Summer 2000

Tales From A College Intern: National Information Center For Ecology (NICE)

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INTERNSHIP REPORT

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INTERNSHIP REPORT

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Date 8/11/00
Western Washington University

Tales From A
College Intern:

National Information Center
For Ecology (NICE)

Internship Report Submitted to
Leo Bodensteiner
(Huxley College of Environmental Studies)
and the
WWU Honors Program

By:

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Bellingham, WA

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Introduction

Nearing my graduation from Western Washington University's Huxley College of Environmental Studies, I found myself seeking out an internship. Glancing through the various internship postings, I encountered a promising flyer: a local non-profit group called the National Information Center for Ecology (NICE) needed help with grant writing and habitat restoration projects around Bellingham. As a college student, I appreciate the value of obtaining funds, and since I plan to pursue graduate school, grant writing seemed a valuable skill to learn. Additionally, as an environmental science major, I believe firmly in restoring threatened and endangered habitats. Thus, this internship seemed right up my alley. The organization's director and I set up a two-quarter program, during which I aided with grant writing, conducted research for the group's newsletter, the Greenhouse Journal, and organized a stream restoration project for a local creek. This experience has taught me invaluable lessons about the challenges faced by non-profit organizations, politics, and soliciting community involvement in environmental issues.
The National Information Center for Ecology (NICE)

NICE is a local, non-profit organization dedicated to environmental stewardship projects around Bellingham. It was founded by a group of local scientists in January, 1999, and is currently headed by Curtis Wambach (M.S. Biologist). This group seeks to involve volunteers and interns of all ages in various community ecosystem restoration projects, as well as to raise awareness of local environmental problems. NICE's stated mission is to "provide research, publication, and technical services to support the restoration of wildlife habitat and the ecological conservation of plants, animals, and natural communities in the nation and in neighborhoods."

To accomplish this, Curtis has coordinated several community restoration projects around Bellingham. For instance, project coordinators and youth teams worked along sections of Fever Creek and in Roosevelt Park, removing garbage, rotting lumber, and other waste. In addition, they undertook planting projects designed to "shade out" the invasive Himalayan blackberry bushes that choke much of the creek. This last example illustrates NICE's policy of using mechanical, rather than chemical, methods to combat invasive species. Although the use of pesticides can have a more immediate impact, Curtis questions how dumping poisons into a creek really saves it.
As a non-profit group, NICE receives most of its funds through grants. Curtis once stated that the organization avoids seeking money from large businesses, such as Georgia Pacific. He commented that NICE does not want to be burdened with "politically-motivated" monetary donations; he feels that this would hamper the scope of projects NICE could undertake.

The Internship

During my first interview with Curtis, he asked me what I hoped to get from the internship. "What's your background? What do you want to do?" I told him about my interest in restoration and my background in ecology, particularly freshwater ecology. My intention in taking this internship was to gain experience in as many areas as possible. The internship, then, was divided into two parts: Winter Quarter 2000, was devoted to some of the "background" operations of a non-profit organization—grant writing, research and writing for the Greenhouse Journal, and soliciting funds through advertisements in the Journal. Spring Quarter 2000, meanwhile, was an opportunity for me to organize a stream restoration project along Fever Creek using grant money that came in during Winter Quarter.
Grant writing

Over the course of this quarter, I primarily helped with grant writing and research for the Greenhouse Journal. My first task was to proof-read a grant just days away from being submitted; this particular grant, like several of those I later worked on, dealt with improving local creeks to benefit salmon runs. Two grants that I worked on - one from the Whatcom Land Trust, the other from the Whatcom Community Foundation - solicited funds for improvements of Padden Creek. In particular, Curtis was hoping to get permission to build storm water retention ponds along Old Fairhaven Parkway. The goal of a retention pond is to provide more settling time for runoff from the roads, the hope being that more pollutants will settle out of the water before it joins the creek. These grants are still in process, so I do not know the outcome.

