United States
Department
of Agriculture

Forest Service
State and Private Forestry
Forest Health Protection
Intermountain Region
R4-OFO-TR-06-04

State of Nevada
Division of Forestry
Department of
Conservation and
Natural Resources
Western Region 1
Headquarters

Forest Insect and Disease Conditions in Nevada 2004

Forest Health Specialists

USDA Forest Service
Ogden Field Office
Forest Health Protection
4746 S 1900 E
Ogden, UT 84403
Phone 801-476-9720
FAX 801-479-1477

Steve Munson, Group Leader
Email: smunson@fs.fed.us

Darren Blackford, Entomologist
Email: dblackford@fs.fed.us

Valerie DeBlander, Forestry Technician
Email: vdeblander@fs.fed.us

John Guyon, Pathologist
Email: jguyon@fs.fed.us

Elizabeth Hebertson, Pathologist
Email: lghebertson@fs.fed.us

Brytten Steed, Entomologist
Email: bsteed@fs.fed.us

Ben Meyerson, Biological Technician
Email: bmeyerson@fs.fed.us

Nevada Division of Forestry
Department of Conservation and Natural Resources
Western Region 1 Headquarters
885 Eastlake Blvd.
Carson City, NV 89704-9167

John Christopherson, Resource Management Officer
Email: jchrist@forestry.nv.gov
Phone: 775-849-2500 ext. 243

Nevada Division of Forestry
Department of Conservation and Natural Resources
State Headquarters
2525 S. Carson Street
Carson City, NV 89701

Gail Durham, Forest Health Specialist
Email: gdurham@forestry.nv.gov
Phone: 775-684-2513

Rich Harvey, Resource Program Coordinator
Email: rharvey@forestry.nv.gov
Phone: 775-684-2507

Cover photo of charcoal kilns-Brytten Steed

NEVADA FOREST INSECT AND DISEASE CONDITIONS

2004

Compiled By:
Valerie DeBlander

Contributors:
Kathy Matthews
Gail Durham
John Guyon
Brytten Steed

Data Summary and Map Production:
Dick Halsey
Phil Mocettini

January 2006

Table of Contents

Introduction

This report summarizes the status of forest insect and disease activity in Nevada during 2004 and was jointly prepared by USDA Forest Service, Forest Health Protection, Intermountain Region and Nevada Division of Forestry, Department of Conservation and Natural Resources. Insect status is based largely on aerial detection surveys. Disease status is based largely on ground observations and surveys.

Forest Health Conditions Summary

Forest health is a complicated topic. In an effort to simplify, this report focuses only on the effects of insects, diseases, and weather on trees in Nevada. Within that realm, precipitation is crucial for trees to remain vigorous, affecting tree resistance to insects and pathogens. With adequate rainfall or snowmelt, trees can maintain their defenses; pushing out attacking bark beetles with pitch, growing new foliage to replace that lost by defoliating insects or augmenting growth to counter effects of diseases. Without adequate precipitation, resistance is compromised, making trees more susceptible to pest activity.

In Nevada and throughout the west, forests have been experiencing drought since 1998. The effects of drought and increased insect activity are noticeable throughout the Intermountain Region states of Nevada, Utah, and Idaho. Compared to 2003, significant tree decline or mortality was seen in pinyon pine woodlands, true fir, white pine, subalpine fir and aspen forests.

In 2004, a second year multi-state effort funded by Forest Health Monitoring (FHM) was made to survey the extent of *Ips confusus*-caused pinyon pine mortality. Of the estimated 11.9 million acres of singleleaf pinyon pine in Nevada, approximately 3.5 million acres were surveyed. Over 4 million trees were infested on approximately 730,000 acres. This was about 1 million more trees and nearly three times the acreage noted in the 2003 survey. Areas surveyed in 2004 included new areas not surveyed in 2003 and areas with repeat surveys. Counties with the highest numbers of pinyon ips- caused tree mortality in 2004 were Mineral, Nye, Douglas, Lincoln, and Lyon.

Fir engraver beetle-caused tree mortality, affecting primarily white fir, increased from nearly 40,000 trees on approximately 18,650 acres in 2003 to over 276,000 trees on approximately 55,000 acres in 2004. For the third consecutive year, White Pine County had the highest rate of white fir mortality affecting over 251,000 trees on approximately 45,000 acres. Fir mortality in Clark County increased from over 4,300 trees in 2003 to over 13,000 trees in 2004.

