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To: [Benton County Talks Trash](#)
Cc: [Sam Imperati](#)
Subject: Common Understandings document: Suggested draft text to be added as a "site description" section
Date: Sunday, September 4, 2022 3:58:07 PM
Attachments: [CommonUnderstandingAdditionsSiteDescription.pdf](#)

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Sam,

Here's some further suggested text to address another major gap in the "Common Understandings" document.

This gives a brief description of the site in terms of geology, climate, surface waters, groundwater, vegetation etc.

This could be useful especially for members of the group who are not acquainted with the natural history of northern Benton County. Coffin Butte and Tampico Ridge are rather unique as the easternmost extensions of the Coast Range into this part of the Willamette Valley. I've included a link to a short video by the Western Oregon U. research group who've been looking at restored oak woodlands along Tampico Ridge.

Joel

SECTION A: Develop Common Understandings

2. Description of the site

a. Geological setting

The **bedrock** of Coffin Butte and Tampico Ridge is mainly of basalt formed by underwater volcanoes on the seafloor during the Eocene (~50 million years ago). These were originally formed as "pillow lavas" similar to what can be seen along the coast of Hawai'i, when lava from erupting volcanoes flows into the sea.

These rocks, along with other marine volcanic rocks and sediments, eventually became part of the Oregon Coast Range, as they were scraped off the top of the slab of oceanic crust sliding below the western edge of North America. This process is continuing today as what we now call the Cascadia Subduction Zone.

These rocks are considered part of the Siletz River Volcanics formation. Similar rocks belonging to this formation can be found in most of western Benton County, but Coffin Butte and Tampico Ridge are the easternmost exposures.

A good place to see this rock is in the old ODOT quarries along Coffin Butte Trail (now part of E.E. Wilson Wildlife Area). In these exposures, the rock is highly fractured, with extensive alteration indicating past circulation of water through the basalt.

Local sediments come mainly from near the end of the last ice age, when the Willamette Valley was flooded repeatedly by waters surging down the Columbia River from the Missoula Floods, from 15,000 to 13,000 BC. Coffin Butte and Tampico Ridge formed a peninsula on the western shoreline of "Lake Allison," the temporary lake that formed periodically during these floods. As this lake gradually drained out through the Columbia River, it left behind silt deposits.

These silts (mapped as the "Willamette Silts" by OSU geologist Ira S. Allison in 1953) are the source of the fertile soils in much of what today is prime Willamette Valley farmland. On the Coffin Butte site, prior to landfill construction these silts were found to the east of the topographic saddle between Coffin Butte and Tampico Ridge. On the west side of the saddle are younger alluvial sediments, deposited by Soap Creek as it flowed out of the hills and mountains which are now part of OSU's McDonald-Dunn research forests.

Earthquake hazards on a regional scale are mainly related to the threat of a "subduction zone megathrust" earthquake on the Cascadia Subduction Zone, which can produce quakes of magnitude 9.0 or greater. Geologic evidence indicates that seven "great" earthquakes have occurred on this system in the past 3500 years, on intervals ranging from 210 to 910 years. The last of these occurred around 9 PM on January 26, 1700 AD, based on records of a tsunami that struck Japan 10 hours about later.

Recent studies indicate a 10% to 14% probability that the Cascadia Subduction Zone will produce an event of magnitude 9.0 or higher in the next 40 years. The risk could be as high as 37% for earthquakes of magnitude 8.0 or higher. Such a quake would be expected to produce very violent shaking that could last as long as four minutes.

In addition to the well-known risk of a major earthquake on the Cascadia Subduction Zone, there may also be a risk associated with the Corvallis Fault, which has been mapped within two miles of Coffin Butte (passing through the new Calloway Creek subdivision just south of Adair Village, and continuing northeast at least as far as the intersection of Camp Adair Road and Independence Highway). Currently it is not known whether this fault is still active, but geologists have urged for this to be considered as a concern for any structures near the fault.

b) Climate

The general climate of Benton County has been described in previous county documents, such as the county's Prairie Species Habitat Conservation Plan

<https://www.co.benton.or.us/parks/page/prairie-species-habitat-conservation-plan>

Willamette Valley portions of the county, including Coffin Butte, are influenced by a maritime climate with wet mild winters and moderate dry summers. Precipitation is mainly rainfall, with some snow accumulation in the foothills and mountains.

Coffin Butte and Tampico Ridge, along with nearby areas of McDonald/Dunn Forest, are part of an area of relatively high annual rainfall compared to most other parts of eastern Benton County. Maps produced by the PRISM project at Oregon State University:

https://prism.oregonstate.edu/projects/gallery_view.php?state=OR

show that these ridges are in a zone with average annual precipitation of 50 to 65 inches per year. This is significantly wetter than downtown Corvallis, and more comparable to Coast Range areas such as Blodgett.

The relatively wet climate results in part from Coffin Butte being in a gap between the rain shadows cast by Chintimini (Marys Peak) to the south, and Bald Mountain (Monmouth Peak) to the north. By far most of this precipitation comes as rain in the cooler months from October through April, with ice storms (freezing rain) and snow possible during the winter months.

c) Surface water

Coffin Butte and the north end of Tampico Ridge are in the Soap Creek watershed, which is part of the larger Luckiamute River watershed that includes Kings Valley in NW Benton County, as well as much of Polk County as far north as Falls City.

Streams flowing off of the west side of these two ridges join Soap Creek directly in the vicinity of Coffin Butte Road and Wiles Road.