Another grant I worked on involved private property. The Kelsey family wanted a parcel of its old farm land to be converted to a nature education site for school children. Given that Himalayan blackberries and other invasive weeds are overrunning the parcel, the initial stages of the project would involve clean-up activities around the property: removing weeds, dismantling dilapidated buildings, and filling an old well. In cooperation with Whatcom County Parks and Recreation,
NICE hopes to plan youth service programs designed to clean up and maintain the property, and in so doing, to give students a chance to learn why and how to preserve wildlife and natural places in their communities. This grant, too, has not yet been fully processed; however, it has passed through the early stages of evaluation.

*The Greenhouse Journal*

In addition to grant writing, I prepared two articles for the *Greenhouse Journal*, NICE’s newsletter. The first article covered the practice of wildcrafting – gathering plant material from its “wild” environment. Michael Pilarski, a lead member of the Friends of the Trees, invited a representative of NICE to his workshop about sustainable wildcrafting. Pilarski’s main message was that people should only collect herbs from healthy populations of non-rare species. He also highlighted several uses to which wildcrafted herbs could be put: In addition to circulation within the “herb trade,” wildcrafted plants can be transferred to nurseries, used in restoration planting, or can be applied to permaculture activities.

The second article provided an overview of the Water Resource Inventory Area (WRIA) 1 Nooksack Watershed Management Program. I focused primarily on the watershed analysis approach adopted by the Initiating Governments of WRIA 1 – the City of Bellingham, Public Utility District No. 1, Whatcom County, and
the Lummi Nation. The approach is two-tiered: Phase I (currently in progress) encompasses an assessment of currently available hydrologic data — how much water is available and how that water is stored or lost. Phase II will involve a quantitative evaluation of ground- and surface water resources throughout the watershed.

In looking through the information available about this watershed analysis, I discovered that water quantity and flow are taking precedence over water quality. The overriding opinion among those in charge is that water in the Nooksack River basin is of good quality, hence this factor is less of an issue. However, the area sustains logging, agriculture, municipal, and industrial activities, all of which can (and do) impair water quality. For example, agricultural runoff has caused high concentrations of coliform bacteria in the lower reaches of the Nooksack River. So, while it is important to budget the area’s water resources, the Initiating Governments of WRIA 1 must bear in mind that there are sources of pollution threatening the resources of WRIA 1 and that water of poor quality will not well serve future residents.

Spring Quarter 2000

At the end of Winter Quarter, NICE received a $5000 grant from the Battelle company for the purpose of continuing
restoration efforts along Fever Creek. Because Curtis was working down near Seattle as a consultant, he delegated organization of a restoration project to me. His original intention was to continue previous NICE work in both Roosevelt Park and along the Xenia Street stretch of Fever Creek. However, work in the Roosevelt Park area was not feasible, so I concentrated exclusively on the Xenia Street portion.

Fever Creek

Fever Creek is a tributary of Whatcom Creek, and spans the area between Barkley Boulevard to the north, Niagara Street to the east, Interstate 5 to the west, and Whatcom Creek to the south (Figure 1). The headwaters, including the Fever Creek Wildlife Pond, sit just south of Barkley Boulevard and east of Saint Clair Street. Along various reaches, the creek is surrounded by forested, wetland, and un-forested areas (Colebrook 1996). The headwaters are mostly forested; the Roosevelt Nature Area is situated just west. The creek flows in its natural channel from the headwaters to Illinois Street, where it has been channelized and restricted to culverts. Development along the lower reaches of the creek has all but eliminated any riparian and buffer areas; consequently, the creek does not serve as a wildlife corridor or provide recreational opportunity (CBPCD c. 1997).
Figure 1. Geographic expanse of Fever Creek, Bellingham, WA. (BPD Accessed 2000 June 27)
Land use around Fever Creek is largely light industrial and urban residential. Not surprisingly, these human influences have impacted the creek. In fact, Fever Creek is one of Bellingham's most impaired waterways. A 1999 Washington State Department of Ecology (DOE) report identified several contaminants of concern within Fever Creek: fecal coliforms, heavy metals (copper, zinc, mercury), and several semivolatile organic compounds. Of those semivolatile compounds found, five were present at concentrations exceeding National Toxics Rule human health criteria in water (Serdar and others 1999). Sources of fecal coliform include runoff from pet waste, hobby farms, leaky septic systems and sewage pipes, and wildlife. Semivolatiles generally stem from incomplete combustion of fossil fuels and wood, petroleum products, plastics, and adhesives. The sources of the metals within Fever Creek have not yet been clearly established. However, zinc concentrations are "probably toxic to aquatic life" (Serdar and others 1999).

