Conservation Design Project

Due Date: Thursday October 25

This assignment will give you experience with conservation planning and design to resolve potentially conflicting interests relevant to biodiversity conservation. Successful design requires a clear statement of the problem to be addressed, which is where you should begin. Next, conservation objectives should be defined clearly, and those objectives should be translated into explicit measurable criteria with which system condition or alternative designs can be evaluated. Finally, the method for deciding among alternatives must be specified.

This assignment will lead you through such a structured approach to conservation planning and design. Your design process should follow nine steps, in the order listed below. Descriptions on the next page provide most information to needed complete steps 1-4. Most of your work on this project will consist of developing alternative designs, evaluating them, and developing a final design; steps 5-9.

Document your work in a written report, which will be evaluated using criteria listed at the end of this document.

1 State the problem to be solved. The issue description below provides a reasonable problem statement, which you may revise as necessary.
2 Define conservation objectives or conditions under which the issue would be resolved.
3 Derive measurable criteria to evaluate status relative to objectives defined in step 2.
4 Determine how you would combine scores relative to multiple criteria to evaluate a given design option.
5 Develop at least three distinct approaches to solving the design problem.
6 Develop preliminary designs using the three approaches in (5).
7 Evaluate preliminary designs in (6) using criteria defined in (3).
8 Assess evaluations (7) and select the design approach yielding the best evaluation, unless your assessment reveals problems with your evaluation approach.
9 Develop a final design using your selected approach.

Recommended Lengths
Project Report: up to 10 pages, including maps, tables, and figures.
Chuckanut Community Forest trail network design

Chuckanut Community Forest (CCF) 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. In particular, intensive recreational uses can degrade wetlands, impair sensitive ecological processes, and disturb diverse plants, animals, and habitats.

In the several 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 get 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. Your excellent design work could inform the official plan, and expedite resolution of conflicts between conservation and recreation.

Project goal: to develop a trail network design for Chuckanut Community Forest, suitable for inclusion in the CCF park master plan. Design objectives include: (1) trail links to important CCF access points, (2) a trail network that provides on-trail travel through diverse CCF regions, (3) minimize total trail footprint, and (4) minimize impacts to wetlands and wetland buffers. You should evaluate your design alternatives relative to these objectives using the following criteria.

(1) Percent (%) of the six major access points not included in trail design (smaller is better).
(2) Total trail footprint (sum of trail length x trail width; less is better); expressed as % of current value (8853 m²).
(3) Trail length crossing wetlands without mitigation (boardwalks, etc.; less is better); expressed as % of current value (188 m).
(4) Trail length within wetland buffers (less is better); express as % of current value (3384 m).
(5) Total boardwalk length (proxy for cost; less is better); express as % of current trail length crossing wetlands (188 m).

Calculate an evaluation score for each of your design alternatives by summing percentages for all criteria (1)-(5), above.

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

Your design should include the following components

1 Existing trails to retain
2 Existing trails to remove and restore to natural conditions
3 Trails to relocate or modify to reduce impacts, e.g., by installing boardwalks

Your design should include the following maps.

1 Existing conditions, annotated with components (1-3).
2 Clean design map, showing only trails that will remain after trail removals, relocations, and modifications
Evaluation: Maximum 100 points possible. A blank evaluation form is shown below.

ESCI 439 Conservation of Biological Diversity
Conservation Design Evaluation Sheet

Name ______________________

Design Project Option ______________________________________________________

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Conservation Objectives (0 pts – provided on page 2)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Measurable Criteria (0 pts provided on page 2)</td>
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<tr>
<td>4</td>
<td>Method to Combine Criteria Scores (0 pts provided on page 2)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Three Design Approaches (20 pts)</td>
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<tr>
<td>6</td>
<td>Preliminary Designs (20 pts)</td>
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<tr>
<td>7</td>
<td>Preliminary Design Evaluations (10 pts)</td>
<td></td>
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<td>8</td>
<td>Design Approach Selection (10 pts)</td>
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<td>9</td>
<td>Final Design (30 pts)</td>
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<td></td>
<td>Writing and Presentation (10 pts)</td>
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<td><strong>Total</strong></td>
<td>(100 pts)</td>
<td></td>
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Evaluation rubric: Descriptions that fully meet the following criteria will earn full credit.

Step 5. Three Design Approaches: distinct from each other, practical, creative, and effective. (20 points)

Step 6. Preliminary Designs: implement approaches described in step 5, described clearly and sufficiently to evaluate according to criteria in step 3. (20 points)

Step 7. Preliminary Design Evaluations: clearly presented, apply criteria (step 3) and method (step 4) appropriately. (10 points)

Step 8. Design Approach Selection: interprets evaluations from step 7 appropriately. (10 points)

Step 9. Final Design: clearly presented, creative, fulfills conservation objectives. (30 points)

Writing and Presentation: ideas are clearly and effectively presented using written and visual elements. Paragraphs use transitions where appropriate, sentences are well-formed, language is precise, spelling is correct. Maps illustrate design effectively, easy to interpret, conforms to standard cartographic conventions (e.g., includes legend, scale bar, and directional arrow). (10 points).