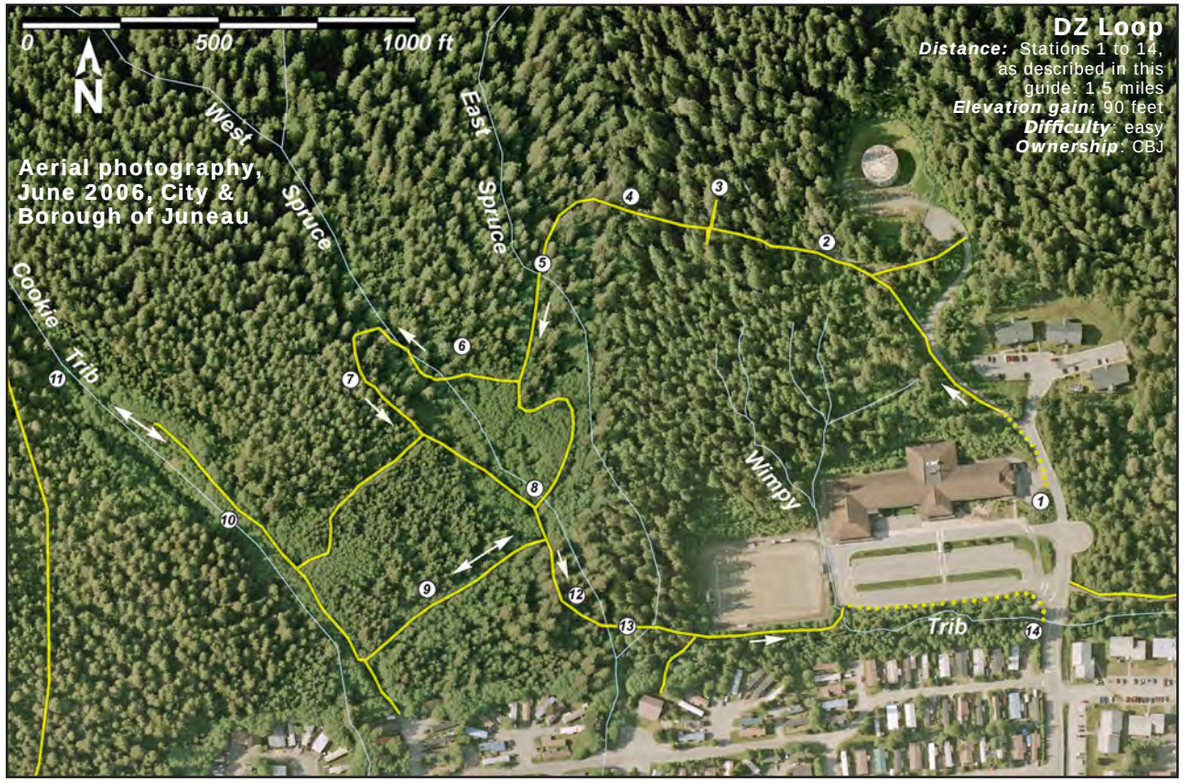


13 Twin bridges. East and West Spruce Tribs used to meet in the reservoir, but since the diversion, they now come together just below the twin bridges. East Spruce was for several years a Water Watch sampling site for DZ students. Only about 20 years old, this new channel has a "raw" aspect, with undermined and buried trees.

14 Restoring Wimpy Trib. This little stream ran clear before 1992, when re-routed during DZ construction. But it filled with orangey iron flocculent leached from exposed marine sediments. In 1994, a new meandering channel was built to AFD&G specifications. Notched logs created scour pools and mini-jumps for resident dollies. Willow bundles were embedded in the banks for channel stability. A few of these sprouted but were eventually overtopped by alders. By 1999, iron floc was still present but invertebrate diversity was high, and isolated planted alders had grown to head height.