November, 1999

On November 7th, 1999, NICE and a team of over 70 volunteers first worked along the stretch of Fever Creek between Alabama and Xenia streets. This reach of the creek is part privately owned by Al Davenport and part city-owned. Prior to the restoration efforts, Himalayan blackberries dominated the riparian zone vegetation. These invasive plants had begun to
choke the creek, and were preventing native plants from colonizing the area. Furthermore, the blackberry bushes themselves provide poor habitat for riparian zone wildlife. Additionally, because this stretch of the creek provides a convenient short-cut between Yew Street and Alabama Street, there were considerable amounts of litter.

Using strictly manual labor, the restoration crew cleared many of the blackberries and tubs of garbage. Then, NICE planted over 300 native trees and shrubs, including cedars, hemlocks, and Douglas firs, along the privately-owned stretch of the creek. Volunteers then spread mulch, which provides nutrients, prevents erosion, and suppresses undesired vegetation.

March-May, 2000

Because of NICE’s policy of no-chemical restoration, maintenance is inherent to the success of any of the group’s projects. Consequently, since so much work was done along the Xenia Street stretch, Curtis opted to apply the Battelle funds toward a maintenance-oriented restoration project of that same area during Spring Quarter. As Curtis was involved in a bioassessment elsewhere,\(^9\) he asked me to pull together a work party for this project.

Curtis referred me to his friend Larry Williams in case I needed help with the project. As it turned out, that was the
most useful advice Curtis gave me during the quarter. Larry, a local contractor, has a keen interest in repairing and restoring Bellingham’s waterways. Despite not having formal training in stream ecology or restoration, he has devoted much of his time for the past nine years to helping restore local streams, hence has a certain feel for how streams (should) work, and what kinds of projects restoration entails. Additionally, because of his background as a contractor, he was of great help in tracking down the necessary tools for the job.

During our first conversation, Larry gave me some of his own insight based on his years working as a volunteer. He noted that restoration work has to be made fun for people: “Removing blackberries is blah. Saying that the restoration will help fish appeals to people’s empathy. Restoration efforts need to emphasize cooperation, that is, people working and playing together.” He suggested that I advertise the work party as a fun, social event, rather than a day of grunt labor. Having been a volunteer, and now having headed a restoration effort, I could not agree with him more.

Before any work was done, I needed to check with the Bellingham City Planning and Development Department and Al Davenport. I needed to get the Planning Department’s permission to work on the city-owned stretch of the creek, and was also looking to see if the city would match any of the project funds.
As none of the work was to be done within the stream channel, no permits were necessary. Working with Kim Spens of the Planning Department, Curtis, and Larry, I pulled together a project budget, for which the city agreed to match $500. Al Davenport was very enthusiastic about continued work on the creek, and immediately gave me permission to work on his property.

After obtaining permission from the landowners involved, the first step was to decide on a date and get the word out. Originally, Curtis intended the restoration project to be a two-day, consecutive weekends event. Thus, given my schedule, the first day fell on May 13th, Mother’s Day Weekend. The goal was to use public service announcements and flyers to spread the word quickly about the first day; once things started moving forward on that, the second day was to be publicized. Unfortunately, it took too long to get the ball rolling, and it quickly became apparent that a second work party scheduled for the following weekend would not be feasible. Thus, by the end of April, my efforts were concentrated solely on the work party on May 13th.

