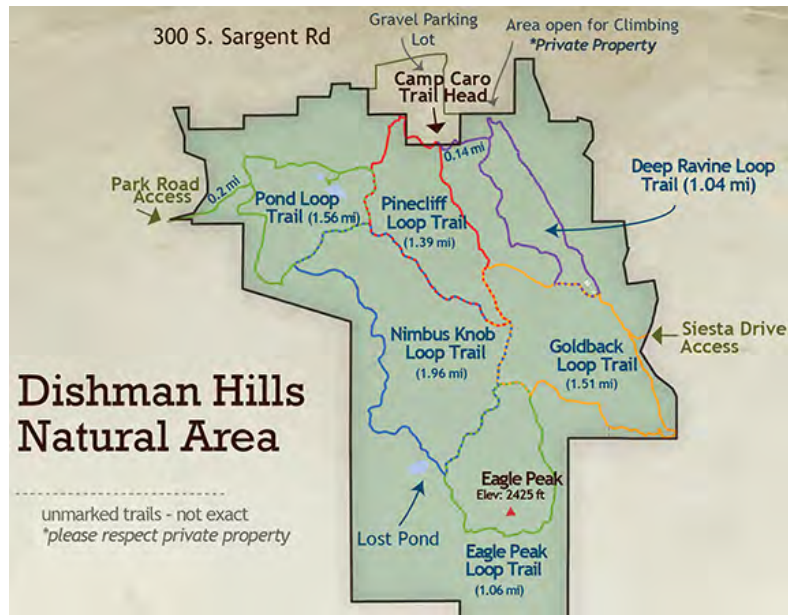


# Deep Ravine Loop Trail

## Dishman Hills Natural Area



### Deep Ravine Trailhead

**Length:** 1.5 miles roundtrip

**Elevation Gain:** 200 ft.

**Trailhead:** Camp Caro Lodge

**Status:** Open All Seasons

### WHAT TO BRING

- Sturdy, closed-toed shoes
- A light backpack with water and snacks
- Map
- Rain jacket (Fall, Winter, Spring)

### DIRECTIONS

From Sprague (one-way westbound) or Appleway (one-way eastbound), turn south on Sargent Road. The road dead ends at Camp Caro, the main access point for the Dishman Hills Natural Area. There are 26 parking spaces available at Camp Caro lodge or overflow parking is available at the corner of Sargent and Appleway.

Once at Camp Caro Lodge, walk through the log cabin breezeway. Take the first obvious left after the sign to begin the Deep Ravine loop.

### ABOUT THE HIKE

Follow this guide along the 1.5-mile Deep Ravine loop to engage all your senses experiencing the incredible diversity of the Dishman Hills. Feel the temperatures drop and see the vegetation change as you descend into the moisture-rich ravine. Visitors in all seasons have many chances to marvel at the rock outcroppings along the route and learn about the rich geologic history of the area.

The Deep Ravine trail rejoins the larger trail system of the Dishman Hills near Goldback Spring, where hikers have the choice to return to Camp Caro and finish the Deep Ravine loop or continue to explore other linked trails.

### 1. THE DOUGLAS FIR

After passing under the breezeway at Camp Caro lodge and before you see a sign on your right, you will pass between two large Douglas Fir trees. This is a great time to read the "How Fir Tree Saved Mouse" story found in the back of this guide. While not an authentic teaching tale attributable to any specific Native American story, the story is based on a Native

American teaching tale used in Native American cultures to communicate intimate knowledge and understanding of the natural world. These tales rely heavily on metaphors to teach, reinforce societal norms and roles, and explain the origins of what can be observed in the natural world.

### About the Douglas Fir (*Pseudotsuga menziesii*):

The interior Douglas fir, that can be observed on your left, is common between the Ponderosa pine ecological zone and either Grand fir or Alpine fir zones at higher elevations. The Douglas fir is part of the Pine family (Pinaceae). The tree is identified by deciduous cones of 5-9 cm that grow downward and have tri-pointed bracts that protrude from the cone scales and needles that are 2-4 cm in length. The Douglas fir can grow up to 220 ft. tall and 14 ft. wide. A mature fir can be identified by its dark brown, thick, deeply furrowed bark which also serves as fire protection as can be observed later in the hike.