Subalpine fir mortality due to subalpine fir decline (western balsam bark beetle and/or root disease) increased in Elko County. In 2003, Elko County had over 11,000 trees affected over 5,200 acres principally on the Mountain City and

Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest. In 2004 this increased to a little over 100,000 trees over 15,000 acres, representing an 89% increase in tree mortality.

Douglas-fir tussock moth defoliation affecting true fir and Douglas-fir decreased in 2004 to 4,200 acres from a high in 2003 of 7,906 acres. Defoliation occurred in Elko County on the Jarbidge and Mountain City Ranger Districts of the Humboldt-Toiyabe National Forest.

Mountain pine beetle-caused mortality in whitebark/limber pine continued to increase with Washoe, Elko, Nye, and White Pine counties experiencing the heaviest tree mortality in 2004. In 2004 tree mortality increased 74% from 3,594 trees on 2,233 acres in 2003 to 13,592 trees on 3,804 acres.

In the Intermountain Region, Jeffrey pine occurs only along the Sierra Nevada and in a few smaller ranges of western Nevada. In 2004, 794 trees were mapped within 477 acres in Washoe, Douglas, and Carson City counties, compared to 92 trees on 55 acres in 2003.

In 2003, aspen defoliation/dieback occurred on 9,000 acres primarily in Humboldt, Nye, and Elko Counties. Additional ground checks in 2004 determined the dieback to be caused by drought, cytospora canker, poplar borer and other pathogens. In 2004, the acres of dieback/defoliation increased to almost 23,000 acres. Further field investigation will be conducted in 2005 to determine the causes of the dieback.

Table 1. 2004 Bark Beetle Mortality by County

County	Mountain Pine Beetle[1]		Fir Engraver Beetle		Pinyon Ips Beetle		Subalpine Fir Mortality Complex	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Carson City	- -	- -	- -	- -	9,204	2,679	- -	- -
Clark	- -	- -	13,167	2,313	17,714	2,898	- -	- -
Douglas	- -	- -	70	35	948,856	61,963	- -	- -
Elko	2,359	1,273	- -	- -	245	237	101,464	15,776
Eureka	125	62	- -	- -	14,241	7,120	- -	- -
Humboldt	15	7	- -	- -	- -	- -	- -	- -
Lander	--	--	- -	- -	8,057	10,129	- -	- -
Lincoln	205	293	1,589	1,100	537,453	145,160	- -	- -
Lyon	- -	- -	- -	- -	307,798	78,199	- -	
Mineral	--	--	20	10	1,137,568	165,607	- -	- -
Nye	1,182	891	9,232	5,529	1,015,932	203,022	- -	- -
Storey	- -	- -	- -	- -	209	104	- -	- -
Washoe	8,655	663	1,081	1,018	301	152	- -	- -
White Pine	1,051	615	251,030	45,078	52,130	43,291	- -	- -
Total	13,592	3,804	276,189	55,083	4,049,708	720,561	101,464	15,776

[1] Mountain pine beetle-caused mortality in whitebark and limber pines only.

Table 2. 2004 Insect Defoliation/Dieback by County

County	Aspen Dieback	Douglas-fir Tussock Moth
	Acres	Acres
Elko	11,629	4,284
Eureka	729	- -
Humboldt	4,181	- -
Lander	297	- -
Lincoln	464	- -
Nye	4,745	- -
White Pine	778	- -
Total	22,823	4,284

STATUS OF INSECTS

Insects: Native

Defoliators

Douglas-fir Tussock Moth
Orgyia pseudotsugata

Hosts: Douglas-fir, all true firs, and spruce

The Douglas-fir tussock moth (DFTM) is an important native insect capable of causing significant defoliation. Heavy defoliation causes reduced growth, stress, and tree mortality. Topkill and mortality of advanced regeneration can also occur during a single season. Outbreaks are cyclic, usually appearing quickly followed by an abrupt decline within a one to four year period.

DFTM defoliation ranging from light to heavy was detected on 4,284 acres in Nevada.

- **Elko County** – 4,284 acres; Light to heavy defoliation occurred in the Jarbidge Mountains and Mountain City Ranger District in The Mahoganies south of Merrit Mountain and the north end of the Independence Mountain Ranges. The majority of the defoliation was in the Jarbidge Wilderness.

Forest Tent Caterpillar
Malacosoma disstria

Hosts: Aspen, oak, and willow

In 2004, ground checks of aspen decline/mortality from aerial surveys of the East Humboldt and Jarbidge Mountains failed to detect forest tent caterpillar (FTC) activity. Instead, the signatures of missing leaves, dead tops, or sparse crowns previously attributed to FTC were found to be a combination of factors including drought stress, poplar borer, cytospora canker, other pathogens and general aspen decline. See the section on Aspen Dieback/Decline.

