

Ecological Restoration of Mount Douglas Park

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1. Introduction

Ecological restoration is defined as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (SER, 2004). The restoration of any site requires large amounts of planning and preparation and the restoration of Mount Douglas is no different. What makes this project unique is that the area is designated as a park. This requires a completely unique approach and the cooperation of many different sectors of society. We have come up with a plan that will hopefully restore the area to the greatest possible extent in reference to the historical ecosystem.

The first step in our restoration was to conduct a site analysis to determine the extent of the damage and recognize the areas which needed the most attention. Using this qualitative information, we began to set up policies, goals and objectives to help guide us through the project. Once those had been finalized, we began to work on a realistic design that would help restore Mount Doug but still allow human interaction and tourism to the park. Due to the high number of visitors to the area and multiple stakeholders involved, a traditional restoration would be difficult. Some of these stakeholders include the general community, government and the tourism industry. After designing the restoration, the next step was to implement it in the field. Over the course of the project, monitoring and managing its progress is essential for a successful restoration. This is by far the most extensive part of the restoration, as it could take many months or even years to finish. Yet even after the project has concluded, it is up to the community to continue preserving the ecological integrity, biodiversity, and habitat in order to not degrade Mount Doug so others can enjoy it for years to come.

2. Site Analysis

2.1 Location

Mount Douglas Park is located on Cordova Bay Road in Saanich, British Columbia, adjacent to the Pacific Ocean. It has an excellent view of the water, the city of Victoria and the Olympic and Cascade Mountains. The surrounding area is dominated by housing, multiple strip malls, Mt. Douglas Golf Course and is only a few kilometers away from UVic. The mountain