The Douglas fir is an excellent example of how abiotic (physical rather than biological) factors, such as light and water, influence biotic factors and determine where the tree can thrive. The Douglas fir needs excellent drainage, requiring watering 1-4 times per month depending on the absorption rate and water retention capacity of the soil. The Douglas fir grows best in full or part shade. This shade tolerance allows the tree to compete with western larch, quaking aspen, and especially ponderosa pine as can be observed throughout this hike.

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## 2. THE ROLE OF FIRE, ROCK, AND SOIL

After passing the sign on your right, take the first obvious left to begin the Deep Ravine loop. Soon, you will begin to ascend slightly. Before reaching some steps as the trail takes a slight right bend, notice that to the left of

the trail there is evidence of fire on the low bark of the ponderosa pines. Fire in the Dishman Hills is almost always man-made; yet, remains an influencing abiotic factor in the ecosystem. This stopping point provides the chance to observe returning biota to the left of the trail contrasted with the undisturbed biota on the right.



To the right of the trail, observe the first of many rock outcroppings that play an integral role in the forest ecosystem of the Dishman Hills. These rocks are composed of gneiss, metamorphic rock that forms under high pressure 10-15 miles below the earth's surface. It is composed of sheet-like layers characterized by alternating darker and lighter colors called "gneissic banding." Look closely and find many different species of lichen that form soils by trapping water, dust, and silt. Lichen and other biotic decay continues to build the soil, creating a suitable habitat for mosses, grasses, small shrubs, and eventually trees, such as the ponderosa pine.



As you continue on, veer downhill and take a left at the fork.



### 3. THE PONDEROSA PINE

As you continue, you will see a sign for Deep Ravine/Goldback and have a view of a large water tower and the east face of the ravine. Before descending right and down at the sign into the ravine, notice the open ponderosa pines scattered around the edge of the ravine. The landscape here contrasts dramatically with that of the Deep Ravine.



#### About the Ponderosa pine (Pinus ponderosa):

The ponderosa pine can be found among Douglas fir, western larch, quaking aspen, and lodgepole pine in moister, mid-elevation forests. The ponderosa pine can be identified by needles 5-10 inches long bundled in groups of three with 3-6 inch long pine cones with sharp points. Old growth ponderosas can grow to be 150-180 ft. tall and 3-4 ft. in diameter. The thick bark of the pine makes the tree drought tolerant and fire resistant. Look closely at the bark and observe how it is made up of stacked plates. Deep cracks in the bark of older ponderosas smell faintly of vanilla and butterscotch.



As ponderosa pines mature, they self-prune, meaning the tree starves lower, unproductive branches that do not receive adequate sunlight or nutrients to



achieve ultimate efficiency. This pruning method also protects the tree against fire by reducing fuel ladders.

Ponderosa pines have fallen prey to the pine bark beetle. The pine bark beetle plays an important role in forest ecosystems - eating away at old, weakened trees and speeding the spread of nutrients to new, growing forest biota. However, increasingly hot summers and mild winters have resulted in increased epidemics. While large outbreaks of infestation are not prominent in the Dishman Hills, evidence of the pine bark beetle can still be seen where large swaths of ponderosa bark have been eaten away exposing the smooth inner bark.

Unlike the Douglas fir, the ponderosa pine requires open, arid areas that receive a significant amount of light. Ponderosas can take advantage of minimal soil and water and can be observed growing on, around, or in cracks of rocks. Take a moment to observe how young ponderosas seemingly defy gravity growing out of small cracks in the large granite outcropping. As you continue the hike, consider the differing abiotic factors favored by the Douglas fir and ponderosa pine and how prominence of these trees indicate water and sunlight availability.