Bark Beetles

Fir Engraver Beetle
Scolytus ventralis

Hosts: Red fir, subalpine fir, white fir

Fir engraver beetle-caused tree mortality increased significantly from 2003 to 2004. Mortality in 2003 was nearly 40,000 trees with 276,000 trees killed in 2004.

- **White Pine County** –45,078 acres, 251,000 trees; Extensive mortality occurred in the Schell Creek Range, White Pine Range, Snake Range, the southern portion of the Egan Range, and Great Basin National Park.
- **Nye County**- 5,529 acres, 9,232 trees; Trees were killed in the northern Quinn Canyon Range and the southern Grant Range.
- **Clark County**- 2,313 acres, 13,167 trees; Scattered pockets ranging from 5-500 trees were mapped throughout the upper elevations of the Spring Mountains.

Jeffrey Pine Beetle
Dendroctonus jeffreyi

Host: Jeffrey pine

The Jeffrey pine beetle is the most destructive bark beetle of Jeffrey pine. Endemic populations usually attack scattered, slower growing, mature and overmature trees and trees struck by lightning. In the Intermountain Region, Jeffrey pine is only found along the Sierra Nevada Mountains of western Nevada.

In 2004, Jeffrey pine beetle-caused tree mortality affected 794 trees compared to 92 trees detected in 2003. The majority of the mortality was found in Washoe County.

- **Washoe County**– 450 acres, 739 trees; Mortality was detected on the eastern Sierra Front. Small groups of mortality were also detected in the area north of Dog Valley and Ball Ranch Creek, with larger areas found south of Pickett Peak, along Forestdale Creek, and in the upper reach of the West Fork of the Carson River.

Mountain Pine Beetle
Dendroctonus ponderosae

Hosts: Whitebark, limber, lodgepole, sugar, and ponderosa pines

Mountain Pine Beetle – Limber/Whitebark Pine

In 2004, mountain pine beetle-caused whitebark and limber pine tree mortality increased 74% from 3,594 trees on 2,233 acres in 2003 to over 13,500 trees on 3,800 acres.

- **Elko County** - 273 acres, 2,359 trees; Most mortality was scattered in small pockets throughout the higher elevations in the Ruby Mountains and the East Humboldt Range. Mortality was also noted throughout the Jarbidge and Cooper Mountains, with three pockets in the north end of the

Independence Mountains and near Pennsylvania Peak in the Bull Run Mountains.

- **Eureka County** – 62 acres, 125 trees; Mortality was scattered in a few small pockets in the northernmost end of the Monitor Range between Summit Mountain and Antelope Peak.
- **Lincoln County** - 293 acres, 205 trees; Mortality was detected in the Wilson Creek Range around White Rock Peak and Wilson Peak.
- **Nye County** – 891 acres, 1,182 trees; Moderate-sized groups were mapped in the Arc Dome Wilderness, north and south of Kingston Canyon, headwaters of Mill Canyon, north and west side of Mt. Jefferson, headwaters of Tulle Creek, Clear Creek, and Green Monster Canyon. Mortality was detected on the Hot Creek Range near Morey Peak and the headwaters of North Sixmile Canyon and two small pockets on top of the south Quinn Canyon Range.
- **Washoe County** - 663 acres, 8,655 trees; All of the mortality was located near Mt. Rose.
- **White Pine County** – 615 acres, 1,051 trees; Mortality was observed in scattered pockets along the tops of the Snake Range, the Schell Creek Range, Egan Range, and Great Basin National Park.

Mountain Pine Beetle in Ponderosa Pine

In 2004, mountain pine beetle activity continued in two counties affecting 189 trees over 94 acres.

- **Clark County** – 89 acres, 179 trees; Mortality was recorded in upper Kyle Canyon and one infested area in lower Lee Canyon.
- **White Pine County** – 5 acres, 10 trees; Mortality was reported in the Snake Range in the upper portion of Horse Creek and south of Granite Peak in Great Basin National Park.

Pinyon Ips
Ips confusus


Pinyon Ips mortality

Host: Singleleaf pinyon

The pinyon ips caused mortality in pinyon-juniper ecosystems has also affected valuable home landscape trees. Continued drought conditions increased tree stress, predisposing trees to *Ips* attack. Because the insect produces multiple generations each year, populations can build and spread rapidly.