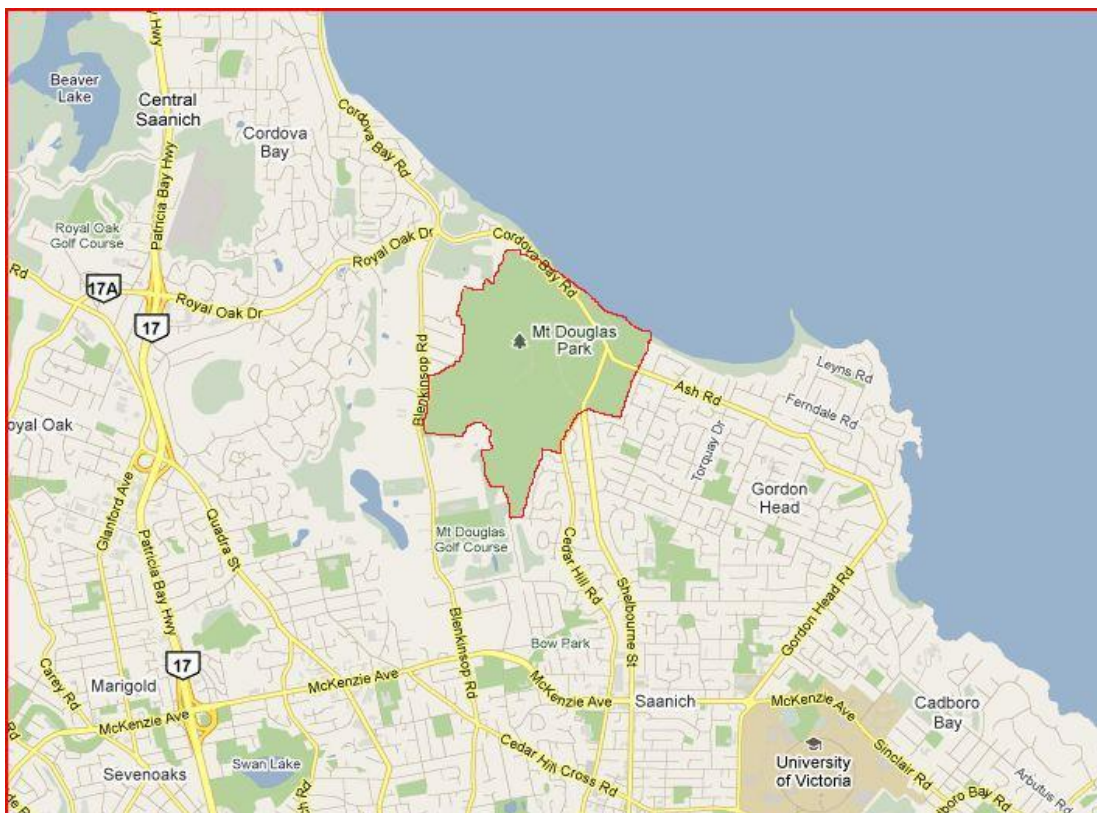


Figure 1. Location of Mt. Douglas Park. Source: <http://maps.google.ca/maps?hl=en&tab=wl>

itself covers 182 hectares and stands 213 meters above the ground, actually categorizing it as a hill instead of a mountain (“District of saanich;,” 2010). This park was created in 1858 by Sir James Douglas as a Government Reserve and has been protected as crown from 1889 till 1992

where it was transferred to the Saanich Municipality (“Mount douglas park,” 2010). It is important to note that this is a regional park and is not managed by Parks Canada or the BC Ministry of Environment.

2.2 Flora and Fauna

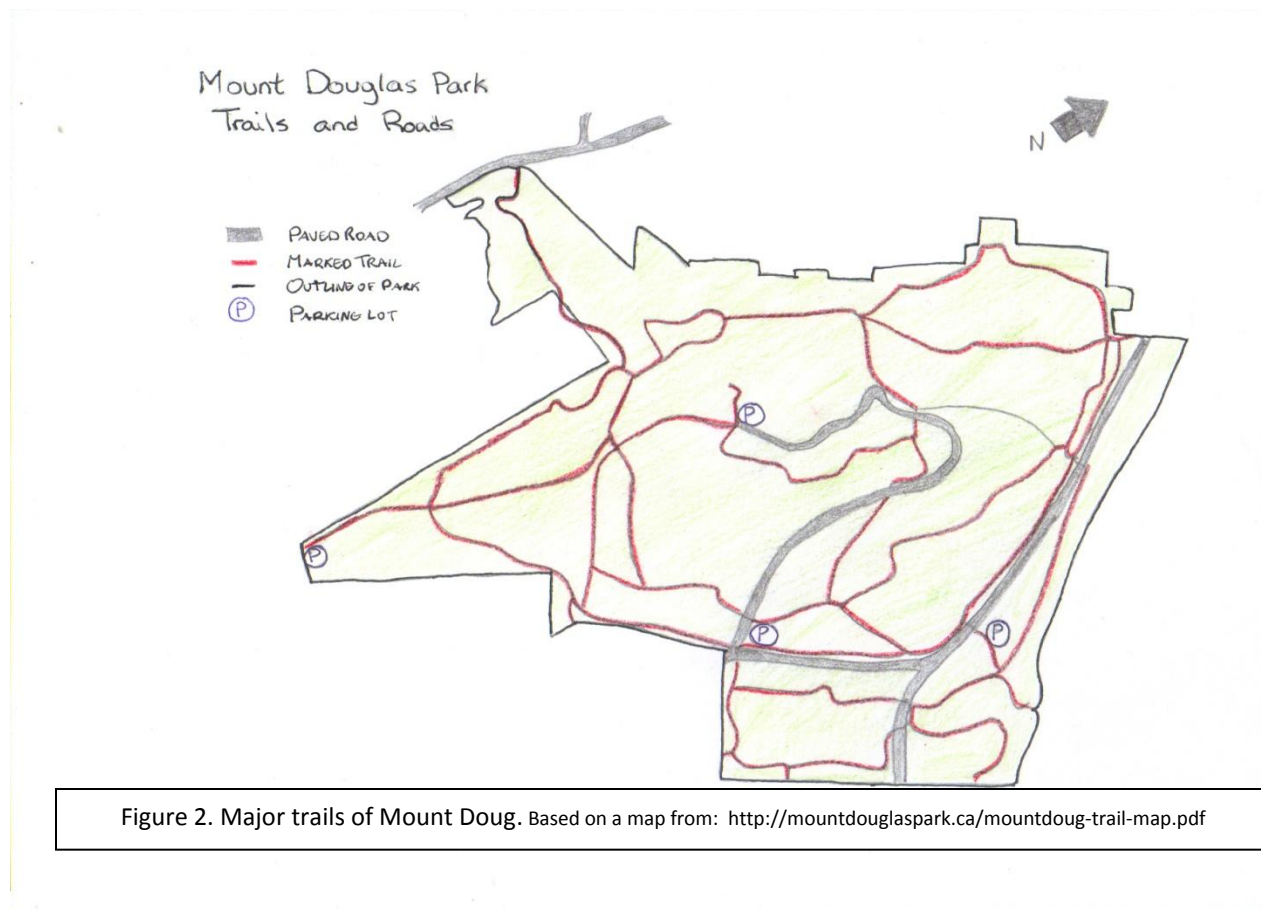
Mount Douglas is well known for having a very large number of Cedar trees as well as Douglas fir throughout the park. There are so many in fact, that the local Songhees people originally called this area the “hill of cedars” (“Mount douglas park,” 2010). Another common tree is the endemic arbutus tree which is Canada’s only broadleaf evergreen tree (*Arbutus menziesii*, 2010). The final one that was frequently spotted was the Garry Oak. Garry Oak ecosystems used to be a regularly spotted around Vancouver Island and the Gulf Islands, although they have declined substantially over the past few decades due to urban development (Erickson, 1993). A widespread plant, covering large portions of the ground is the sword fern (*Polystichum munitum*) which is especially prevalent on the sides of banks. More sporadically situated in the park are the snowberry (*Symphoricarpus albus*), and the skunk cabbage (*Symplocarpus foetidus*). Skunk cabbage is generally found near creeks as they like moist soils. It should come to no surprise then that the two locations that we spotted the cabbage were close to the streams in Mount Doug. (See Appendix A for photos of all native floras).