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#### 4. AN ANCIENT FAULT

After passing the Deep Ravine/Goldback sign, descend right and into the ravine. Take a moment to observe the massive gneiss outcropping. This ravine is one of many ancient faults in the Spokane area where the earth's crust fractures and moves. North America,



including Spokane, is drifting west at about 1 inch per year. Due to plate tectonics in these faults, our movement west causes collision over the Pacific Floor resulting in western earthquakes and geologic activity in the Rocky Mountains and Cascades. Glacial floods during the Ice Age excavated this fractured, metamorphic bedrock, leaving deep canyons, including Deep Ravine, with vertical walls. Believe it or not, the bedrock in this natural area is up to 1.5 billion years old!

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#### 5. INTO THE RAVINE: THE WONDERS OF WATER



Descending further into the ravine, observe how the landscape transitions from open ponderosa pines to a rich diversity of Douglas fir, deciduous trees, and low shrubs. A tree or shrub that loses its leaves annually is categorized as “deciduous” and the leaf litter from these plants build up the soil, allowing other plants to flourish. This dramatic change and incredible biodiversity is largely due to the collection, retention, and availability of water and soils in the ravine microclimate.

The following are some plants you will be able to identify and observe in the ravine:

### Snowberry (Symphoricarpos):

The snowberry is a deciduous shrub native to North and Central America. Its genus name is derived from the Greek word "symphorein" meaning "to bear together" and "karpos" meaning fruit. This name is quite fitting, as the common snowberry can be identified by its tightly packed white berries. Don't be fooled by the allure of these berries - they are actually quite toxic and cause vomiting and dizziness upon consumption. Despite these adverse effects, Native Americans used to eat snowberries to settle an upset stomach after a hearty meal. Snowberry seeds spread with the help of birds and sprout eagerly after fires. They are often planted to restore damaged sites of all kinds and improve ecological health.



Snowberry plants are an important food source for many different birds, mammals, and insects. Quail, grouse, and bears forage these plants while rabbits and mice take advantage of the stems of the shrub. The leaves of the shrub are sources of food for deer, elk and variety of pollinating insects.

### Ocean Spray (Holodiscus discolor):

Another common, native deciduous shrub found throughout the ravine and along the loop, is ocean spray. Ocean spray is common in the forest understory of eastern Washington forests and west of the Cascades. Ocean spray is given its common name due to its white, cascading flowers that have a light, sweet, and sugary scent during the blooming period between May and July. Ocean spray is also known as Indian Arrowwood, as its straight, hardwood branches were once used by the Native Americans

as arrow shafts. In the Inland Northwest, it was also called Ironwood for its strength and was frequently used to make the digging sticks used to harvest camas, bitterroot, and other tubers.

Despite its beauty and fragrance, ocean spray is a valuable source of nectar for many butterflies and serves as a larval host plant for some species of butterflies as well.

### Woodland Pinedrops (Pterospora andromedea)

Woodland pinedrops are interesting reddish-brown plants with sticky, unbranched stems. They produce small, white to pink urn-shaped flowers that hang upside down. By mid-to-late summer, the stems become stiff and woody. This plant produces very little chlorophyll and thus is not green and does not perform photosynthesis. Rather, the plant is a root parasite of the mycorrhizal fungi, deriving resources from the fungi to survive. It was also known as Coyote's Arrow.



As you will see, there is rich biodiversity along the Deep Ravine loop and throughout the Dishman Hills. This biodiversity characterizes a healthy, working forest dependent on each and every contributor to thrive.

As you begin to ascend out of the ravine, stay on the main trail.



## 6. A RICH GEOLOGIC HISTORY

Along the main trail, you will pass an incredibly interesting geologic feature on your left. The host rock of this outcropping is 1.5 billion year old gneiss! The light, fine-grained rock observed within it is 70 million-year-old igneous granite that intruded through faults and cracks in the gneiss bedrock. The horizontal bands in the rock are called sills and the vertical bands are called dikes.



