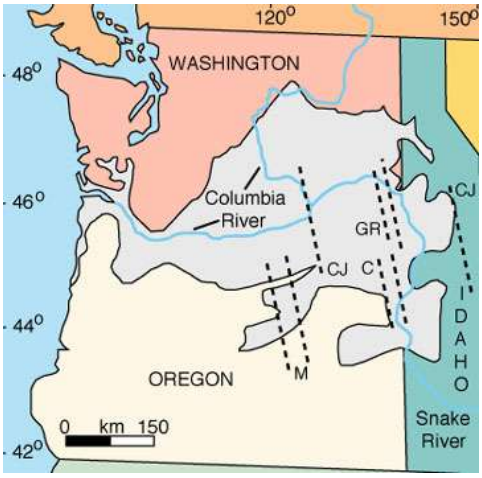
Geology

Geology happens very slowly, over a long time. Who knows which geologist is most "accurate" with dates when the rocks were formed at Multnomah Falls..…We can all agree it was a long time ago; they do seem to agree how it all arrived; layer by layer.



Volcano World: http://volcano.oregonstate.edu/columbia-river-flood-basalts

~17to ~13 Million years ago or ~6 to ~15 Million years ago

Flood Basalts (called that because the flows are very runny) came from over 300 volcanoes that were vents (big cracks) in the ground in eastern OR & WA and western ID. They spread more than 200 cubic miles of lava over much of eastern WA, western ID and portions of OR, covering over tens of thousands of square miles. Individual lava flow layers can be hundreds of feet deep.

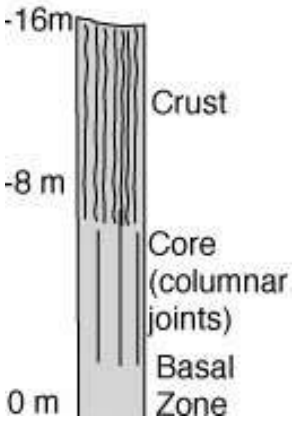
These different basalt flows -Imnaha, Grande Ronde, Wanapum, and Saddle Mountain-were named by geologists for nearby modern day landscape features.

Looking at the Layers

Lava flows here were thick enough to form a different looking top, middle and base. Geologists think water (remember, the Columbia River has been here a long time too) covered fresh lava then seeped into cracks down to the middle layers causing it to cool quickly.

Columnar basalt is the layer that had the longest time to cool, allowing minerals in the lava to line up how they like it best. Just like slow cooling fudge forms grainy crystals of sugar, slow cooling basal forms 6 sided "crystals" we call columnar basalt.

When lava pours out into water, it forms even another shape, called pillow basalt. You can see pillow basalt formations towards the top of Multnomah Falls.



Volcano world: http://volcano.oregonstate.edu/columbia-river-basalts-features-typical-flow

Local Volcanoes

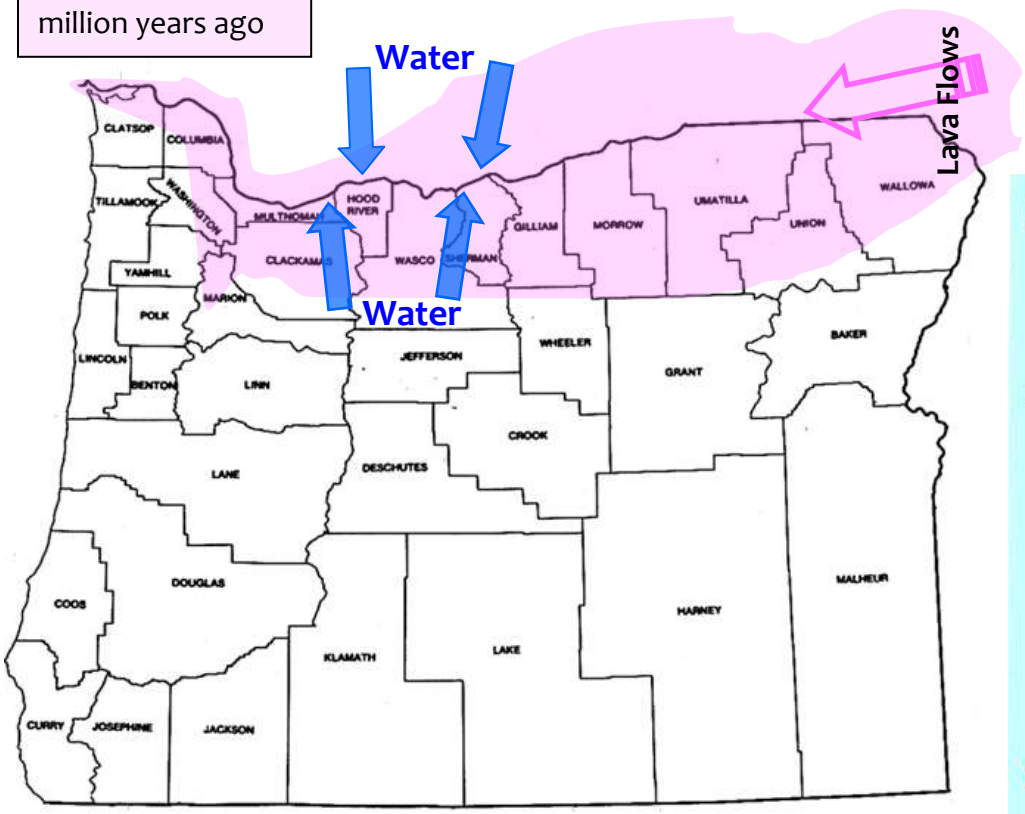
Larch Mountain- a 4,056ft shield volcano that produced (mostly) basalt ~1.4 to 1.8 million years ago.
Mt Hood- ~11,240ft stratovolcano producing mainly andesite & dacite lavas. Eruptions began ~8 million years ago, with the most recent major one in 1790. Considered dormant, but not extinct. Some eruptions melted glaciers, resulting in lahars- fast moving mudflows- reaching the Columbia.
Mt St Helens- a 8,367ft stratovolcano that has produced olivine basalt, andesite and dacite, started forming around ~40,000 years ago.