Fauna can be more difficult to spot in the park because of the high number of daily visitors. Regardless it is still quite common to spot a deer when walking just off one of the many trails. A lot of areas around Victoria and Vancouver Island have had problems with too many deer and their overgrazing. Due to so much human influence in the surrounding area, natural

predators are almost non-existent, allowing their numbers to grow unchecked (Estes, 1996). Recently due to previous restorations, fish have finally returned to Douglas Creek after a long hiatus. Fish are very important in many river ecosystems because of the nutrients and food they bring back into the area. Their return to the creek is also significant because it gives hope to restorationists and to many of the dwindling stocks of fish species struggling from environmental degradation. There are numerous other small animals that use the park such as bald eagles, woodpeckers and squirrels.

2.3 Trails

One of the main attractions of Mount Doug is its extensive network of trails. There are three different categories of trails to choose from depending on their degree of difficulty. They are *developed*, which is flat and suitable for strollers, *natural*, which has the occasional rock or



root along the path and finally *unimproved*, which is steep and hiking boots are recommended. Many of these routes are named after local pioneer families such as John Irvine or Sam Norn. Along with the man-made, named trails there are numerous other lesser known routes that people can choose to use to hike up the mountain. It is these trails that can lead to the degradation of the ecosystem and cause negative repercussions. Many of these went through sensitive areas near creek beds or areas where native species would likely be trampled. In addition, there is one paved road that extends from the end of Shelbourne, all the way up to the summit. This allows people to drive up the 1.5 kilometers instead of parking at the bottom and hiking up. Apart from these two parking lots along the road, there are also two others within the park boundaries. One is situated on Glendenning Road and the other is located just past the first lot and the base of the mountain. These are shown on the map as the letter "P".