### The Great Missoula Floods

Floods at the end of the Ice Age period shaped the present landforms found in the Dishman Hills. The Cordilleran ice sheet that extended south along the Canadian Rockies and Coast range and into the United States is estimated to have been roughly 9,842 feet in thickness or 5.5 stacked World Trade center towers! The Purcell Ice dam blocked the Clark Fork river, a major tributary to the Columbia river, creating glacial Lake Missoula. The dam failed, likely due to mounting pressure and changes in climate, releasing a volume of water more than Lakes Erie and Ontario. The floods released 9 cubic miles of water per hour traveling at speeds up to 50 miles per hour. Waves reached 98 feet high and were spaced about

300 feet apart! These incredible flood events shaped the landscape of the area, depositing material ranging from sediments to boulders the size of cars.

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## 7. ASCENDING OUT OF THE RAVINE

Staying on the main trail and ascending out of the ravine, notice how the surrounding ecosystem changes back to open, spacious ponderosa pine trees, scattered low shrubs, dead fall, and grasses. The moist, shady microclimate created by the ravine supports a diverse array of deciduous biota that can thrive in shade while requiring a good amount of water (such as the Douglas fir). Recall that the ponderosa pine takes advantage of minimal soil, little moisture, and a significant amount of light.

At many points along this part of the loop, competition among young



ponderosa pines can be observed. As you pass through dense, young ponderosa pine populations, contrast the young population to the older ponderosas. The older ponderosas that make up the canopy of the forest in this area provide a window into the future. Only the trees

most suitably positioned in terms of light and preferable moisture content in the young, dense population will thrive. Eventually, we can infer that these densely-packed young ponderosas will open up and select for trees that can produce nutrients most efficiently. The forest is a competitive place!

### Western Dwarf Mistletoe (*Arceuthobium campylopodum*)

The ponderosa pine is susceptible to Western dwarf mistletoe. Dwarf mistletoe is a bright yellow parasite plant that derives almost of all of its needed minerals, nutrients, and water from its host. The parasite drains the tree of its valuable resources resulting in reduction of overall tree growth, premature mortality, reduced seed/cone development, and increased susceptibility to other pathogen and insect attacks.



According to the United States Forest Service, dwarf mistletoes have become the most widely dispersed pathogens throughout forests in the western United States. Dwarf mistletoe is quite unusual. The fruit of the parasitic plant builds up internal pressure and, when ripe, fires off a single, sticky seed at speeds up to 50 mph!

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## 8. DEADFALL: REMNANTS OF AN ICE STORM

Pass the Deep Ravine signpost and continue on the main trail until you near fences and a bridge at Goldback Springs.



Continue the Deep Ravine loop by taking a radical right marked by the Camp Caro sign.

This section of the trail is especially notable for the amount of deadfall littering the ground. In November 1996, Spokane experienced the region's worst ice storm in 60 years.



Up to 1.5 inches of freezing rain fell, causing trees to crack and fall under the immense weight of the ice. Note that the population of remnant deadfalls are all roughly the same diameter ponderosa pines that topped at roughly 15 feet. The remains of the ponderosas, both standing and on the ground, were then attacked by bark beetles for their living cambium - the growth layer of the tree under the inner bark.

Over time, only the heartwood remains. Any part of trees left standing were brought down by decay over time. The time it will take for the remaining deadfall to be broken down to humus, the organic component of soil created by the decomposition of organic matter, will equal the time it took the living tree to grow. This decay and return of nutrients to the surrounding ecosystem is credited to organisms too small to see with the naked eye.

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## THE RIDGE: BLENDING ABIOTIC AND BIOTIC



Continuing past the Camp Caro sign, you will come to another fork in the trail. Take another radical right at this fork, ascending uphill. If you pass the Goldback Springs/main trail sign you've gone too far!