Rocks	Age	Name
Recent basalt flows	Tertiary	~ 3 million years ago **Pliocene**
Basalt & andesite in High Cascades		~ 11 million years ago **Miocene**
Flood basalts and andesite flows		~ 25 million years ago **Oligocene** **Eocene**
	Mesozoic Era	~ 60 million years ago **Cretaceous** **Jurassic** **Triassic**
	Paleozoic Era	~ 225 million years ago ~ 600 million years ago

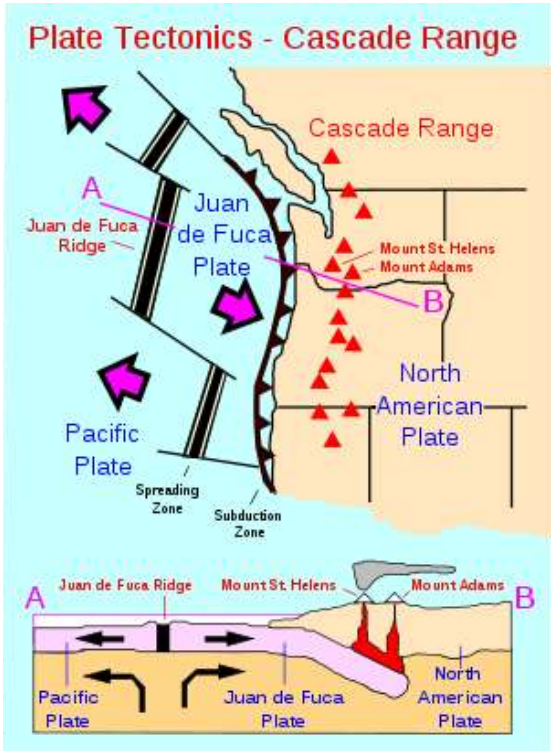
Effects we can see around Multnomah Falls

Sandwiched in between layers of lava flows are soils that had formed as well as ash and gravel that were washed down by lahars and through normal erosion.

Pre-Cascade Mtn
Miocene Era: ~17 million years ago



Formation of High Cascades
Pliocene Era: ~7 million years ago



Wikipedia

Talus Critters

Rough-skinned newt

Taricha granulosa

Rough-skinned newts color ranges from light brown to olive to brownish-black above with a sharply contrasting yellow to orange belly.

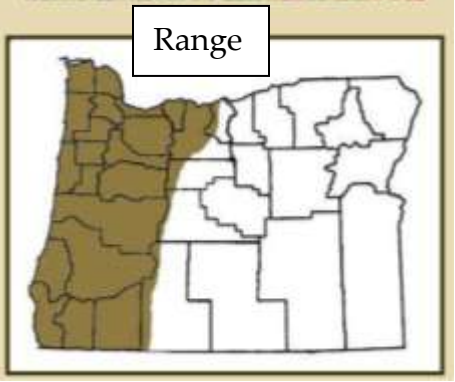
They are12.7 to 21.6cm long and their skin is granular; with males develop smooth skin during the breeding season.

They produce a powerful neurotoxin- tetrodotoxin-used as a defense against predators. While these newts are perfectly harmless to handle for most, the toxin has been known to irritate bare skin and mucous membranes of some individuals.