In 2008, the restoration would have to be judged a "mixed success." The bad news: iron floc persists. The good news: Almost the entire stream below the parking lot is cooled by overhanging alder and spruce, creating a cozy bear corridor between DZ and Switzer Village. A few invasives like marsh forget-me-not (*Myosotis palustris*) occur but are being overgrown. The stream is now barely visible from the road, hidden by native bullrush (*Scirpus microcarpus*) in the foreground of right-hand shot.

Forest sleuthing questions

On DZ forest-mapping projects, we find it helps to bring a checklist of questions about forest structure and history. With each change in forest character, we take a GPS waypoint, and answer these questions:

What's your elevation? What's the ratio of spruce to hemlock (or alder) among the high-canopy trees? Is there a subcanopy of smaller trees? Do all trees appear roughly the same age, or is it an uneven-aged old-growth forest? What is the range in tree diameters? Is it a spacious forest, or do trunks crowd closely together? Are there large gaps admitting plentiful light, or do crowns interlock, shading the understory? If it's an old forest, how many snags are there? Leaning trees? Down logs that shelter voles and invertebrates?

How about the substrate? Check geology maps, stream cutbanks, etc, or dig a hole and feel the soil. Is it extremely soggy, or relatively well-drained? How many of the shrubs and low-growing plants can you name? Are they tender summer greens that wilt in fall, or "evergreens" that feed deer all winter?

Look for wildlife sign. Do you see squirrel middens? Deer-clipped blueberries? Porcupine scat? Woodpecker holes? If there's a stream, turn over rocks and look for aquatic insects like mayfly larvae.

As you answer these questions, the forest will begin to come alive. More than just a collection of trees, it's a *home*, constantly changing, different from all others. The questions call out its inhabitants and elucidate its history.

For more examples of productive sleuthing questions, download *Priming the pump: Socratic method in the field and in print*, in the Fall 2006 *Discoveries* newsletter. It's on the publications page of our website, listed below.

This trail guide is part of a series of interpretive products created in 2010 for trails on CBJ lands by Discovery Southeast. Other creations include natural history signs, a summary guide to CBJ trails and free web products.

Discovery Southeast

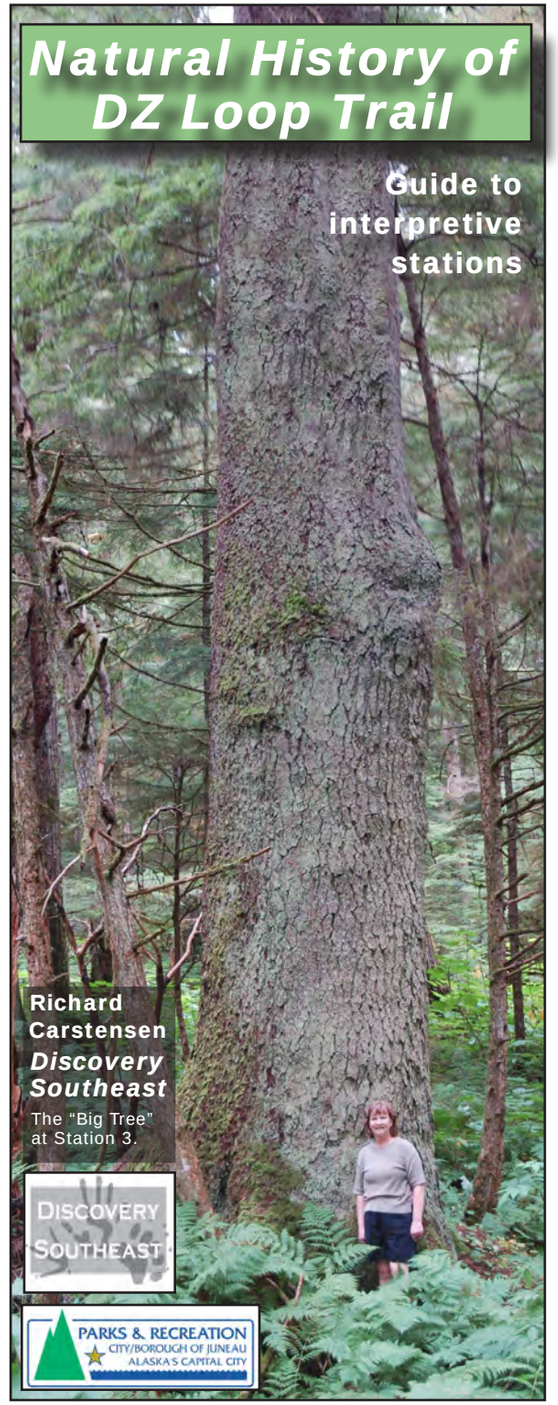
Founded in 1989, DSE is a nonprofit organization promoting direct, hands-on learning from nature through natural science and outdoor education for youth, adults, and teachers. Discovery naturalists deepen the bonds between people & nature. *www.discoverysoutheast.org* • *463-1500*