I tried to publicize the event using a variety of means. First and foremost, I used public service announcements in area newspapers, community postings, and radio stations. Then, I prepared and distributed flyers around downtown Bellingham and Western Washington University’s campus. I also made phone calls
to area group organizations — such as the Shalom Center, the Boy Scouts, and the Boys and Girls Club — hoping to get a couple of groups to commit their time. I further discovered (during the week before the restoration date) that Bellingham has a Volunteer Services hotline, which connects project leaders with interested people in the community; at that late a date, I was unable to utilize this service effectively, but for future reference, I now know it exists.

Once the publicity portion of the project got underway, it was time to ensure that the volunteers would have both equipment and goodies once they arrived. Larry aided me with tool acquisition. Before deciding on which tools to purchase, Larry and I did a visual assessment of the project area. Since November, it appeared that most of the plants had survived and were doing well. Also, the mulch put down in the November project was still in evidence, protecting the plants. The blackberries had not made a significant resurgence, although it was evident where root balls had been missed. Instead, Morning Glory — another invasive weed — had begun to take control of the area, especially along the city-owned stretch. Thus, we opted to go for shovels to remove the remaining blackberry root balls, loppers to deal with persistent blackberry stems, pitchforks for handling the mulch, and gloves. He told me of a local tool place called Northwest Handle, which reconditions tools and
sells them for reduced prices. Just for comparison, I checked out tool costs at some other area hardware stores. In all, I got three times as many tools — with a better variety, as well — by purchasing from Northwest Handle. Larry also agreed to lend his work truck and wheelbarrows to the project.

Finding mulch was a bit trickier. Bellingham has a variety of private businesses (primarily tree services) that have access to mulch. Of those I contacted, only one said it had mulch on-hand, and that company was not able to deliver it in the time frame needed. The city, however, donates mulch to projects such as this; working with Larry and James Luce of City Parks, I managed to obtain enough mulch for this particular project, to be delivered on the project date.

Requests for food donations, as I discovered, sometimes need a bit of processing time. For example, Haggen and Fred Meyer require at least two weeks notice for donation requests. After calling around, I managed to get goodies from Haggen, the Bagelry, and the private landowner, Al Davenport.

By the time the restoration date rolled around, I had firm commitments from several of my friends, Larry, and Curtis’s wife that they would attend. Otherwise, I had little idea if anyone would come. By 9:30 am, the equipment, mulch, and a small group of people had arrived to work the creek with me. As it turned out, only a handful of people came, but they worked
enthusiastically, and so made a visible difference over the course of the day. We dug up root balls, untangled Morning Glory, picked up trash, spread fresh mulch in thick mats along both the private and city-owned reaches, and created a drainage channel for a pipe jutting out from under an adjacent property.\footnote{11}

As we worked, KVOS (TV 12) stopped by to videotape the restoration project in progress. Last November, Curtis had invited them out to film the project. After hearing of its success, TV 12 requested to know of any future NICE projects along Fever Creek. Curtis, who was in the area for a wetlands conference the week prior to the restoration date, did an interview while he was in town; the camera crew stopped by during the late morning as we were all clearing out weeds and building the drainage ditch.

\textit{In Retrospect}

I suffered some anxiety over this project, given that Curtis was otherwise occupied throughout the whole process, despite attempting to be involved. I think that things would have progressed more efficiently had he simply turned 100\% of the operations over to me; timelines would have been met sooner, which would have facilitated the entire process.

