

Chuckanut Community Forest Trail Network Design

Reports by students in ESCI 439/539 Conservation of Biological Diversity

Course instructor: John McLaughlin

In October 2019, Western Washington University students designed trail networks for Chuckanut Community Forest (CCF) as an assignment for a conservation course. Reports and designs by four students are available on this web site. The document you are reading summarizes the assignment and design process. A different process, perhaps emphasizing other CCF values or uses, could produce somewhat different design solutions. We hope designs provided here will stimulate community discussion about current and future CCF stewardship and inform CCF park master plan development.

Trail network design guidelines were informed by input provided during a public hearing on 26 June 2019. The hearing was well-attended and speakers shared diverse comments about their desires for CCF and about a prior set of CCF trail designs. The course instructor developed design requirements and criteria based on public input, as described on the next page of this document.

The students followed a structured design and selection process, in which they evaluated three trail design alternatives relative to a set of criteria and selected the alternative that scored best. Their reports contain three trail network designs, accompanied by numerical evaluations of each design. Some students refined their selected design further into a final design; for other students, their selected design was the final. To help you find the final trail design in each report, below is a table listing student authors and the location of the final trail design within each report.

<u>Student Author</u>	<u>Page with final design map</u>
Jack Gavin	7
Abby Severns	7
Turner Campbell	11, 12, 13
Octavio Cruz	5 (Figure 1)

CCF Conservation and Recreation Background

Chuckanut Community Forest was acquired as public open space due to its outstanding environmental values, desirable natural aesthetic character, and strong potential for outdoor recreational uses. Without thoughtful management, some of these values may conflict. Intensive recreational uses can degrade wetlands, impair sensitive ecological processes, and disturb diverse plants, animals, fungi, and habitats. Conversely, strict access restrictions would provide conservation benefits but reduce recreational opportunities valued by the community.

In the years since CCF was opened to public access, ecological conditions and aesthetic qualities have been degraded by construction of new trails, widening of pre-existing trails, and associated disturbances to soil, vegetation, woody debris, wildlife, and wetlands. Trail proliferation has degraded CCF ecological conditions and experiences of some human visitors, who become lost amidst an expanding web of trails.

Potential conflicts between recreational uses and conservation values of CCF could be reduced or resolved by implementing an appropriate trail network design. The Bellingham Parks Department will develop a park master plan for CCF, which will include a trail plan. Work on the master plan is not scheduled to begin until 2022. Meanwhile, trail impacts continue to expand. Thoughtful design work conducted in advance could inform the official plan and expedite resolution of conflicts between conservation and recreation.

Trail Network Design Process

Project goal: to develop a trail network design for Chuckanut Community Forest, suitable for inclusion in the CCF park master plan. Input during the 26 June 2019 public hearing suggested any design must meet several demands in order to be acceptable to most constituents. These were elevated to design requirements. Public input also suggested optimizing other characteristics as desirable. These characteristics became objectives that were translated into measurable criteria for designs to maximize.

Design Requirements

- (1) trail links to each of the six primary CCF access points;
- (2) a major loop trail with trail links to the six primary CCF access points;
- (3) trail crossings of streams or wetlands must be mitigated by boardwalks or bridges .

Design Objectives

- (1) a trail network that provides on-trail travel through diverse CCF regions;
- (2) minimize impacts to wetlands;
- (3) maximize opportunities for recreational solitude and human interaction with the natural environment;
- (4) maximize amount habitat distant from trails;
- (5) minimize number of trails that ascend or descend steep slopes.

Design Criteria

- (1) Total boardwalk length (proxy for cost; less is better); expressed as % of current trail length crossing wetlands (188 m). Measurements for this criterion were transformed as $100\% - \%$ of current length of trail crossing wetlands, to obtain a value where larger values are better.
- (2) Length of secondary trails that are at least 30 meters from other trails (more is better), expressed as % of current value. (proxy for recreational solitude; more is better)
- (3) CCF area at least 30 meters from any trail (more is better); expressed as % of total area (32.9 ha). (proxy for habitat buffered from human activity; more is better)

An evaluation score for each trail network design alternative was calculated by summing percentages for criteria (1)-(3), above. The design alternative with the highest score was considered best.

Maps of CCF and the surrounding area are in the CCF baseline report, available at the following URL:

<https://www.chuckanutcommunityforest.com//files/CCF-Baseline-Documentation-Report-Final-5-8-17.pdf>