One should be careful to wash one's hands after handling; if you accidentally rub your eyes can be very painful, but is generally not serious. Humans have been documented to die after ingesting these newts.

Rough-skinned newts prey upon amphipods, insects, snails, leeches, and tadpoles.
Adults can live in the water (aquatic) as well on land (terrestrial) with some individuals preferring to be more aquatic or terrestrial than others. Terrestrials live in woodlands under logs, rocks, and leaf debris.

Amphibians and Reptiles of OR: Dr. Tom Titus



Tim Johnson 2004

Lowering their temperatures for the winter will promote courtship the following spring. Eggs are laid singly on roots, aquatic vegetation, and debris and are also toxic like the adults.

Larvae metamorphose in 4 months to a year. Juveniles can require several years to reach maturity, 4-5 years being average for wild populations.

Caudata Culture http://www.caudata.org/cc/index.shtml

Larch Mountain Salamander

Plethodon larselli

R.D.Bartlett

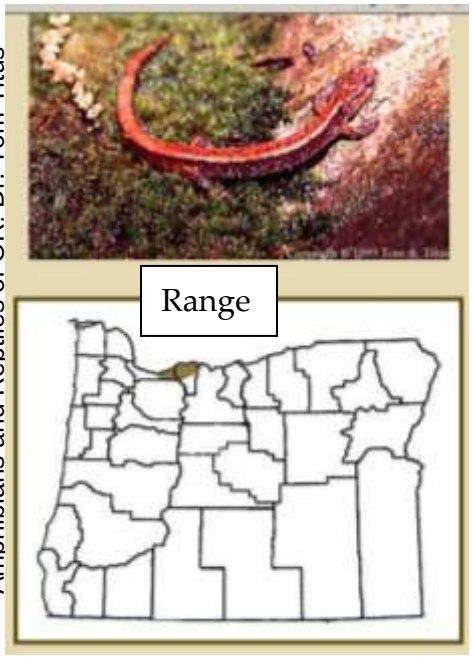
Not much is written about the Larch Mountain Salamander. Its natural habitat is temperate forests and rocky areas and is threatened by habitat loss.

It belongs to a family of salamanders that lack lungs. They breathe through their skin, and the tissues lining their mouths.

Another distinctive feature is the presence of a vertical slit between the nostril and upper lip. This “groove” is lined with glands, which enhances the salamander's ability detect chemical signals produced by other animals.

In many species eggs are laid on land, and the young hatch already possessing an adult body form. Many also have a projectile tongue, which they can fire almost a body length away at high speed to capture prey.

Wikipedia



Amphibians and Reptiles of OR: Dr. Tom Titus

American Pika

Ochotona princeps

Habitat and Food

The pika is a small relative of the rabbit. They only live in talus (rockslides and boulder fields) where vegetation- including flowers, grasses, leaves, lichen and mosses- is available close by. Most pikas spend the summer collecting plants which it dries in “haypiles”, eating this food supply over winter because pikas do not hibernate. They can make over 100 collection trips per day!

They can be fearless in gathering up food, since they are dependent upon their hay farming abilities to survive the winter. Pikas don’t huddle together like many other mammals, as far as scientists can tell, but remain fiercely territorial and solitary throughout the winter, guarding their hay piles with their lives.

Johanna Varner: pika researcher – 5-2013;
Wikipedia

Photo: Becka Barkley

Like rabbits, after eating they initially produce soft green feces called caecal pellets (pronounced see-cal). Caecal pellets concentrate the vegetative energy from the first pass through, providing further nutrition for these small animals. Pikas eat these pellets or store them for later. Their final fecal pellets are hard and round, resembling peppercorns.

Gorge pikas appear to consume large amounts of moss year ‘round, which may help them survive here. They can rest during the warmest parts of the year, rather than gathering up huge haypiles.

Although pikas can meet their water demands from the vegetation they eat, they do drink water if it is available.

Johanna Varner: pika researcher – 5-2013;
Wikipedia

ODFW

Pikas are vocal, using both calls and songs to communicate among themselves. A pika’s distress call serves up to eight different functions, including territorial defense, alarm call, and mate attraction. Their calls also differ dramatically across the species’ geographic range in terms of pitch and notes.

Predators of the pika include eagles, hawks, coyotes, bobcats, foxes and weasels. Rocks provide safe haven from pika’s predators.

But more importantly for **pikas living in the gorge**, the spaces between rocks provides a cool, moist microclimate where pikas cool down during hot summer days. The pika is very sensitive to high temperatures and can’t survive long out in temperatures above 75 degrees. In the summer it relies on cool places within the rocks to regulate its body temperature. In the winter, these same spaces deep in the talus provide the perfect sanctuary in which to settle in during long winter nights, protected from the snow and chilling winds.

Johanna Varner: pika researcher – 5-2013;

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