MAINLAND UNITS

01EC Echo Cove

Geography, subsheds, ownership This northwesternmost CBJ map page contains only one Priority Area (PA 1.09), a 2,902-acre unit on City land.[1] Other landowners in the neighborhood include Goldbelt Inc., Gospel Missionary Union Inc., and the US Forest Service, which administers the recently created Experimental Forest called Héen Latinee, or *river watcher*. CBJ has a data-sharing agreement USFS researchers studying Héen Latinee.

For our purposes in wetlands assessment, the CBJ portion of the watershed has been divided into 12 'subsheds,' shown here with blue lines. A NNW-SSE-running ridge—named by us Hill 970—splits PA 1.09 in half. Westerly subsheds feed into Cowee-Davies, draining more than 30,000 acres northward into Berners Bay. Easterly subsheds of Hill 970 drain directly to beaches at Bridget, Sunshine and Bessie Coves.

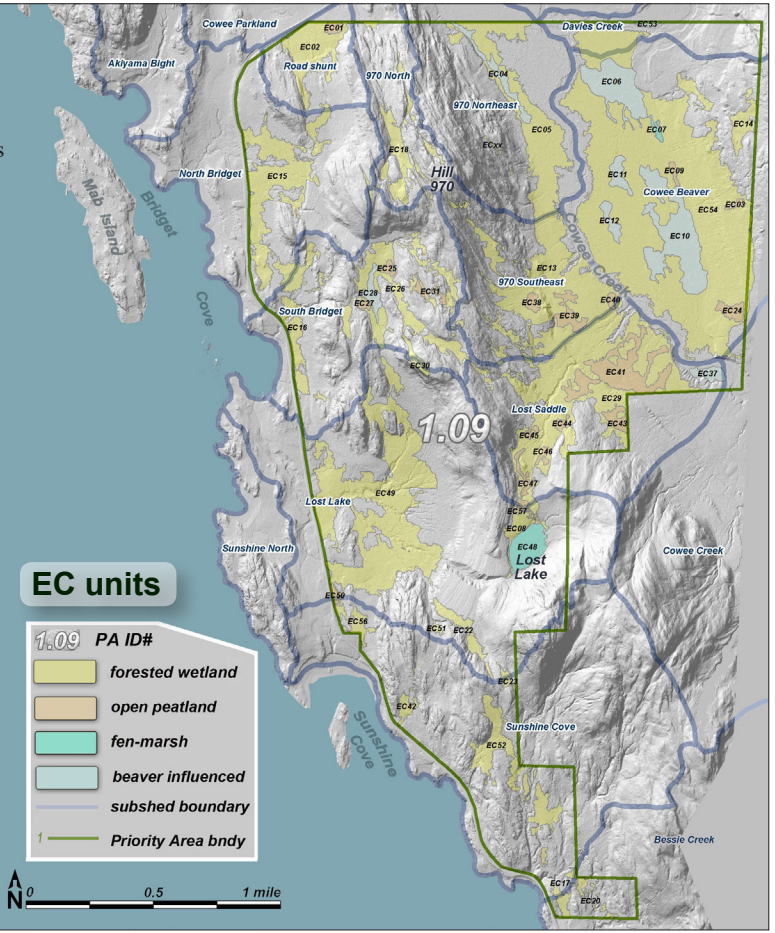
Geomorphology, glacial history Cowee and Davies watersheds are some of the most topographically diverse in the CBJ. This includes both extreme relief—with summits to 5,800 feet only 4 miles from Echo Cove—and some of the borough's most expansive, level or gently rolling lowlands.

Following the Great Ice Age, at the onset of the Holocene (Carstensen, 2013a, 2013b), relative sea level was about 700 feet higher than today. Poorly drained marine deposits extend almost to the top of Hill 970.[2] On these deposits, forested wetlands and occasional pocket peatlands have developed.

Much more recently, land was again depressed, by glacial advances of the Little Ice Age. With glacial waning, beginning around 1800 AD, land began to rise. This

1 The CBJ parcels layer shows portions around Lost Lake as "unassigned." Possibly USFS?

2 More in sidebar, following; *A new highwater mark?*



Left: View NNW, 20050811, over Cowee Creek toward its outlet in Cowee Meadows. Little Ice Age legacies pervade the alluvial bottomland.

Right: A mile upstream along the informal anglers' trail, west bank of Cowee Creek. *Normalized vegetation* shows 5 trees taller than 180 feet within this acre. Bosworth and Allison stand by 2 of them.

recent isostatic depression and recovery more directly affected AAs we surveyed on the following Eagle River (02ER) map page. But even here in Cowee-Davies watershed (EC map page), the legacy of expanded glaciers in the headwaters and stream downcutting toward a falling relative sea level exerts strong influences on hydrology and succession.[3] Northward and downstream from Glacier Highway are Cowee meadows and parkland (State and Private), all recently tidal, which vie with Risen Valleys (Eagle-Amalga region, 02ER, following) as the most important wildlife habitat in the roaded (or 'near-road') CBJ.