However, having to otherwise coordinate the project by myself, I learned a lot from it. For example, I am now familiar with writing and distributing public service announcements, and
with various community-based volunteer networks. Additionally, I have seen how much work goes into putting a restoration project together — in terms of the details, i.e. finding funds, applying them as efficiently as possible, getting them matched, obtaining donations, and publicizing the event, and in terms of motivating citizens to contribute their time and energy. I think that nailing down firm commitments from groups would have significantly increased the number of volunteers present. I also believe that picking a day other than one on Mother’s Day weekend (and other such days) for the project would have been beneficial. Additionally, as I alluded to earlier, I did not give enough notice about the project and did not distribute the information as widely as I could have. In future restoration efforts, lessons learned from these mistakes will no doubt prove valuable in putting together a more lucrative work party.

In Conclusion...

This internship was my first real opportunity to put my ideologies to work. It gave me a chance to apply the things I have learned in class to a real-world project. By working with a local non-profit, I discovered a lot about the community in which I live and about how hard a job protecting the environment can be. My personal interest in saving the environment, coupled with going to Huxley where most of my peers think similarly,
sometimes blinds me to the fact that, while many people are concerned about the environment, protecting it often does not top their list of priorities. I now see it as a challenge to transform that concern into the motivation for action. It appears that restoration projects need to be advertised by playing on people’s sympathies for quality of life factors, such as salmon, water quality, and the protection of the environment for future generations. Community members need to identify with the environment to appreciate why it needs to be restored.

In this country, the grassroots-level organizations are typically the most visible crusaders for the environment. Their task is not a small one, as work with NICE has shown me. Local interpersonal politics, the quest for funds, and the need for volunteer effort to accomplish even the smallest tasks are all hurdles for the small non-profit group to clear. But success is possible, and a little volunteer effort can go a long way, as I have seen. However, the success of a non-profit group necessarily rests on a solid administrative framework. If the business aspects of the organization are not well ordered and maintained, then no project gets the focus it needs to truly succeed. Curtis, for all his good ideas for restoration projects, had too much on his agenda to be effective in organizing and conducting any of them.
While I certainly would not be averse to working for a non-profit organization again, I would opt for a larger group. Working with Curtis demonstrated that, for an ambitious non-profit to succeed, more than one person needs to be actively involved in running the operation. The interns were not organized enough to substitute for Curtis in the managerial sense when he left for King County, and the overall workings of NICE suffered as a consequence. However, NICE has conducted some quality restoration projects; if Curtis would take the time to hire and train an office assistant, the organization could continue to make a significant impact in and around the Bellingham community.
Endnotes

1 Taken from the February 2000 issue of the Greenhouse Journal.

2 Curtis also originally intended for me to test water quality in Fever Creek. However, it took so long for the equipment he wanted to arrive that water quality monitoring no longer worked into my schedule.

3 Refer to Appendix A for a copy of this article.

4 Refer to Appendix B for a copy of this article.

5 Some of these sources were printed material, but most information came from Washington State University’s WRIA 1 Project website. These are referenced in Appendix B.

6 The Battelle corporation develops new technologies and products for both industry and government. The company’s goal (as stated on its website) is to "insert technology into systems and processes for manufacturers, pharmaceutical companies, and government agencies supporting energy, the environment, health, national security, and transportation."

7 Fever Creek is subject to some rather intense personal politics. A resident of the Roosevelt neighborhood has taken a keen interest in restoring the creek, just as Curtis has done. The resident has become rather territorial about the creek, particularly the section running through the Roosevelt neighborhood and park area. The City Planning Department, in an effort to minimize conflict (and headache to them, no doubt), put the brakes on NICE doing any further work in the area for the time being, despite the significant efforts made by the organization over the past year.

8 Caffeine was detected in the Fever Creek sampling locations. This caffeine could be an indication of human sewage, most likely caused by leaky septic tanks, combined sewer overflows, or illegal domestic sewer connections (Serdar and others 1999).

9 Curtis operates a consulting firm in addition to orchestrating NICE. He was hired for a bioassessment down in Renton for the entirety of Spring Quarter. Consequently, I was left largely to my own devices to try to put a project together.