In 2003, in response to increasing concern of pinyon pine mortality, a special multi-state effort funded by Forest Health Monitoring (FHM) was made to survey the extent of *Ips confusus*-caused pinyon mortality. Approximately 3 million of the estimated 11.9 million acres of singleleaf pinyon that grow in Nevada were surveyed in 2003. In 2004 over 3.5 million acres of pinyon-juniper woodlands were flown. Within these 3.5 million acres, 720,000 acres were recorded with some level of pinyon mortality and >4million dead trees. Reported *Ips*-caused mortality of singleleaf pinyon increased, primarily due to additional survey coverage of the pinyon pine type.

Results of the 2004 aerial survey follow:

- **Carson City County** – 2,679 acres, 9,204 trees; Heavy mortality was recorded in the Pine Nut Range from McTarnahan Hill west of Brunswick Canyon east to the county line, including Eldorado Canyon.
- **Clark County** – 2,898 acres, 17,714 trees; Moderately-sized groups were recorded in the headwaters of Trout Canyon, and Telephone Canyon, near Angel Peak, and in the northwest Spring Mountains west of Bill Smith Spring, and around Oak Springs.

- **Douglas County** – 61,963 acres, 948,856 trees; Heavy mortality was recorded in the Pine Nut Mountain Range from the California border north into Lyon County.
- **Elko County** - 237 acres, 245 trees; Mortality was at low levels in this county with a few small groups mapped near the southern end of the East Humboldt Range.
- **Eureka County** – 7,120 acres, 14,241 trees; The 2004 numbers represent a significant increase from 2003 with one large pocket on the northeast end and scattered pockets on the northwest end of the Monitor Range.
- **Lander County** – 10,129 acres, 8,057 trees; Most of the mortality occurred on the northeast side of the Toiyabe Range from Kingston Canyon to just north of Sheep Canyon. Small to large pockets of mortality were reported in the Toquima Range from the Nye County border to Rutherford Canyon. A couple of large pockets of mortality also occurred on the west side of the Shoshone Mountains just north of the Nye County line.
- **Lincoln County** – 145,160 acres, 537,453 trees; These numbers represent only about ¼ the mortality detected in 2003. One of the largest concentrations of pinyon mortality in Nevada, the Wilson Creek Range, had widespread mortality on the lower two-thirds of the range. The lower end of the Quinn Canyon Range had widespread mortality as well.
- **Lyon County** – 78,199 acres, 307,798 trees; Most of the heavy mortality is a continuation of the Douglas and Carson City Counties mortality in the northern Pine Nut Mountains plus the new areas that were mapped in the Pine Grove Hills and Sweetwater Mountains which were heavily infested in the host type.
- **Mineral County** – 165,607 acres, 1,137,568 trees; No mortality was listed in Mineral County in 2003. Heavy mortality in this county is attributed to the addition of new areas such as the Wassuk, and Excelsior Ranges and the area around Aurora Crater in the 2004 survey area.
- **Nye County** – 219,713 acres, 1,046,249 trees; In 2004 mortality increased significantly, likely due to the addition of high infestation areas added to the 2004 survey including the Paradise and Hot Creek Mountain Range. Scattered pockets of mortality occurred throughout the Sunrise and Shoshone Mountains and Grant, Monitor, Toquima, Toiyabe, and White Pine Ranges. The majority of pinyon pine mortality occurred in the areas of Quinn Canyon Range from the White Pine County line south to the Lincoln County border, throughout the Paradise Range, the west side of the Shoshone, the east lower hillslopes of the Toiyabes, and the east-central portion of the Hot Creek Range.
- **Storey County** - 104 acres, 209 trees; Mortality was mapped in the Virginia Range around Flowery Peak with a few smaller areas in Lousetown Creek- mapped mortality was similar to the 2003 survey.

- **Washoe County** - 152 acres, 301 trees; Mortality was mapped in the western portion of the Virginia Range.
- **White Pine County** – 43,291 acres, 52,130 trees; Scattered mortality was mapped in the Snake, Egan, Schell Creek and White Pine Ranges. Larger areas of mortality occurred in the northwest end of the Snake Range, southeast portion of the White Pine Range into the Horse Range, and the headwaters of Lampson Canyon and Freeland Canyon, and north of Black Rock Canyon.

Pine Pitch Mass Borer
Dioryctria spp.


Pine pitch mass borer –Brytten Steed

Hosts: Singleleaf pinyon, Jeffrey pine, Ponderosa pine

In the larval stage, species of *Dioryctria* bore into the cambium of the trunk and branches to feed causing wounds. The tree produces large masses of pitch in response to the feeding. The boring injury can weaken the tree and kill branches. In pinyon areas, this injury coupled with prolonged drought, has weakened pinyon trees sufficiently predisposing the tree to pinyon ips attack. Dioryctria species are found throughout the state of Nevada in most counties where pinyon occurs. The heaviest concentrations seem to occur in western Nevada where Dioryctria spp. also affects Jeffrey and ponderosa pine.