[a map of the local hydrologic features would be very useful here]

Water flowing eastward off of these ridges have been substantially modified by ditching in conjunction with the construction of Camp Adair during the early 1940s. The main flow passes through "Toketie Marsh" (a remedial wetland constructed by Valley Landfills Inc. to compensate for destruction of existing ponds higher up on Coffin Butte) and thence through a culvert into the former stream which was ditched to form the waterway now known as "the canal" on E.E. Wilson Wildlife Area.

This "canal" continues east through the feature known as the "Canal Pond," from which some water is pumped annually into a popular fishing pond. East of there the canal passes just north of the Pacific Recycling Center (PRC), where it receives surface runoff from the PRC area. East of the wildlife area

and the PRC, it continues as mainly as a ditched stream until it reaches Independence Hwy at Springhill Drive. There the stream turns north to join the lower part of Soap Creek, about a mile before Soap Creek flows into the Luckiamute River at Luckiamute State Natural Area. The Luckiamute River in turn reaches its confluence with the Willamette River about a mile beyond where Soap Creek flows in.

The south end of Tampico Ridge is part of a watershed divide between the Soap Creek watershed to the west, and the Calloway Creek / Bowers Slough drainage which joins Frazier Creek northeast of Corvallis, and flows into the Willamette River near Bowers Rock State Park.

d) Groundwater

Groundwater in the area is poorly understood, particularly in the bedrock underlying Coffin Butte and Tampico Ridge. Household and agricultural wells around these ridges mainly tap into fractured zones in the basalt, but there have been no investigations to determine the lateral extent of these zones, or how they might be connected to fractures in the bedrock closer to the landfill site.

Groundwater patterns in the unconsolidated sediments adjacent to the landfill (chiefly Willamette silts east of the topographic saddle, and recent alluvium west of the saddle) are much more well understood, based on a network of mostly shallow monitoring wells. These show that groundwater movement away from the current landfill site in these shallow sediments is mainly in the direction of the topographic gradient.

One household well in sediments west of the landfill, on the former Helms home site, received sufficient contamination from the landfill site that the well had to be decommissioned under DEQ supervision. Contaminants have also been found in excess of regulatory limits in monitoring wells on the east side of the landfill.

e) Vegetation

As summarized in the county's Prairie Species Habitat Conservation Plan:

<https://www.co.benton.or.us/parks/page/prairie-species-habitat-conservation-plan>

prior to settlement most of the Willamette Valley portions of Benton County were an open expanse of native upland and wet prairies, riparian areas, and oak savanna. Reconstructions of vegetation at the time of the earliest land surveys (1850s) show oak woodland and oak savanna as the main habitats on Coffin Butte and Tampico Ridge, with upland prairie and some wetlands in the surrounding areas of lower elevation.

Photos from the Ben Maxwell Archive (Salem City Library) from the early 1940s, just prior to the construction of Camp Adair, show a pastoral landscape with mainly open savanna habitats still maintained by grazing along the ridges, open pastures in the saddle area, and cropland in the surrounding lowland areas, with riparian vegetation along the creeks.

A remnant of this oak savanna habitat can still be seen on the portion of Coffin Butte accessible to the public via the Coffin Butte Trail (E.E. Wilson Wildlife Area). Native wildflowers including Menzie's larkspur, Tolmie's mariposa-lily ("cat's ear"), tough-leaved iris, fawn lily, spring-gold, coralroot and camas bloom in spring alongside of native prairie/savanna grasses including Roemer's fescue, California oatgrass and blue wildrye.

Private lands along Tampico Ridge also include stands of legacy oak woodlands which have recently been the focus of oak woodland restoration projects, including research on oak ecology, tree stress physiology, biodiversity, and climate change by a group from Western Oregon University in Monmouth:

<https://www2.wou.edu/nora/woutv.video.viewer?pvideoid=1754>

Other portions of Coffin Butte and Tampico Ridge closer to the landfill site have become more heavily forested with Douglas-fir and big-leaf maple as dominant species. In some cases the Douglas-firs grew in naturally following the cessation of fire and grazing, while in other areas these are monocultural plantations.

Adjacent public lands on the east side of Hwy 99W are managed by Oregon Department of Fish & Wildlife (ODFW). These lands include about 200 acres of native prairie restoration plus marshes and riparian corridors with native Oregon ash as a tree main species.

Lowlands on landfill-owned properties elsewhere around the landfill are a mix of cropland with recently constructed remedial wetlands to manage runoff, plus riparian growth along Soap Creek. One wetland area was planted with hybrid poplars as part of an unsuccessful plan to treat landfill leachate by phytoremediation.

Several areas are infested with invasive species, including yellow flag (iris) in the older remedial wetland ("Toketie Marsh"), reed canarygrass, bulbous canarygrass (Harding grass), meadow knapweed, Himalaya blackberry and teasel in disturbed or unmanaged areas around the edges of the active landfill and quarry sites. Bamboo has been spreading along Soap Creek from the vacated Helms home site now owned by VLI.

f) Wildlife and conservation

The entire area around the landfill has been identified by Benton County as areas of high priority for conservation actions to benefit key species in Benton County. The saddle area between Coffin Butte and Tampico Ridge is shown on county maps as part of a wildlife corridor connecting from the edge of the Coast Range (Dunn Forest) to the west to riparian habitats of E.E. Wilson Wildlife Area to the east, and beyond there all the way to the Willamette River at Luckiamute State Natural Area and Willamette Bluffs.

[add more text on Great Blue Heron rookeries]