The ridge top part of the trail can be observed for how abiotic factors - a blend of light, air/wind, and soil - affect the biotic life able to thrive there. Open ponderosa pines are some of the most prominent biotic features along the ridge. These pines can grow in, through cracks, or on rocks and take advantage of minimal soil and moisture and

significant light. On the ridge, biotic features such as the ponderosa are exposed to wind and thus rely on sufficient root anchors to hold them up during windy periods. When ponderosa roots are blocked by rocks, their anchor becomes unbalanced and they will often fall due to these insufficient anchors and the force of wind on their weaker side.



At the next high point of the trail, pass a large root ball - an extreme example of tree fungal infection - and begin descending back toward the beginning of the loop.



Once you see the water tower, take a left at the fork and continue back to the trailhead and Camp Caro lodge.

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## ABOUT THE DISHMAN HILLS CONSERVANCY

The Dishman Hills Conservancy is actively working to conserve and connect the existing Conservation Areas in the Dishman Hills Conservation Corridor. We do this in part by buying and conserving lands along the Dishman Ridge between Camp Caro and Stevens Creek. Our

vision is that through our work the three existing Dishman Hills Conservation Areas - the Natural Area, the Glenrose Area and Iller Creek - will become a contiguous conservation area that provides crucial wildlife habitat while allowing for low-impact public recreation.

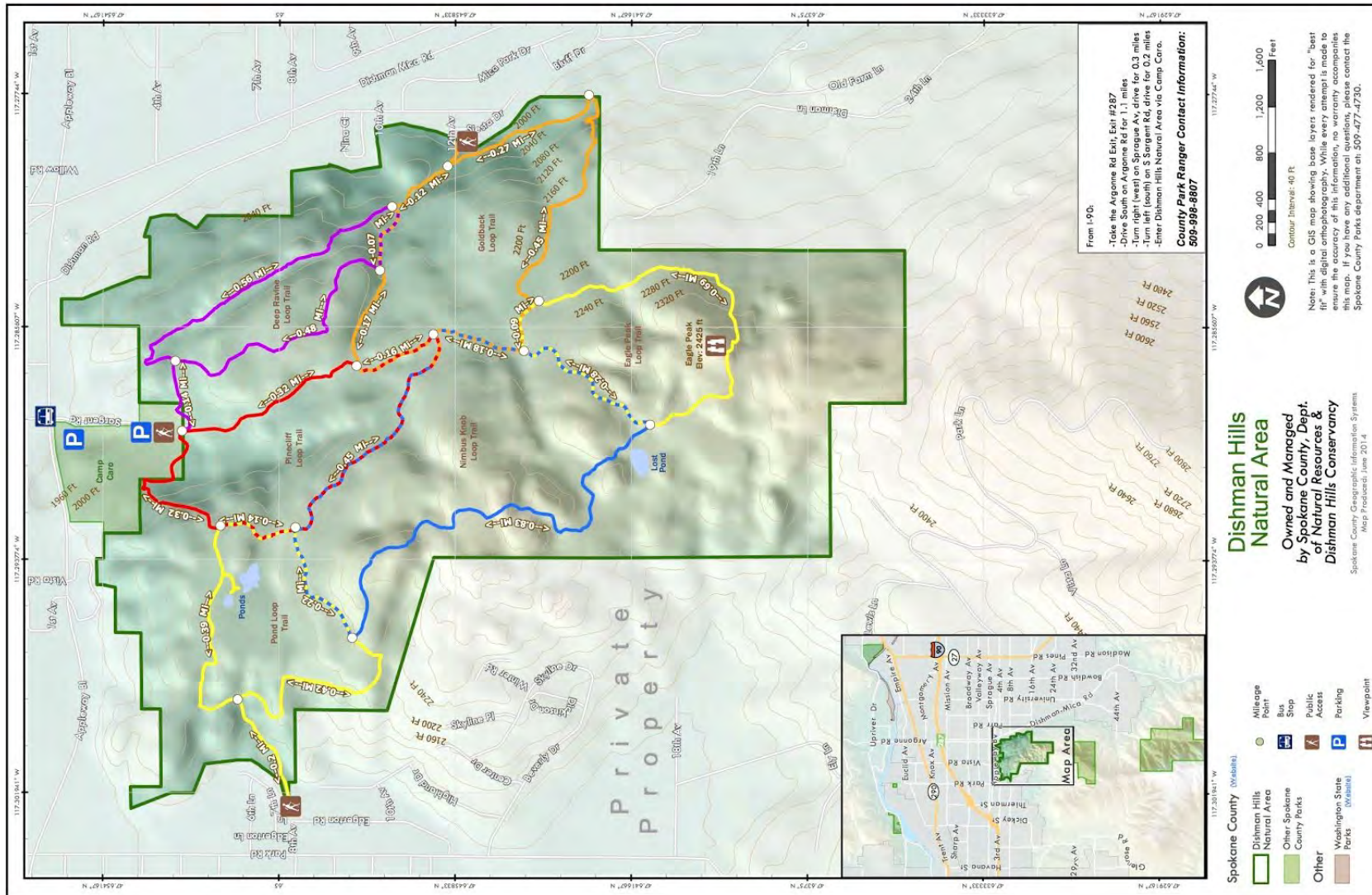
If you value quiet recreation opportunities and promoting local conservation work, please show your support and appreciation by donating to the DHC today.

