

Lindt Schmitz

CCF restoration

Part 1 Restore compacted soils: approach clearly described; methods plausible and practical. Methods appropriate to sites. (15 points)

For small trails that are going to be permanently closed, parties of 20-30 volunteers with pickaxes, pitchforks, augers, long bars, and shovels would break up the compacted soil and then plant native vegetation on it. See part 2 for details on what vegetation goes where. For larger trails that need to be narrowed, hand tools should suffice, but then temporary barriers should be put in place so that new vegetation won't get trampled. For more heavily trampled areas, the zai technique would be utilized. This involves digging holes at regular intervals during the dry season, which then would be planted in the following year. The holes serve to increase groundwater infiltration and concentrate compost formation so that when it comes time to plant, the vegetation's roots would more easily penetrate the soil, allowing it to break up the surrounding soil over time. Areas where this is necessary would have to be blocked off from any human activity until the transplants have taken root. This can be accomplished via signs and roadblocks.



zai holes

Part 2 Restore vegetation: approach clearly described, plausible, and practical.

Vegetation species or growth forms appropriate to sites and likely to establish. (15 points)

For smaller trails, native fern species would be sufficient, because the compacted soil isn't severe enough to warrant woody species, and the tree canopy is unlikely to have a gap that needs filling. For larger trails that need narrowing, woody shrubs such as huckleberry, elderberry, and snowberry are needed, because they are larger than herbaceous species like ferns (thus deter humans trodding on them better), but are easier to transplant and more cost-effective than trees (and cover more ground when fully grown, more successfully deterring soil compaction). Trees would be planted in the zai holes and would have tags on them to identify individuals for monitoring. Species for this could include bigleaf maple and crabapple. These are hardy species that are easily transplantable and reach maturity much quicker than conifers.

Part 3 Close trails and direct visitors to sanctioned trails: strategies and structures clearly described, feasibly installed, and likely to be effective. (15 points)

Since signs might be ignored, physical barriers may be necessary at the openings of trails while the transplants are taking root. These barriers might be some rented chain-link fence (to keep people from hopping over them) or possibly some plastic road barriers that are filled with water. "Keep out" signs or tape could be used in conjunction with these barriers to make it very clear that the trails are closed and in the process of being restored. Explaining this on the sign is a likely additional deterrent to human trampling. Natural materials would likely not be a very good barrier because a) it would disturb the surrounding environment, and b) it would blend in with the forest, possibly leading the visitors to think that there is simply incidental blockage of the trail instead of intentional rerouting. In addition, once transplants are in the ground but haven't taken root yet, a volunteer patrol might be organized to enforce these signs and report violations.

Part 4 Restrict visitors to narrowed trails: criteria similar to part 3. (10 points)

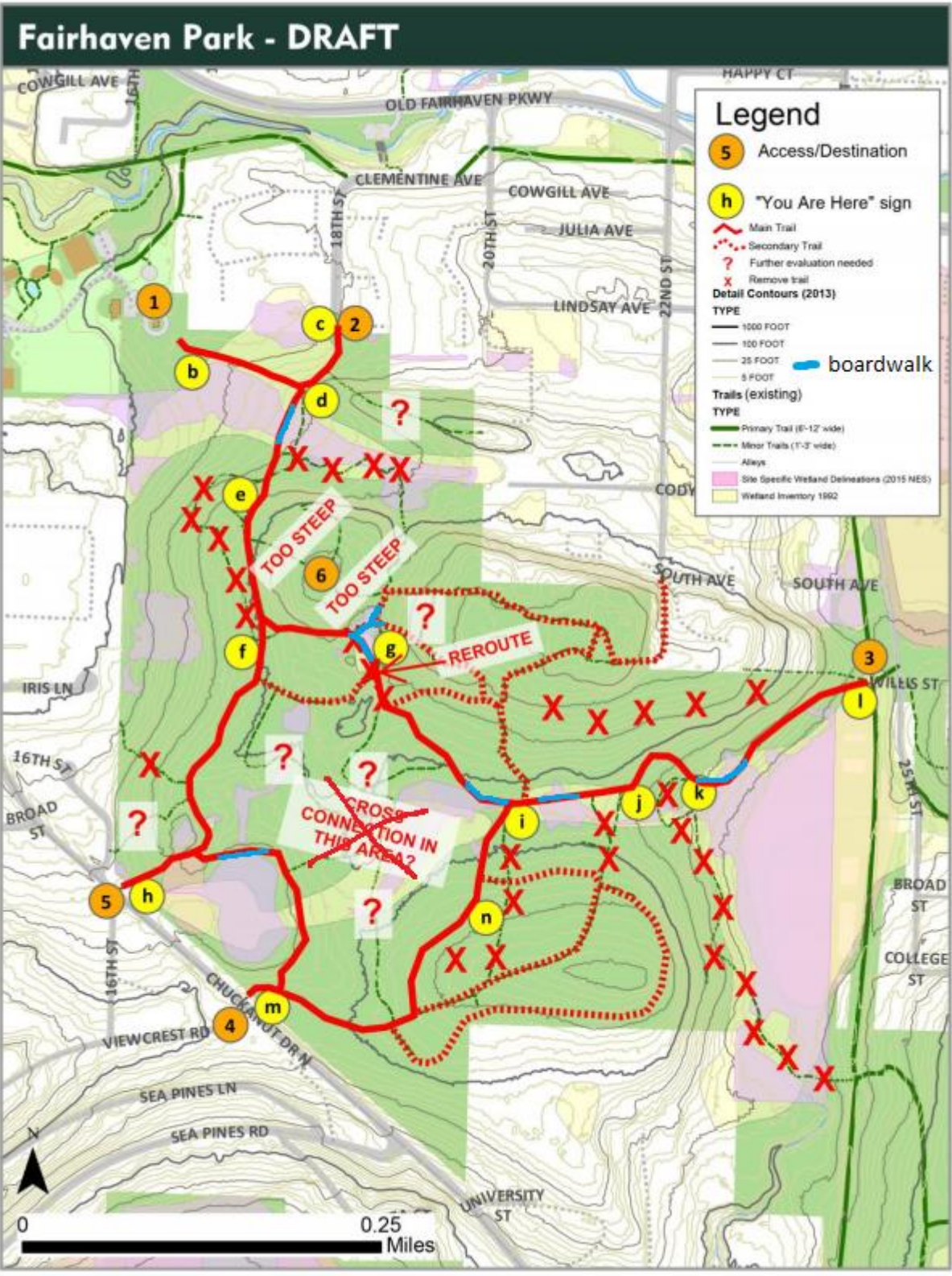
Since signs might be ignored, physical barriers may be necessary on the sides of large trails that are being narrowed while the transplants are taking root. These barriers might be some rented chain-link fence (to keep people from hopping over them) or possibly some road barriers that are filled with water. "Keep out" signs or tape could be used in conjunction with these barriers to make it very clear that the trails are