3. Problem Identification

3.1 Invasive Species

Globally, invasive species cost astronomical amounts of money to eliminate, suppress and prevent them each year. The problem is no different here in Victoria or Mount Douglas with numerous exotic species outcompeting native ones for habitat and food. Within the park, species such as English Ivy (*Hedera helix*), English holly (*Ilex aquifolium*), scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus discolor*), garlic mustard (*Alliaria petiolata*) and rabbits are taking over (Appendix B). Plants such as ivy have the potential to completely cover an entire area, including up trees which could potentially kill them. As of right now, Mount Doug does not have a serious ivy problem, although there is some scattered throughout the park. The

potential is there however for it to expand its territory and devastate the park like it has to certain areas of the University of Victoria. Other plants such as holly and blackberry do not spread quite as extensively as ivy but still can pose a threat to native species. Also due to the fact that this is a public park, control of these species may be a higher priority in part because of the thorns and sharpness of the plants. In all of our trips to Mount Doug, the only location that we spotted any rabbits was near the base of the hill and nowhere near the top. This is a promising sign, since just like the deer they can become hyper-abundant and overgraze on all of the lower, native vegetation.

3.2 Trampling of Native Species

After walking through the trails on Mount Doug for a while you begin to notice a consistent trend. Along most of the major trails there is very little smaller native vegetation on the ground apart from the trees. This is almost certainly due to the heavy traffic of people repeatedly trampling the plants. Lesser known trails still have plenty of plants but as the main ones become more degraded and overused, people may use smaller trails more often causing them to also become void of native species. Non-native species often are more resilient to trampling. Plants such as holly are prickly causing people to avoid contact, while ivy can grow back from leaves or even a small root.

3.3 Garbage and Waste

Park management has done a good job of keeping most of the mountain clear of any garbage and waste. There are multiple waste disposal containers located throughout the park,

mostly near the parking lots. Even with these containers in place, we were still able to locate on multiple occasions, wrappers and other smaller litter scattered around the trails. Thankfully



Figure 3. Garbage Bin



Figure 4. Plastic Bag

there were no instances where large amounts of waste were discovered. Mount Doug is a dog friendly park and whenever there are animals, you are likely to find their fecal remains. It is rare to take a walk in the park and not spot at least one location of feces on one of the trails. People are generally good about cleaning up after their pets but some choose not to. Those that do clean up sometimes throw the bag back onto the ground after using it, which actually makes the problem worse, as shown in the Figure 4.

3.4 Stream Blockage

Both Douglas Creek and the other streams that pass through Mount Doug are a vital part of this ecosystem. They supply not only drinking water but also important habitat for species that require wet or moist areas to survive. Unfortunately, many of these streams have been highly degraded and now are barely flowing and support almost no fish species. Just recently, five salmon have been spotted in Douglas Creek for the first time in many years

because of the efforts of past restorations. This is good news, yet the area is far from in good condition and will need continued efforts in order to keep it healthy. One of the smaller streams we found was struggling to flow due to blockage by one of the trails. Mud, leaves and rocks blocked much of the water from flowing through the pipes under the trail. The first photo shows the stream gently flowing until it reaches the second photo farther down where it is fully blocked off.



Figure 5. Stream



Figure 6. Stream

3.5 Fragmentation of the Landscape

Many animals need to roam large distances each day simply to find food and water. When an area is fragmented with roads, trails or any other urban development, it prevents these animals from moving. Mount Doug is a very fragmented park that has basically no purely natural areas left in it. On top of that, it is also isolated from other natural areas because of all

the housing that surrounds the area. These two combined, along with other anthropogenic influences, are likely the reason that there are no large mammals in the area other than deer.