CBJ Parks & Recreation

The City and Borough of Juneau/Parks & Recreation welcomes you. Parks & Recreation manages 50 miles of trails and fosters innovative stewardship of its diverse resources. Collectively, along with our partners Alaska State Parks, the U.S. Forest Service, Trail Mix and SAGA, 135 miles of trails are managed--connecting our community with Juneau's magnificent landscape.
We hope you have a great experience on your trails. Take only memories, leave only footprints. Call Parks & Recreation at 586-5226.
www.juneau.org/parksrec

Natural History of DZ Loop Trail

Guide to interpretive stations



Richard Carstensen
Discovery Southeast

The "Big Tree" at Station 3.

DISCOVERY SOUTHEAST

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Numbered stations

Interpretive stations are marked by numbered posts along DZ Loop trail, and show on aerial photos in this brochure.

1 Trailhead sign. This is a good place to get an overview of the geology of Switzer Watershed and the array of forest types near DZ. On the surficial geology map, note that the lower portion of the DZ Loop Trail is on an *alluvial fan*, grading to ancient marine sediments higher on the slope. Also check out the profile drawing of forest types. On this trail we'll see large-tree old growth, forested wetland and second growth of 3 different ages. To reach the trailhead, walk up the water-tank road.

2 Forested wetland. As you turn onto the trail, note how open and brushy the forest is. Trees are stunted because of soggy soils. On the orthophoto, compare the small size of these tree crowns to that of stations 3 and 4. This wet forest resembles that which grew on the DZ building site. Moving on, trees get bigger and the canopy gets shadier.

3 Big tree. The largest tree we know of near DZ is shown on the cover of this brochure. There's currently just an informal spur to the base of this 5-foot diameter spruce. Mr Kovach's classes have been investigating the possibility of a boardwalk and gathering platform, so students can appreciate the tree without damaging its root system.

Notice the clustered branches emerging from the trunk about 40 feet up. These are *epicormic branches* that sprouted late in the tree's life. There's a pronounced lean to this tree, but we hope it will survive many more centuries.

4 Large-tree old growth. The elevational high point on the DZ Loop Trail also has the most majestic forest. Check out the canopy on the aerial photo. Large tree crowns and wide gaps give this the roughest texture on the image. Trees here are also very old. Understory is devil's club and tall elderberry, typical of gappy alluvial fan forests with laterally moving ground water.

5 First bridge, creek material. A large spruce log embedded in gravel has diverted the creek eastward under this bridge. At Stations 8 & 13, we'll return to the significance of this event. The creek bed has flat, slatey rocks. South from here, the trail runs straight down an engineered berm with the creek on the left and a ditch on the right. What was this ditch for? We'll find out at station 8.

