Key Concept Summary of Field Stops

Day 1 – Pre-Excursion Stop. Natural Science Building Roof

Tectonic setting of western Oregon, Juan de Fuca Plate, North American Plate, Coast Range accretion, Cascade Volcanic Arc, Earth Energy sources (gravity, geothermal, solar), watersheds, trip itinerary/overview.

Day 1- Stop 1. Santiam River State Recreation Area

Geomorphic mapping criteria (landform, material, age, process), bedrock vs. regolith, colluvium, alluvium, force, work, mass, gravity, weight, bedload, suspended load, dissolved load, climate history, glacial history of western Cascades, geologic history of western Cascades

Day 1 – Stop 2 Big Cliff Dam / Santiam

Dams, anthropogenic, reservoirs, energy vs. load, downstream scour, upstream sedimentation, salmonid habitat, dam census of Pacific Northwest, significance of dams, social factors of dams, dam building history, reasons for dams (flood control, reservoirs, water resources), more on western Cascades geologic history

Day 1 – Stop 3 Suttle Lake / Mount Washington Overview

Mt. Washington vs. Black Butte, high cascades volcanic arc, history of cascades/high cascades, climate change, glacial vs. interglacial, glacial erosion, roadcut with diamicton

Day 1 – Stop 4. Suttle Lake

glacial vs. interglacial, glacial erosion, suttle lake, moraine dammed lake, glacial valley, soils chronology

Day 2 – Stop 1. Mazama Ash at La Pine Campground

Mt. Mazama, Crater Lake, caldera collapse, Mazama ash deposition, 7000 year marker horizon, surface stratigraphy and measuring geologic time

Day 2-Stop 2. Paulina Peak

Overview of newberry volcano, cinder cones, big obsidian flow, history of newberry eruptions, Newberry volcanism vs. Cascade arc, overview of caldera / lakes, significance of newberry with respect to regional tectonics, cinder cone morphology / age relations.

Day 2 – Stop 3. Paulina Lake

Little Cone Campground (east side of Paulina Lake): Paulina lake observations, lake terraces, wave erosion, caldera uplift; Paulina Lake Outlet: Paulina lake observations, lake terraces, wave erosion, caldera uplift, Paulina outlet knickpoint, headward erosion, catastrophic outburst floods;

Day 2-Stop 4: Paulina Creek gravel deposits encountered during hike

terraces, terrace gravels, mazama ash, catastrophic outburst, floods, floodplains, high terrace, middle terrace, flood scour, soils chronology, aridisols, clay films, soil development vs. time, landform / geomorphic surfaces

Day 2-Stop 5: Aa lava flow and Lava Butte cinder cone,

Overview of Newberry volcano, cinder cones, basaltic eruptions, cinder cone development, tephra, lava flows, soils chronology, lava-damming, history of upper Deschutes, Lake Benham / benham falls, carbon dating, cinder cone morphology, age relations of cinder cones, Mazama ash, crater lake history, cross-cutting relations, age dating of geomorphic landscapes, deposits, and bedrock.

Day 3-Stop 1: Trout Creek campground

Stratigraphic layering and analysis, geomorphic mapping, floodplains, hillslopes, terraces, colluvium, alluvium, diamicton, sediment sorting, clast roundness, pumice layers, Mt. Jefferson eruptive history, soils development, soils chronology, lacustrine deposition, hillslope vs. valley bottoms, bedrock geology and history of middle Deschutes River, Clarno Formation, John Day Formation, Columbia River Basalts, landslides, terraces, canyon rim

Day 3-Stop 2: Railroad Cut: Confluence of Warm Springs and Deschutes rivers

Stratigraphic layering and analysis, geomorphic mapping, floodplains, hillslopes, terraces, colluvium, alluvium, diamicton, sediment sorting, clast roundness, pumice layers, Mt. Jefferson eruptive history, soils development, soils chronology, terrace chronology, middle Deschutes geomorphic history

Day 3-Stop 3: Upstream Whiskey Dick Campground Lecture (Deschutes hydrology lecture)

Ground water, hydrogeology, regional geology of Deschutes basin, influence of groundwater on Deschutes River discharge, flood history of Deschutes river, regional hydrologic analysis.

Day 4-Stop 1: Hike to overview of “The Pot” landslide deposits near Whiskey Dick pull out

Landslides, rock-block slides, creep, aerosols / dust influx, hillslope transport, slope wash, soils development, colluvium, active vs. inactive hillslopes, bedrock vs. regolith, large-scale landslides, hummocky topography, knob-and-kettle topography, chaotic landscape development, relative dating, landforms analysis, co-seismic mass wasting, landslide dams, catastrophic outburst floods.

Day 5-Stop 1: Large gravel deposit at tributary mouth near Dant / Buckskin Mary Rapids

Debris Flow / Buckskin Mary hillslope observations Recurrence intervals, flood frequency-magnitude, debris flow, flooding, transport-limited hillslopes, weathering-limited hillslopes, aspect, aspect-controlled hillslope processes, north slope/south slope moisture conditions

Day 5-Stop 2: Outhouse Flood Gravel Bar near outhouse at lunch stop

Deschutes flood history, flood records, landscape analysis, paleoflood hydrology, depostional vs. erosional landscape records, carbon dating, flood chronology; meteorological vs. geological flood records