4. Policy, Goals and Objectives

4.1 Policy

Mount Douglas Park is an area allocated and dedicated to the preservation of the natural ecosystem in order to provide recreational and aesthetic use for the public population. It is in our best interest to enhance this land so well known for its historic beauty and mystique. Threats such as invasive species (English ivy, garlic mustard, broom) and human influences (trails, roads, infrastructure) continually endanger the integrity of this land. Our intention is to reverse and maintain degrading forces to a minimum while promoting the growth of native flora and fauna through persistent and long-term community involvement. We will uphold this statement through a series of implemented goals and objectives which will strive to embrace the intrinsic connectivity between humans and nature.

4.2 Goals & Objectives

Goal 1:

To restore Mount Douglas Park's ecosystem back to pre-logging/urbanization conditions once managed and upheld by local aboriginal people.

Objective:

As already outlined in section 3.2, invasive species are a major ecological issue globally, with the Mount Doug area being no exception. "...invasive species are now considered the

second largest threat facing imperiled species after habitat loss.” (Biggerstaff and Beck 2008)

With this in mind, it is evident that removal of species such as English ivy, scotch broom, Himalayan blackberry, English holly and garlic mustard (all of which currently threaten Mount Douglas Park) is a top priority. Once invasive species have been removed our goal will then become that of repopulating the area with local and native plant species.

Mount Doug has also seen degraded hydrological settings. Douglas Creek was once home to the spawning grounds of salmon, yet in recent years there have been nearly no fish. Factors such as soil compaction due to heavy human traffic are surely affecting the hydrology of this area as stream blockage is visibly evident. Problems such as the fragmentation of streams due to overlying paths need to be addressed in this regard.

Goal 2:

To provide effective, efficient, and engaging restorative action through education, community involvement and long term commitment.

Objective:

As stated in the Principles and Guidelines for Ecological Restoration in Canada’s Protected Natural Areas, “To be truly successful, the process of ecological restoration will help provide for significant improvement of the state of the ecological integrity, opportunities for people to appreciate and experience the protected area, and engagement of the public in the process.” (Parks Canada, 2008. p.24) In order for this to take place, a vision and subsequent visionary need to be had. This will be implemented through the designation of a Mount Douglas Park restoration manager and coordinator. A position such as this would require a

person(s) with backgrounds and experience in ecological restoration, environmental sciences, and organizational abilities to carry out a multi-layered, long-term plan. This would fall under the responsibilities of the District of Saanich Parks and Recreation.

Responsibilities would include, but not be limited to:

- Creation of an environmental assessment of the area in order to assure all major issues have been addressed
- Creation of short and long term goals with regards to what restorative action needs to take place
- Creation of a monitor and evaluation plan once the main share of restorative work is finished
- Engaging stakeholders through organized restorative activities
- Recruitment of restoration workers/volunteers
- Education and training of volunteers
- Meeting with stakeholders and volunteers to ensure all issues and concerns are addressed
- Creating communicative/informative material in order to reach out to the public population (eg. Website, news articles)

Goal 3:

To reduce anthropogenic disturbance while maintaining the visitation norm for cultural and recreational purposes.

Objective:

A major issue in the Mount Douglas Park area has been human impact both through infrastructure and trampling of floral ground cover. Construction of roads, radio towers, and other structures has entailed the removal of native tree species while promoting continued soil erosion. Furthermore, there are a plethora of hiking and bandit trails which have become difficult to delineate. Paths are poorly marked leaving it up to a matter of guess work for the many people who walk this park daily.