6 Second-growth. Step a few yards north off the trail here. How is this forest different from stations 3, 4 and 5? (Clue: look at the 1948 photo.) Note that tree crowns are smaller on the 1988 and 2005 air photos. Trees are young and same-sized. Because crowns interlock, understory is shady, with few plants to feed herbivores. Look for spruce branches on the ground and examine their needle tips. In winter, porcupines pull off these branches and eat the needles, tossing the leftovers–called niptwigs–to the ground.

7 Tall spruce. As you approach the stairs, look down to the largest spruce growing on the productive stream deposits of West Spruce Trib. This tree is younger than the big leaner at station 3. Spruce branches radiate outward in a "starry" pattern that sometimes distinguishes them from hemlocks on aerials. Find more big spruces on the 2005 orthophoto.

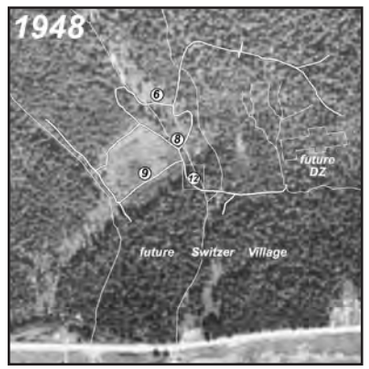
Before descending from the old-growth, study the bare area at station 8. This was a reservoir, drained in the mid-1980s. On the 2005 aerial this area has smooth-textured, pale green canopy. Do these changes explain the origin of the red alder forest?

8 Red alder forest, creek rerouting. Below is a panorama looking up West Spruce Trib from the bridge at station 8. Without historical air photos, you might never guess the origin of this alder forest. Clearly it's young and even-aged, resulting from some disturbance. But if it was logged, where are the stumps? Once there *was* an old-growth forest here. But logged stumps were buried in sediment on the bottom of a *reservoir*! Remember the mystery of the ditch, back at Station 5? The ditch conducted water into a reservoir that drained by the time of the photo above.

Alders are short-lived trees that need a lot of light. Can you predict what this forest will look like in 50 years? Note the dense layer of chest-high spruce saplings. These will eventually overtop and shade out the alders. Alder stands support wildlife uncommon in old growth, and shed nitrogen-rich leaves to the forest floor and stream.

9 1945 2nd growth. Before returning to DZ, take the right fork to station 9, along an old logging road.

On the 1948 photo, the future site of Switzer Village had large, dark tree crowns. All that remains of this majestic *alluvial fan* forest is a patch at station 12.



Stations 6, 8 & 9 were freshly logged in 1948, maybe for hemlock piling, judging from the fairly small, rotten stumps in the clearcuts. How would you characterize this 1945 clearcut for wildlife habitat, compared to the old growth at station 4? Imagine you are a deer in winter, trying to find

10 Marine sediments. At the end of the logging road, turn right (northwest) up the old reservoir road. Cookie Trib is the most deeply-trenched of the streams that created the big Switzer Village fan. Here we can see what underlies the upper DZ Loop Trail. At station 10, look across the creek to where a recent slump has exposed fine, sorted sediments laid down when this site was under the sea 9,000 to 12,000 years ago. On the trailhead sign, the surficial geology map codes this area green, for *glaciomarine sediments.*

11 Bedrock, young alder. Station 11 is optional, for those who don't mind a short scramble. If you drop down to Cookie Trib and follow it upstream you'll come to a little waterfall. This is the only place near DZ where you can see the bedrock that elsewhere is hidden under surficial deposits. At the base of the falls are piles of easily-eroded slate chips. You first encountered these at station 5, and will see more downstream at stations 12 and 13. Are the alders here larger or smaller than at station 8? Does this corroborate the forest ages indicated by the air-photos?

12 Water Watch station. This map (see white rectangles on 1988 and 1948 aerials) was made by DZ students at the apex of the big Switzer Village fan long before Loop Trail construction. Water quality in this old-growth reach is excellent, and down logs provide hiding cover. But the creek is "flashy;" in storms it washes heavy sediment into culverts downstream.