Pinyon Needle Scale
Matsucoccus acalyptus

Host: Singleleaf pinyon

This is a sap-sucking insect that feeds on previous years needles. The pinyon needle scale causes needle injury, needle loss, stunted tree growth and branch death. Small trees may be killed and large trees may be seriously weakened after repeated infestations, increasing their susceptibility to pinyon ips attack. Pinyon needle scale is found throughout Nevada.

Insects: Non-native

European Gypsy Moth
Lymantria dispar

Hosts: Various deciduous species

Statewide, 600 pheromone traps were placed by Nevada State Department of Agriculture and APHIS, (Animal and Plant Health Inspection Service). No male moths were captured in 2004. The last identified positive catch occurred in an RV park in Winnemucca in 1999.

STATUS OF DISEASES

Diseases

Stem and Branch Diseases

Dwarf Mistletoes
Arceuthobium spp.


Male dwarf mistletoe plants on Jeffrey Pine

Hosts: Douglas-fir, pines, true firs, singleleaf pinyon and spruce

Dwarf mistletoes are the single-most damaging agent of coniferous trees. These parasitic plants remain the most widespread and frequently observed disease within the state. Profusely branched, dense masses of host branches called “witches brooms” are typically symptoms associated with this disease. Heavy dwarf mistletoe infestation can predispose trees to insects and other disease, reduce incremental growth, affect the forest canopy structure, and lower resistance to drought. Infected trees visually affect recreation and aesthetic resource objectives. Since dwarf mistletoe infests trees of all ages, infestation problems may exist in trees of all size and age classes.

Dwarf mistletoe on pinyon pine can be found throughout the state, but it has never been comprehensively surveyed. Pinyon ips mortality was observed in some of the heavy dwarf mistletoe infected pinyon pine stands within Nevada. Some of the dwarf mistletoe weakened trees died due to pinyon ips attack.

White Pine Blister Rust
Cronartium ribicola

Hosts: Five-needled pines including limber, bristlecone, whitebark, sugar, and western white pine. *Ribes* spp. are alternate hosts.

White pine blister rust has been known to exist in western Nevada on the east side of the Sierra Nevada Mountains for several years. The rust has expanded its range in Nevada in recent years, with populations of rust now confirmed in the Jarbidge Mountains. Forest Health Protection conducted a ground survey for white pine blister rust in the mountain ranges in eastern Nevada primarily focused on high-elevation Great Basin bristlecone pine. No newly infected areas were discovered, and the previously reported rust infection in the Ruby Mountains was found to be dwarf mistletoe. In 2004 the only confirmed population of white pine blister rust is in eastern Nevada in the Jarbidge Mountains.

Sudden Oak Death
Phytophthora ramorum

Host: Quercus spp., tanoaks, rhododendron spp., manzanita

Sudden Oak Death (SOD), a newly identified forest disease caused by the pathogen *Phytophthora ramorum*, has been killing thousands of tanoak and oaks in the coastal areas of California but has not been observed in Nevada. However, with the release of potentially infected nursery stock in all 50 states from a California nursery, State Agriculture officials contracted with the USFS to conduct surveys in forest areas on host and potential host species near nurseries or where landowners may have outplanted this potentially infected stock. Nevada Division of Forestry personnel have assisted Nevada Department of Agriculture officials with these surveys. No SOD was detected in the 2004 surveys. Surveys will continue into the 2005 season.

Root Diseases

Annosum Root Disease
Heterobasidion annosum

Hosts: Douglas-fir, lodgepole pine, ponderosa pine, spruce, true firs, and incense cedar

This disease can be found throughout the state on true firs, but it frequently acts as butt decay or as a saprophyte on dead trees, stumps, roots, and cull logs or fallen stems. The fungus occasionally kills young ponderosa pine, especially in plantations on droughty soils. Symptomatic small trees can frequently be found around stumps that had butt decay. The symptoms on larger trees include a thinning crown and fruiting bodies that develop at the base of the tree or inside stumps.

Armillaria Root Disease
Armillaria spp.

Hosts: Douglas-fir, pines, spruce, subalpine fir and red fir

Evidence of armillaria root disease can be found throughout the state causing mortality in all species of trees. This disease also frequently functions as a weak pathogen or saprophyte. Fruiting bodies grow in clusters from the roots or at the base of the tree during moist conditions. There is a close association between root disease pockets and endemic level bark beetle populations. Disease incidence increases during periods of drought increasing tree mortality particularly in subalpine fir.