In order to get to know the area better we invite you to download a map and then get out on the trails to explore the many facets of the Dishman Hills.

Like us on Facebook and please consider contributing to our effort to help us keep Spokane Near Nature.

Website: <http://www.dishmanhills.org>





How Fir Tree Saved Mouse



One summer's day, a long time ago, fear arrived on a dry west wind. In the deepest parts of the great forest, animals great and small, stood perfectly still. Each used all of its senses to identify the great danger approaching at great speed. With a terrible roar, Fire was racing toward their forest to consume everything on the forest floor with its greedy hunger.

Those fleet of foot, raced to the east. Deer, Elk, Cougar, Grey Wolf and Coyote leaped deadfall, boulder, and stream, fleeing faster than fire could advance.

Bear headed for the security of his deep winter lodge. Mighty Eagle, Red-Tailed Hawk, Screech Owl, and mischievous Raven swiftly flew high up and away from the terror advancing through the ancient forest. Tiny Nuthatch and Black-Capped Chickadee quickly followed. Beaver returned to her lodge. Muskrat and Otter sheltered deep beneath watery cut-banks along their fast moving streams. All had hope of surviving Fire's new rampage. All that is except tiny Mouse. And she had her family to save!

Mouse could not swiftly race through the forest at great speed, fly fast and high, or swim deep to safety. But she did not give up. As fast as she could, Mouse went from tree to tree asking for shelter. The first she asked was Tamarac. "Please, please" she squeaked! "Allow my children and me to climb high into your branches. Fire is lazy and is only interested in what it can easily consume as it travels so swiftly through our home."

Terrified that it might anger Fire, Tamarac refused! Next Mouse led her family to mighty Red Cedar, giant of the forest. Then on to

Hemlock and ancient Yew she ran. The answer was always the same. All were too afraid of angering Fire.

Mouse was out of time and on the edge of despair. Fire would soon be upon her family. Only one giant was left to ask, was the great Fir. One final time Mouse shrieked her plea! "Oh great and mighty Fir, please allow us to hide in your high branches. If you refuse us we will surely die!" With no time spent in thought, Fir agreed to help them.

In a rush of relief, Mouse and her children quickly scurried up Fir's great trunk. Racing out onto Fir's high branches, they began to hide themselves in her cones. Quickly they burrowed headfirst behind the cone's scales. There they took shelter, rear feet and tails still exposed. Fire swiftly passed below, not bothering to look up. Mouse and her children were saved by Fir's compassion and courage.

From that day forward, all Fir cones have an added part. It is a reminder of Fir's service so very long ago. Look closely and you can see what looks like tiny mouse bottoms and tails sticking above the scales that protect the seeds in every cone. Remember Mouse's determination and Fir's compassion and courage.

Rick Severn, Teacher and Naturalist, Dishman Hills Conservancy