Figure 7. Radio Tower

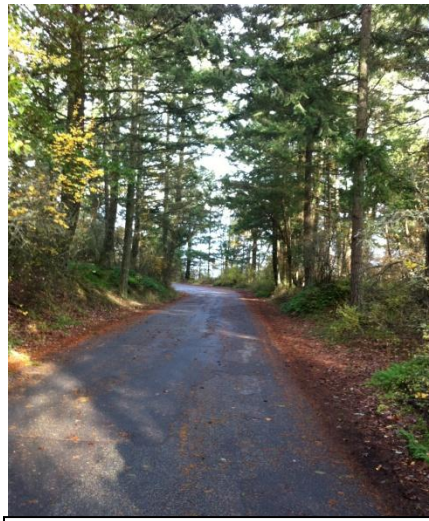


Figure 8. Road to Summit

We suggest that through the upgrading of hiking trails, as well as continued community involvement and education, anthropogenic disturbance can be brought down to a minimum. Mount Doug not only provides aesthetic pleasure, but also brings opportunity for the general public. “Ecological restoration activities should create opportunities for meaningful public engagement and visitor experiences that connect people more deeply to their protected areas. Visitor experience may be enhanced, for example, through direct participation of visitors in restoration actions...”(Parks Canada, 2008. p.60) It is through this community participation that

people begin to develop a sense of pride, belonging, and connection to this land, which is something we need to strive for.

5. Project Design

In order for any restoration project to be successful it needs to have a solid base design before you can begin. Mount Doug has reasonably high biodiversity of plants when compared with the other areas in Saanich. Protection of this biodiversity is one of the main aspects of our design along with preserving the natural beauty that this park offers to so many people each year. Dealing with these invasive species like ivy is imperative as they can easily overtake an area essentially creating a monoculture. Even though when contrasted to other parks it is small, the 182 hectares poses quite a challenge for restorers. Therefore designing both long and short term goals is important if the restoration is to be successful.

5.1 Efficiency

A large group of dedicated workers and most importantly volunteers is a necessity if the project is to achieve its goals. Unfortunately due to budget costs, hiring a fulltime team is not plausible so we must rely on the community for help. These volunteers can be students from the University of Victoria, people who live near the mountain or simply just people who are passionate about helping out. The design needs to be as efficient as possible. Having straightforward guidelines such as where to plant native species or how to remove exotic plants is a must. Without this knowledge, well-meaning restorers could accidentally cause more damage to the park than there was before. Nowadays with the internet and social networking sites

playing a larger role in society, using these could help get the message out. Instead of going around passing out flyers and doing talks to classrooms, sites like Facebook and Twitter could reach out to far more people and requires far less effort.

5.2 Effectiveness

Determining how effective a restoration project like this is can be difficult. It is an ongoing struggle, one that will likely never conclude. Invasive species must consistently be removed and suppressed over the long-term if native species are to have a chance and biodiversity is to remain high. Similarly, education is something that must be thorough and widespread if it is to change the way people think about the environment and how they go about their actions. Setting up signs at important locations is a good start but cannot be the only method. These signs would need to describe the importance of not littering and staying on



Figure 9. Educational Signs

the paths to avoid trampling of native species. Too many people would not stop and read these so another process must be implemented. Education in schools from a young age is likely the most useful way to slow degradation.

5.3 Engagement

Commitment from all of the people associated with this project is critical for the long term success of restoring Mount Doug. Far too often, there is widespread engagement in the project only to have it slowly diminish over time. When this occurs, the short term goals can be accomplished but there is little hope of achieving long term victory. Engagement from donators and sponsors is also important especially for aspects that require significant amounts of money such as tools or the reintroduction of native plants. Since Mount Doug is a well known area, it is likely easier to receive these donations in the long term than an area that is less high profile.

6. Implementation & Management

6.1 Invasive Species

The removal of invasive species is a goal that will always be considered long-term, if not indefinite. Plants such as English ivy and scotch broom are so viral to an ecosystem that trying to put a time frame for removal on these is essentially a waste of time. A good case study, pertaining to garlic mustard from May 2008, was found published in the Victoria Times Colonist. The article outlines how after only a mere four years of existence in Mount Douglas Park, garlic mustard has spread at an uncontrollable rate regardless of continued attempts to dispose of it. Judy Spearing, chairwoman of the Friends of Mount Doug Park Society invasive plant species committee, was quoted regarding restoration and removal efforts: "For 2008, we've clocked 300 hours to remove this species and we're likely not halfway through."(Victoria Times