Black Stain Root Disease
Leptographium wageneri

Black stain root disease in Pinyon, Ely RD, Humboldt NF.

Hosts: Pinyon pine, ponderosa pine, and Douglas-fir

Black stain root disease is an important disease of several hosts, but it is only found on pinyon pine in Nevada. It usually kills affected trees within a few years, and it can produce groups of mortality several acres in size. Pockets of infected trees are preferred hosts for endemic populations of pinyon engraver beetles. No new pockets of black stain root disease were observed in 2004, but the current outbreak of ips beetles probably obscures any current activity by the disease, during the aerial survey.

Leaf and Needle Diseases

Aspen Leaf Spot
Marssonina populi

Host: Aspen

Blight and leaf spot caused by this disease have been mapped previously throughout the host type. However, no visual symptoms were observed in the 2004 aerial survey.

DECLINES / COMPLEXES

Subalpine Fir Mortality Complex

Host: Subalpine fir

The western balsam bark beetle (WBBB) is the most significant mortality agent in a complex of forest insects and disease, causing subalpine fir mortality. Endemic populations will occur in storm-damaged trees, diseased trees, slash, or trees exhibiting symptoms associated with poor vigor. WBBB infestations may build to epidemic levels, where mortality can occur in groups of 100 to 10,000 trees. Annosum root disease, woodborers and several species of smaller bark beetles are also involved in this complex. Environmental stress associated with drought also predispose subalpine fir to WBBB attack.

In 2004, mortality caused by WBBB tripled from 5,000 acres to over 16,000 acres.

- **Elko County** – Over 100,000 trees in large scattered pockets of tree mortality were mapped throughout the Jarbidge Mountains, including the Jarbidge Wilderness. Additional mortality was reported in the Independence Mountains, the Bull Run Mountains and The Mahoganies.

Aspen Dieback/Decline

Host: Aspen

Aspen decline is a phenomenon that has been observed throughout the Western US for many years. Almost 23,000 acres of aspen decline were mapped in the 2004 aerial survey. In the declining clones several types of canker diseases and heavy borer activity were found during ground surveys. However, other major forces involved in aspen decline are drought, fire suppression, conifer encroachment, and grazing pressure. Many clones with heavy mortality and exhibiting signs of general decline have little or no reproduction.

Cytospora canker is one of the most common diseases affecting aspen in ornamental settings and often attacks stressed trees through wounds. This fungus girdles branches by killing the cambium; however, vigorous trees limit the disease spread and are rarely killed. Cytospora canker has been identified through ground surveys. A number of factors including drought and other diseases are most likely the cause of aspen decline. Activity from this pathogen is most likely associated with several years of drought or defoliation caused by other insects or diseases. Aerial observers recorded this dieback

as forest tent caterpillar defoliation in 2002 & 2003. Further field study is needed to determine all causes of aspen dieback and decline.

In 2004, 22,823 acres of aspen dieback were mapped in seven counties.

- **Elko County** – 11,629 acres; Dieback/decline was reported in the Jarbidge, Tennessee, Bull Run and the Mahogany mountains. Light to heavy dieback/decline occurred throughout the Ruby Mountain and East Humboldt Ranges from the White Pine County line to Star Valley.
- **Humboldt County** - 4,181acres; Light to heavy aspen dieback/decline occurred throughout the Santa Rosa Mountains.
- **Eureka, Lander, and Nye Counties** – 729, 297, and 4,745 acres, respectively; Dieback/decline was mapped on the Toiyabe, Monitor, and Toquima Ranges. No dieback/decline was noted in the Shoshone or Paradise Ranges.
- **Lincoln County** – 464 acres; Mortality was scattered in pockets throughout the Wilson Creek Range.
- **White Pine County** – 778 acres; Most of the dieback/decline occurred from the central to southern Schell Creek Range. Only one pocket was found on the White Pine Range and three pockets on the Snake Range.

ABIOTIC DAMAGE

Frost Damage

Hosts: Maple, gambel oak, aspen

No frost damage was reported during the 2004 survey, but part of the pinyon ips damage in the Sweetwater Area may have been associated with frost.

Blowdown

Areas of concentrated, high velocity winds can cause tree windthrow. Blowdown occurs in groups or as scattered trees within the landscape. Depending on the tree species, patches of blowdown in coniferous forests can provide a food source for various species of bark beetles, enabling populations to build to epidemic levels. These epidemic populations may then attack and kill standing, live trees adjacent to the blowdown. There was no observed blowdown in 2004.