Ecology Fresh alluvial deposits on the alluvial plain of Cowee Creek result in productive spruce forests with trees up to 200 feet tall. These bottomland forested wetlands (spruce—devil's club over skunk cabbage, or PISI-OPHO/LYAM) are quite different in structure and function from contiguous

3 Judging from our DEM-generated contours, Cowee Creek is incised about 6 feet at the Glacier Highway bridge. For comparison, Mendenhall River at Brotherhood Bridge is incised about 10 feet. The difference may be partially attributable to formation of Mendenhall Lake a century ago, resulting in sediment starvation and more rapid downcutting than in the less heavily glaciated Cowee watershed.

upland forested wetlands (hemlock—menziesia over skunk cabbage, or TSHE-MEFE/LYAM), under WESPAK enfolded into single *fw* AAs on both sides of Cowee Creek. *Appendix 5* has more detail on these distinctions in landform, hydrology, and community composition.

Cowee-Davies watershed contains 15% of the large-tree alluvial spruce forest of the entire Lynn Canal biogeographic province (Carstensen, Schoen & Albert, 2007). No other CBJ watershed comes close to this level of forest productivity, which can be traced to a combination of high-carbonate, slatey parent material, and well-drained, nutrient-rich alluvium. Stream incision has removed most of these forests from the annual flooding zone; thus they are not mapped as *fl* (floodplain wetland) under WESPAK. However, root systems of these fast-growing spruce forests still benefit from hyporheic delivery of marine-derived and alder-based nutrients.[4] The riverine assessment guidebook by Powell *et al* (2003) classifies this next-outward band—removed from annual flooding levels but still strongly interacting with the stream—as "slope river proximal." By whatever name,[5] this bottomland tall-spruce&beaver-swamp complex is part of what makes Cowee-Davies the

> *"wildest, biggest, fishiest, beariest, most forested-glaciated-uplifted and most ecologically indispensable [watershed] to our borough." (Carstensen, 2013a, p.39)*

Farthest upvalley beaver swamp on Cowee Creek, 2.6 miles above our Priority Area. View downstream to confluence with the Canyon Fork, 20120919.

Cowee Davies has vast beaver swamps, probably more than all the rest of the road-accessible CBJ combined. This keystone mammal enhances fish and wildlife habitat, altering hydrology so profoundly that a special WESPAK mapping category has been created to identify active beaver systems.

In part because Cowee-Davies has 17 miles of mapped anadromous channels, 82% of which are designated "floodplain" on the USFS channel-type layer, these paired watersheds are 'off the charts' for fish values (Carstensen 2013a, p13-16). In turn, these remote floodplain channels offer opportunities for wary brown bears to access spawning reaches elsewhere too close to human development and recreational trails. We saw tracks of 2

4 The hyporheic zone, in large floodplains like Cowee-Davies, is a vast, slowly moving braided groundwater system, carrying far more flow than in visible, surface channels. It stores and redistributes nutrients from both up- and down valley, benefiting riparian habitats throughout the bottomlands.

5 Unfortunately neither of these unmemorizable tongue-twisters—"hyporheic belt' nor "river slope proximal"—are likely to catch hold amongst any but the most jargon-tolerant of field workers or land managers. We need a friendlier name for wetlands interacting with riverine hydrology and nutrient exchange. *Appendix 5* explains the problem, and the need for an additional wetland category on those landforms.

Two species with higher concentrations in Cowee-Davies than elsewhere in the CBJ:

- Toadlet, probably a yearling, grown to a bit over 2 inches by mid-September. Cowee yearlings were not only more abundant, but also larger than average for their age.
- Tracks of medium-large brown bear on exposed sandbar of Cowee Creek above confluence with Davies, toward conclusion of the salmon runs. Approximately 6.5 inches across forefoot pad. Another individual left 5-inch tracks farther upstream in mid summer (pre-spawning).

different-sized brown bears (and much black bear sign) during our 2014 surveys. Telemetry by ADF&G shows considerable movement by brown bears (and moose!) between Berners Bay and the Héen Latinee (Flynn et al, 2012). Opinions differ on whether there's a viable breeding population of brownies in Cowee-Davies. Their data suggests several Cowee females may commute to Berners Bay at mating time.

Western toads have suffered major population crashes since the late 1980s throughout their entire range, including Southeast Alaska. During extensive surveys in 2002 and 2003, only 7 remaining breeding ponds were located within 1/2 mile of CBJ roads (Carstensen *et al*, 2003). But to our surprise, almost every 2014 visit to Priority Area 1.09 turned up yearling toadlets, not only in the beaver marshes and alluvial bottoms but in small, isolated fens and bogs high on the western slopes of Hill 970. On some days our team collectively saw more than 20, including clusters of up to 5. No adults were seen, nor were any 2014 metamorphs. All toadlets were in the 3/4-to-2-inch size range consistent with yearlings (*ie* eggs in May, 2013, metamorphosis in August). Clearly, 2013 was a boom year for toad reproduction at Cowee, and not just in a couple natal ponds; the toadlets we saw were too widely dispersed.

Researchers have recently noted cases of increasing amphibian resistence to the chytrid fungus that has decimated species worldwide (National Science Foundation, 2014). Whether that explains the apparent resurgence throughout Cowee-Davies, we don't know.

Elsewhere in our 2014 wetland surveys, with the exception of Risen Valleys (02ER, following), toad encounters remained rare. One pattern we think we're seeing Southeast-wide is least impacted populations in areas with deepest snow. Both Cowee and Risen Valleys fit that pattern.