Colonist, 2008) Furthermore, a 2006 study of this invasive plant found that "...in recent greenhouse experiments, garlic mustard's impact on native understory flora may involve competitive or allelopathic effects on native plants..." (Callaway et. al., 2006 p.2). What this means is that impending soil damage will occur if the species is left to its own devices, making the reintroduction of native species very difficult. The only thing that can be done here is persistent involvement from the community. The implementation of weekly invasive species removal groups is highly important. Although this goal may never fully be 'complete', it is absolutely vital to these ecosystems, or else, as Judy Spearing reminds us, "If left unchecked for about ten years, that's [garlic mustard] all you would have growing in the understory of the forest (Victoria Times Colonist, 2008).

6.2 Garbage & Waste Cleanup

At present the District of Saanich has done a good job of providing an adequate amount of signs and waste disposal bins in the Mount Doug area. However, as already stated in section 3.3, we did come across a fair amount of waste when conducting site analysis. A community clean-up program would be beneficial to the area. This would be somewhat like the invasive species removal groups proposed in above section, however slightly less frequent, perhaps once a month. Moreover, we believe that with upgrading of hiking trails, further implementation of signage, continued community involvement in the restoration of this area, a sense of pride will be reinstalled, hopefully reducing disrespect for the area.

6.3 Education

If this area is to be restored, the general public needs to be properly informed as to what issues are presently affecting Mount Doug, how these issues are going to be addressed, and how the public can help on a personal level. This could be done through the production of informative brochures and the creation of a website for the Mount Doug restoration project with historic and present information on native flora and fauna. Furthermore, workshops held for volunteers on the processes of invasive species removal and subsequent replanting of native flora would be advantageous in terms of creating a more engaging experience for all involved.

6.4 Restoration of Trails

The hiking trails of Mount Douglas Park have become a greater issue than needed. A lack of maintenance, along with poorly marked (or not marked at all) pathways has created cause for the continual trampling of native species by the many daily visitors. One thing we observed when visiting the area was the difficulty of finding the same path you came up when wanting to walk back down. This is something that needs to be strictly delineated, as trampling of this fragile ecosystem leads to further soil compaction and soil erosion, each of which damages the terrestrial and hydrologic systems of the area. What we have proposed is the construction/upgrading of a few main hiking trails, marked heavily with signage and tree markings in order to assure proper navigation. Also, trails would be bordered heavily with native species such as snowberry and sword ferns as a means of deterring visitors from straying off the designated path. Furthermore, the implementation of boardwalks in sensitive areas, such as trails in the vicinity of streams, needs to be implemented. This would also reduce any

further trampling of floral cover, soil compaction, and soil erosion as foot traffic would be directed away from ground cover, and onto a designated walkway.

6.5 Protection of Streams

The many streams of Mount Douglas Park are important to both the drainage of the area, as well as to fauna for a source of drinking water. When conducting site analysis we noticed many of the streams were obstructed by overlying dirt paths. Furthermore, the drainage systems installed, in hopes of creating flow through these overlying paths, were more often than not blocked due to dirt and debris being washed downstream and into these drainage pipes. We have suggested the removal of drainage pipes, and instead constructing arched bridge walkways over top of the streams in order to allow a more natural flow of water, reducing the chances of debris induced blockage.