NOXIOUS WEEDS

Noxious weeds are a continuing problem for all Western states. They have the ability to colonize disturbed habitats aggressively displacing native plant species and altering ecosystems. Several State and Federal agencies have the responsibility for monitoring and controlling noxious weeds. Our intention by including this information is to increase noxious weed awareness. Table 3 contains a list of plants listed as noxious weeds by the State of Nevada.

The following noxious weed websites, while not inclusive, give additional information on invasive plants including biology, history, and suppression/eradication.

http://www.invasivespeciesinfo.gov
This website maintained by the National Agricultural Library serves as the official reference gateway to federal and state programs, organizations, and services concerning invasive species. There are links to numerous invasive species databases. This website should be the first site referenced.

http://www.agri.nv.gov/PLANT_NoxWeeds_index.htm
This website contains information about noxious weed prevention, control and management for all land managers in Nevada.

http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm
California Department of Food and Agriculture has a very comprehensive website. Information includes: identification, biology, and management. Pictures of the plants in various stages are just a click away.

http://www.nwcb.wa.gov/index.htm
State of Washington's noxious weed control board website has information on black henbane, buffalobur, camelthorn, Canada thistle, Dalmatian toadflax, dyer's woad, goatsrue, houndstongue, johnsongrass, jointed goatgrass, diffuse, Russian and spotted knapweed, leafy spurge, Mediterranean sage, musk thistle, perennial pepperweed, purple loosestrife, puncturevine, rush skeletonweed, silverleaf nightshade, scotch thistle, St. Johnswort, yellow nutsedge, purple and yellow starthistle, and velvetleaf. Topics include description, economic importance, geographic distribution, habitat, history, growth and development, reproduction, response to herbicides, response to cultural controls, and biocontrol potentials.

http://www.ipm.ucdavis.edu/PMG/selectnewpest.landscape.html#WEED
University of California pest management website has information on bermudagrass, field bindweed, Russian thistle, yellow starthistle, and others. Topics include identification, biology, and management through cultural and chemical controls.

http://www.ext.colostate.edu/pubs/natres/pubnatr.html
Colorado State University Cooperative Extension website in the Range section has fact sheets on musk thistle, leafy spurge, Canada thistle, diffuse, Russian, and spotted knapweeds. Information includes description, phenology, and management options such as cultural, chemical, mechanical, and biological.

http://www.weedcenter.org
An interagency website housed at Montana State University. The Center for Invasive Plant Management (CIPM) promotes the ecological management of invasive plants in the West through education, by facilitating collaboration among researchers, educators, and land managers, and by funding research projects and weed management areas. The center serves as an information clearinghouse, providing examples of ecological management, and delivering implementation tools and products to land managers. The center operates in partnership with federal, state, counties, private industry, universities, foundations, and landowners.

http://invader.dbs.umt.edu
The University of Montana's Invaders Database has a search engine that links the user to informational websites on most of the invasive weeds. You can search the database for the list of Noxious Weeds by state and most identified plants have some information and links to more information.

Table 3. Nevada Noxious Weeds

DESIGNATED NOXIOUS WEEDS
(NRS 555.101)
(Blueface denotes a year 2000 addition)

- African rue
- Austrian fieldcress
- Austrian peaweed
- Black henbane
- Camelthorn
- Common crupina
- Dyer's woad
- Erasion water-milfoil
- Goats rue
- Klamath weed
- Hemlock: Poison; and Water
- Horse nettle: Carolina; and White
- Houndstongue
- Hydrilla
- Knapweed: Diffuse; Russian; Spotted; and Squarrose
- Leafy spurge
- Mayweed chamomile
- Mediterranean sage
- Medusahead
- Perennial pepperweed (tall whitetop)
- Puncturevine
- Purple loosestrife
- Rush skeletonweed
- Saltcedar (tamarisk)
- Sorghum species, perennial, including but not limited to: Johnsongrass; Sorghum alum; and Perennial sweet sudan
- Sulfur cinquefoil
- Thistle: Canada; Musk; Scotch; Sow; Iiberian star; Purple star; and Yellow star
- Toadflax, dalmatian
- Toadflax, yellow
- Whitetop (hoary cress)

APPENDIX A

Table 4. 2004 Acres Surveyed by County.

