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Bark Beetle Mitigation Plan

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Introduction:

The Parks and Recreation Department has prepared the following Bark Beetle Mitigation Plan in response to the current mountain pine beetle epidemic that the Rocky Mountain Region is experiencing. This plan incorporates the principles of an Integrated Pest Management (IPM) structure to alleviate the impact on the community that this epidemic may cause. This plan is being developed specifically to manage conifer trees in the parks, cemetery, and open space areas that are the owned by, or are the responsibility of the city for care and maintenance. Our expectations are that the following guidelines will be a proactive step to help lessen the impact of bark beetles in the City of Laramie's urban forest. If approved, this plan will also be posted on the City's web site and distributed throughout the community for citizen input and education.

Background:

Bark beetles are endemic to the Rocky Mountain Region, and have been common for thousands of years. Beetles are always present in mature forests, and are one of nature's way of renewing the forest. Under normal conditions, bark beetles cause single tree and small group mortality. Populations of beetles are naturally regulated by cold temperatures, other insects, and birds such as woodpeckers. It would take temperatures of -40 degrees Fahrenheit or colder for several weeks to freeze bark beetles, as they produce their own ethylene glycol anti-freeze for winter protection.

The current mountain pine beetle epidemic in the Snowy Range area west of Laramie is the largest in recorded history. Periodic outbreaks, or epidemics, have occurred naturally in the forest environment over time and can be attributed to many causes such as drought, warm winters, age class distributions of the trees in the forest, overstocking of trees, and fire exclusion. All of the above mentioned reasons affect the general health of trees, and can inhibit their ability to naturally fend off an attack by bark beetles. All of these conditions in varying degrees have been present in the forest and have contributed to the current epidemic outbreak the Snow Range is currently experiencing.

The mountain pine beetle is about the size of a grain of rice. Adult beetles bore into the trunks of pine trees to mate and lay their eggs. They form a vertical tunnel or egg gallery in which they lay upwards of 75 eggs. The eggs that are deposited in the galleries hatch producing larvae that continue to bore and eat the cambium layer underneath the bark as they mature through the winter. Larvae transform into a pupal

stage in early summer and then undergo metamorphosis into winged adult beetles which bore out of their host tree to fly to new green trees and begin the process again.

Mountain pine beetles also introduce a blue stain fungus that impedes the flow of water and nutrients that nourish the tree. The blue stain fungal infections inhibit the trees natural ability to force out or “pitch” the beetles out of the tree. If the tree’s ability to move sufficient amounts water in the cambium layer is compromised, the tree will ultimately die. Usually only large mature trees, eight inches or greater in diameter are attacked by mountain pine beetles. High populations of beetles combined with the prolonged climatic conditions have led to trees as small as four inches in diameter being attacked by mountain pine beetles and killed. When the mature tree resources become depleted, smaller diameter trees will be at greater risk as alternate mountain pine beetle hosts. The timing of adult beetle emergence and flight from the host tree is related to temperature. Often trees on the south side of buildings in the urban landscape may produce flying beetles sooner than a tree located in a shady area on the north side. It is generally believed that the beetles produced from a single tree will infest three to five additional trees.

What Can Be Done To Mitigate The Beetle Risk:

The staff has attended several conferences to gather information that would assist the City of Laramie in drafting a plan of action for beetle mitigation. From the information that has been gathered, the following “Bark Beetle Mitigation Plan” has been formulated. It is important to note that this plan must be flexible, as specific conditions relating only to Laramie’s geographic area, citizen response, and infestation levels of beetles will govern appropriate responses and treatments to protect the conifer trees within our public parks and open spaces.

Exclusion:

The first principle of an Integrated Pest Management (IPM) response is the exclusion of the beetle within the City of Laramie. This goal would be virtually impossible to achieve, but educating the public on how the beetle has arrived, may decrease the number of beetles being transported from the forest into the city.

