Douglas Fir Tussock Moth	
	Coneworm	
	Buck Moth	
	Tussock Moths	16 - 43
	Pine Butterfly	
	Bagworm	
	Leafrollers	
	Tortrix	
	Mimosa Webworm	
	Tent Caterpillar	
	Jackpine Budworm	
	Blackheaded Budworm	
	Saddled Prominent	
	Saddleback Caterpillar	
	Eastern & Western Hemlock Looper	
	Orangestriped Oakworm	
	Satin Moth	
	Redhumped Caterpillars	11 - 31
	Spring & Fall Cankerworm	
	California Oakworm	
	Fall Webworm	

**Special Instructions:**

<sup>1</sup>Use the higher rates on advanced larval stages or under high density larval populations.

<sup>2</sup>In treating Gypsy Moth and Asian Gypsy Moth infested trees and shrubs in urban, rural, and semi-rural areas, exposure of non-target vegetation including, but not limited to, native and ornamental species and food or feed crops is permitted.

Use and mix this product with other pesticides only in accordance with the most restrictive of label limitations and precautions. Do not mix this product with any product containing a label prohibition against such mixing. Do not exceed label dosage rates.

**GENERAL NON-AGRICULTURAL USE INSTRUCTIONS**

Not for use on plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes. For use on plants intended for aesthetic purposes or climatic modification and being grown in ornamental gardens or parks, or on golf courses or lawns and grounds.

Not for use on trees being grown for sale or other commercial use, or for commercial seed production, or for the production of timber or wood products, or for research purposes except wide-area public pest control programs sponsored by government entities, such as mosquito abatement, Gypsy Moth control, and Mediterranean Fruit Fly eradication.

Foray 48B contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 48B is a stomach poison and is effective against lepidopterous larvae. After ingestion, larvae stop feeding within hours and die 2-5 days later. Maximum activity is exhibited against early instar larvae. Apply Foray 48B only by aerial application.

Use Foray 48B with a closed-loop mixing/loading system that will minimize the potential for accidental spills and exposure of ground handling personnel.

If dilution with water is needed for full crop coverage, fill tank with approximately 3/4 of the water required for dilution. Begin agitation and pump Foray 48B into the water while maintaining continuous agitation. Agitate as necessary to maintain suspension. Do not allow diluted mixture to remain in the tank for more than 72 hours.

Monitor to detect early infestations.

Crop	Pests	Rate <sup>1</sup> (fl. oz./acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Seed Orchards, Ornamental Fruit, Nut & Citrus Trees <sup>2</sup>	Gypsy Moth & Asian Gypsy Moth	21 - 107
	Elm Spanworm	
	Spruce Budworm	21 - 80
	Browntail Moth	
	Douglas Fir Tussock Moth	
	Coneworm	
	Buck Moth	
	Tussock Moths	16 - 43
	Pine Butterfly	
	Bagworm	
	Leafrollers	
	Tortrix	
	Mimosa Webworm	
	Tent Caterpillar	
	Jackpine Budworm	
	Blackheaded Budworm	
	Saddled Prominent	
	Saddleback Caterpillar	
	Eastern & Western Hemlock Looper	
	Orangestriped Oakworm	
	Satin Moth	
	Redhumped Caterpillars	11 - 31
	Spring & Fall Cankerworm	
	California Oakworm	
	Fall Webworm	

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<sup>1</sup>Use the higher rates on advanced larval stages or under high density larval populations.

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Use and mix this product with other pesticides only in accordance with the most restrictive of label limitations and precautions. Do not mix this product with any product containing a label prohibition against such mixing. Do not exceed label dosage rates.

**Aerial Application**

Apply Foray 48B, either alone or diluted with water, aerially at the rates per acre shown in the application rates table. Spray volumes of 32-107 fluid ounces of product per acre give optimum coverage. Best results are expected when Foray 48B is applied to dry foliage.

For smaller spray volumes, mix the proper number of teaspoons of Foray 48B from the following chart to attain the desired rates:

If the rate is:	Add this amount per gallon of mix:
8 fl. oz. (0.5 pt.)/acre	1/2 teaspoon
16 fl. oz. (1.0 pts.)/acre	1 teaspoon
24 fl. oz. (1.5 pts.)/acre	1-1/2 teaspoons
32 fl. oz. (2.0 pts.)/acre	2 teaspoons
48 fl. oz. (3.0 pts.)/acre	3 teaspoons
64 fl. oz. (4.0 pts.)/acre	4 teaspoons

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