County	2004 Acres Surveyed	Total Acres in County	% Surveyed
Carson City	45,062	103,569	43.5
Clark	189,256	5,176,177	3.7
Douglas	234,486	478,351	49.0
Elko	637,657	10,979,963	5.8
Eureka	123,598	2,663,738	4.6
Humboldt	129,819	6,219,557	2.1
Lander	202,714	3,534,543	5.7
Lincoln	382,065	6,782,623	5.6
Lyon	177,499	1,310,315	13.5
Mineral	384,519	2,462,989	15.6
Nye	1,690,069	11,686,348	14.5
Storey	13,544	167,774	8.1
Washoe	129,511	4,234,009	3.1
White Pine	1,095,509	5,676,727	19.3
Total	5,435,308	61,476,683	8.8

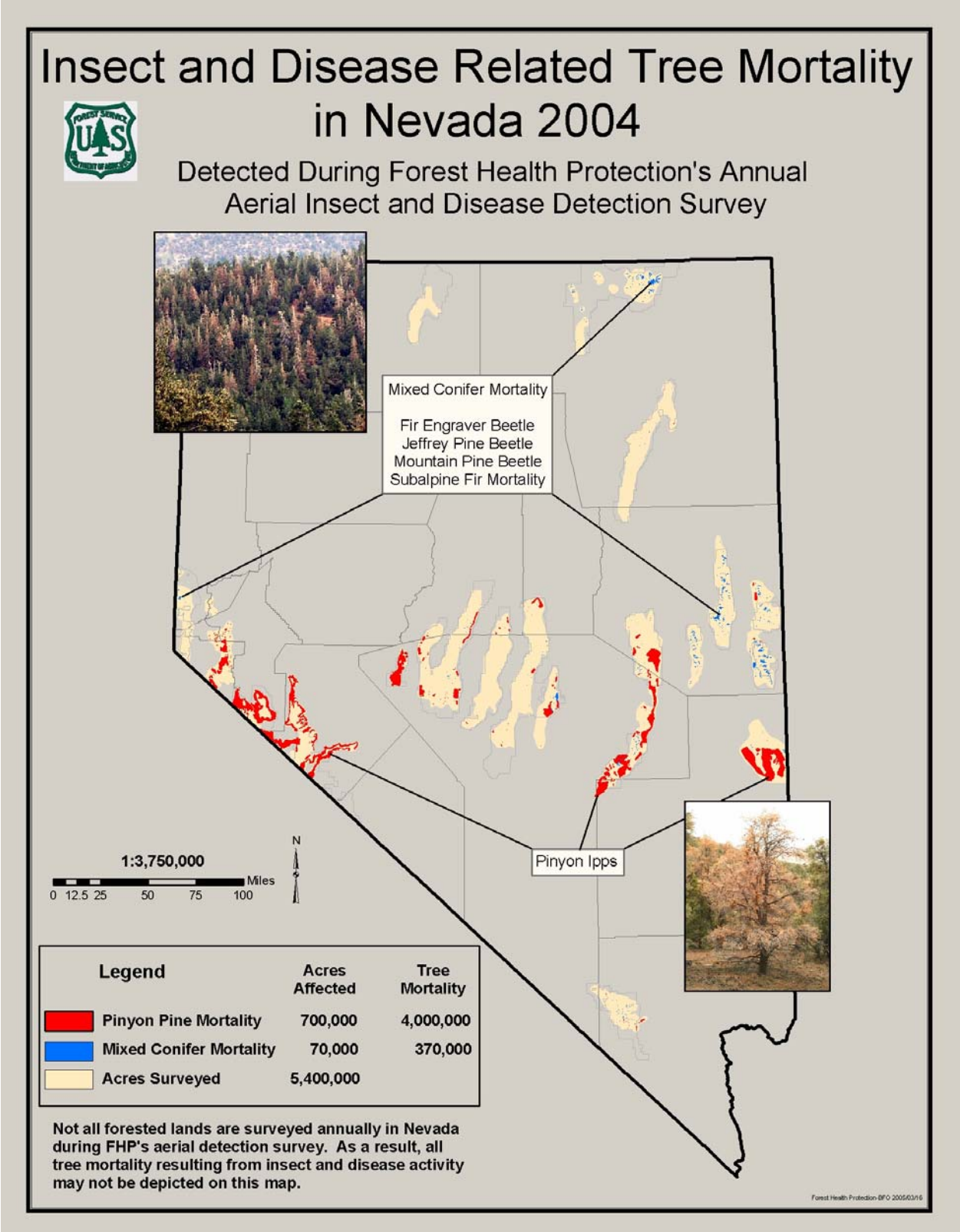

Figure 1. Map of Insect & Disease Tree Mortality.