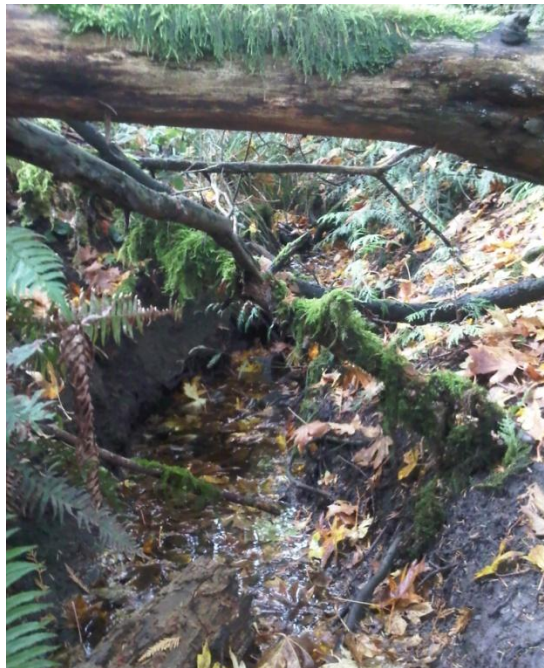


Figure 10. Creek

6.6 Community Involvement

A restoration project of this scale requires a large input of labour. The only way this is able to take place is through reaching out to the community. As outlined in goal 2, one of the responsibilities of the restoration project manager is the recruitment of volunteers. This could be done through social networking websites such as Facebook and Twitter, presentations at the University of Victoria, Camosun and other local colleges and secondary schools in order to inform students, posting of informative signs around the city and newspaper advertisements.

7. Monitoring & Evaluation

7.1 Goals & Objectives

As we know, nature is highly dynamic and impossible to precisely predict. We need to keep this in mind when considering an end goal to our restoration project. Although many of our goals may be met in the long term, restorative action is a continual process that needs constant monitoring and evaluating of the area in order to assure the ecosystem does not degrade back to pre-restoration conditions. In order to properly monitor our project, a running set of evaluations, reports, and steps taken along the way will need to be documented throughout the course of the project as a means of assuring that the project is going as planned, and on track with the described goals and objectives. Furthermore, these documents will be kept in a permanent database for historical purposes so that the site coordinator will be able to reflect on these in order to guide future decisions in terms of maintaining this area.

7.2 Evaluation

Site analysis and restorative action data as well as other information collected and archived will be subject to evaluation. Evaluation of data will be carried out by the project manager and other professionals contracted by the project manager as needed. These evaluations will be run by stakeholders and any community members interested in order to assure satisfaction.

7.3 Reporting

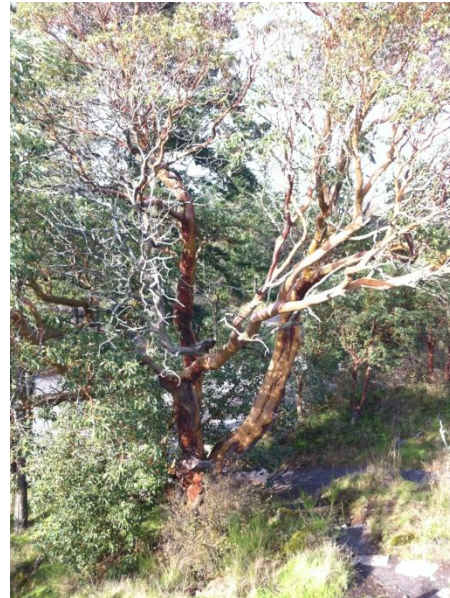
Yet another responsibility of the project manager will be to create written reports regarding different sections of the restoration project as well as the project as a collective whole. Reports will touch base on, but not be limited to:

- Goals and objectives, and whether or not that have adequately been met
- Future plans for the continued maintenance of the area, including a financial plan
- A list of the historic and restored ecosystem flora and fauna
- A plan for keeping invasive species at a minimum
- A plan for visitor relations and trail maintenance

8. Appendixes

8.1 Appendix A: Native Species

Arbutus tree (*Arbutus menziesii*)



Garry Oak (*Quercus garryana*)



Skunk Cabbage (*Symplocarpus foetidus*)



Snowberry (*Symphoricarpos albus*)



Sword Fern (*Polustichum munitum*)



8.2 Appendix B: Introduced Species

English Holly (*Ilex aquifolium*)



English Ivy (*Hedera Helix*)



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