closed and in the process of being restored. Explaining this on the sign is a likely additional deterrent to human trampling. Directional signs pointing the visitors to the proper path may help prevent incidental trampling. In addition, once transplants are in the ground but haven't taken root yet, a volunteer patrol might be organized to enforce these signs and report violations.

Part 5 Structures described clearly. Structures would be practical and effective. Map identifies locations clearly, easy to interpret, conforms to standard cartographic conventions (e.g., includes legend, scale bar, and directional arrow). (10 points).

All trails going through wetlands would be removed by breaking up the compacted soil and planting wetland species on them such as skunk cabbage, cattails, and native sedges. Barriers and signs would redirect visitors to alternate routes. Any section of trail that would remain (ie, not be restored to forest understory) and also that intersects a wetland hydrological connection zone would have a raised boardwalk constructed over it, with as little disruption to the surrounding vegetation as possible. Any sites where water collects in the trail would likewise have a raised boardwalk constructed over it with as little disturbance to the surrounding vegetation as possible. This is to prevent hikers from walking around puddles that form in the middle of the path to avoid getting their feet wet, thereby trampling surrounding vegetation. The boardwalks would be wheelchair accessible with a ramp and a wide enough girth that a wheelchair user could easily move across the length of the boardwalk and turn around on it without fearing falling off (at least 36 inches). There would also be a handrail on at least one side so that ambulatory disabled people and the elderly can have something to hold so they don't lose their balance and fall into the water. Each board on the boardwalk would have a nonslip surface to ensure safety. The boards would ideally be made with recycled plastic, which would decrease the maintenance needed and eliminate risk of introducing nonnative pests. They would also be lighter and reduce waste, and eliminate the need for timber.



Part 6 Restore hydrologic connections: approach clearly described; methods plausible and practical. Methods appropriate to sites. (10 points)

All paths that go through wetland would be removed using the steps outlined above. Paths (excluding main trails) that go through buffer zones would be rerouted or removed so they don't cross the buffer zones. Drainage routes would be mapped out to accurately place the boardwalks of the main trails so that during the wet season, no one is walking through and contaminating the wetland's water source.

Part 7 Monitoring and evaluation plan: includes measurements sufficient to evaluate performance relative to the six objectives. Measurements can be recorded and analyzed practically and noninvasively, yielding clear results. (15 points)

The project would be done in several phases. Phase 1 would be to evaluate each section of the forest, in order to identify the places that need the most restorative work, and also to establish a baseline (the criteria for this measurement are described below). Phase 2 would be to restore compacted soil and plant vegetation. Barriers and signage would be placed during this phase and left until the plants have taken root. Phase 3 would be to construct the boardwalks around the wetlands. After phases 1-3 are complete, the last phase is to monitor the health of the forest ecosystem. Each month, the following measurements are recorded in each section of restored forest:

- the health of each transplanted sapling, ie how well it is taking to its new environment
- the health of the transplanted bushes lining the narrowed path
- the degree of trampling in each of the previously compacted sites, on a severity scale and a percentage of ground trampled (0 being no evidence of trampling, 5 being it looks like it did pre-restoration)
- Porosity of the soil, using a percolation test
- the percent of deer browse
- the diversity of the flora in number of species
- any new flora that has taken root in the space
- health of the wetland ecosystem, measured by presence of indicator species
- flow of water between wetland areas

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. Figures or tables illustrate ideas effectively, easy to interpret, and are cited in report text (10 points).