Beetle-infested firewood gathered from the national forests and transported into Laramie is a vector of mountain pine beetle into our community. Gathering of firewood within a beetle-infested forest will bring beetles to town if precautions are not adhered to by the firewood gatherers. The following guidelines for firewood have been established by the Forest Service to help make the public aware of not bringing them into our communities.

- Only cut trees with visible exit holes in the bark (about the size of a pen head) and with all of the needles fallen off the tree. Beetles feed only on the moist tissue between the bark and the wood. They do not live in dry trees, the lumber in your house, or other dry wood.
- Stripping bark from firewood. This dries out the cambium layer and the developing beetles lose their food source and die.

Health of the Urban Forest:

The best defense to impede the beetle infestation is to disallow the transport of infested firewood into the community. We also need to ensure that the urban forest is receiving adequate water to maintain the trees in a vigorous state, so they might exclude the beetles themselves by pitching them out when attacked. The City of Laramie's location at 7,200 feet in elevation on a high mountain plain that receives little natural moisture and suffers continual wind, means that good supplemental irrigation practices are vital for our trees health.

The staff will continue to monitor and adjust the irrigation system watering schedule on a bi-weekly basis to assure that the urban forest is receiving adequate water. All the turf irrigation systems are inspected and repaired on a monthly basis. The drip irrigation systems, mostly employed in open space areas and beautification projects, will be inspected on a monthly basis to make certain they are functioning properly.

Staff will also focus on adequately maintaining the mulch rings that are currently placed around the all trees. The mulch ring is an important part of a healthy urban forest as the mulch helps retain soil moisture surrounding the trees and helps to alleviate damage from turf mowing operations surrounding trees.

Inspection:

Another integral part of a successful IPM program is the ongoing inspection of possible host trees to diagnose trees that may become infested or to identify trees that are already infested and need to be removed to prevent further beetle migration. It is anticipated that a vigorous inspection program will enable staff to quickly decide if an area or park may need a "spot" pesticide treatment to prevent any further attacks. We believe that all of the pine trees in the parks, cemetery and open spaces could be inspected on a monthly basis. This inspection schedule should help prevent a wide spread beetle infestation of any one park or area.

The second part of the inspection process would be the examination of other conifers in the parks, cemetery and open spaces that may be prone to attack from other bark beetles such as the spruce ips beetle. The spruce ips beetle is similar in pattern of life cycle and processes as the mountain pine beetle with the exception that it prefers the spruce variety of conifer tree over pine, and the attack will begin at the top of the tree instead of the main trunk that the mountain pine beetle prefers. With over 1,200 spruce trees within the parks, cemetery and open space areas inspections and any spot treatments would be completed on an as needed basis only.

Treatment:

The staff is recommending a preventative pesticide treatment to control mountain pine beetle attacks on all the pine trees larger than four inches in diameter within the parks, cemetery and open space areas for the 2010 season. A permethrin based insecticide would be applied by the labeled instructions to species of pine trees, larger than four inches in diameter, around the first of June. The entire trunk of the tree will need to be sprayed with the permethrin based pesticide until runoff for the first 30 or 40 feet up from the ground or when the stem tapers to less than four inches

in diameter, whichever occurs first. This application could be made as early as the first two weeks in May. If applied correctly, the pesticide will provide control throughout the early flight periods of the mountain pine beetles.

During the application treatment individual park areas will be closed to public access and monitored until the pesticide application completely dries to prevent any pesticide exposure risk to the public. We will also require additional signage and barricades surrounding the application areas, along with increased public service announcements and public education efforts to inform the citizens of the park closures.

The preventative pesticide treatment of all species of pine trees with a diameter greater than four inches within the parks, cemetery and open space is estimated to incur some additional costs for provisional/part time employees to assist with the application and inspection, the additional pesticides, and the rental of a portable lift to reach the tops of the larger pine trees.

The application of the permethrin based insecticide would be from mid-May to mid June, this would be the best “window” for spraying to have the most effective control before beetle migration.