10 In its previous projects, NICE borrowed tools from the Roosevelt Neighborhood Association and from Larry Williams. As the Roosevelt neighborhood was not involved in this project, I did not seek the use of its tools. Furthermore, Larry was adamant that NICE build its own tool base; he was concerned that the organization was relying too heavily on his personal stock of tools, and that volunteers might damage them.

11 Refer to Appendix C for pictures of the restoration project.


References

Papers and Reports


World Wide Websites

APPENDIX A:

Wildcrafting and Medicinal Herbs

Wildcrafting and Medicinal Herbs

On Sunday, January 23, 2000, Michael Pilarski, of The Friends of the Trees, hosted a workshop on the wildcrafting—gathering plant material from its “wild” environment—of medicinal herbs in the Pacific Northwest. Pilarski’s passion came alive when speaking of studying and collecting regional herbs. He has compiled a non-exhaustive list of over 250 northwest native plant species with known medicinal properties. Pilarski, along with many other herbalists and wildcrafters, stresses the need for ethical collecting. The primary concern is depletion of plant stocks due to overharvesting and uninformed gathering of threatened or endangered plant species. A 5-10% harvest of a healthy stand is commonly recommended; this minimizes impacts on the ecosystem by leaving the bulk of the stand intact for reproduction and wildlife. In addition to harvesting medicinal herbs judiciously, Pilarski suggests that plant salvaging and the use of native medicinal plants in restoration projects can help make the wildcrafting of medicinal herbs a sustainable practice.

In his Resource Guide to Sustainable Wildcrafting & Medicinal Herbs in the Pacific Northwest, Pilarski identifies eight “sustainability categories.” At one end of the spectrum are abundant, non-native invasive species. At the other end are native plants that are officially classified as rare, hence are illegal to harvest. Between these extremes are native plants which are abundant locally but rare throughout their range and native plants which are rare locally, but which may be plentiful elsewhere in the region. Plants that are rare but legal to harvest should be collected prudently, Pilarski concludes, so that native plant stocks are not irreparably diminished. In addition to the 5-10% harvest guideline, many wildcrafters suggest only harvesting from large, healthy stocks, never harvesting protected plants or plants sensitive to disturbance, and only harvesting what you can process and use. Howie Brounstein, another Pacific Northwest wildcrafter, advises that, “When in doubt, don’t pick it.”

Once harvested, wildcrafted herbs can be circulated into the “herb trade,” transferred to nurseries, or used in restoration planting. Currently, there is little regulation of medicinal herbs; however, the U.S. Forest Service and Department of Natural Resources are beginning to formulate a set of rules. Presently, it is illegal to harvest plants from designated wilderness areas or state and national parks. On other state lands, some harvest is allowed with a permit. On private lands, the landowner must give permission and may require a fee. Pilarski made special note of the fact that the lack of regulation allows some larger corporate wildcrafting outfits to gather their wares irresponsibly. He urges people to work with smaller wildcrafters, who can more clearly identify the sources of the herbs they sell.

An activity related to wildcrafting is plant salvaging. It has become common practice for plant cultivators to collect plants in areas destined to be clear-cut, networked with roads, or otherwise developed. Such areas are windfall opportunities for wildcrafters. Generally, wildcrafters seek “pristine,” largely untouched areas for their herbs. Harvesting plants from areas slated for development allows wildcrafters to gather plants that would otherwise be lost permanently. Consequently, salvaging has the opportunity to reduce pressures on other wild stands and to potentially maintain the gene pool of commonly harvested herbs.
In addition to salvaging, wildcrafting can be applied to restoration and permaculture activities. For instance, many restoration projects involve the use of herbicides to remove non-native invasive species from the site. Common non-native species harvested in wildcrafting yet undesired in restoration sites include St. John’s Wort, Himalayan blackberry, and scotch broom. Such plants could be harvested from a restoration area, thereby ameliorating the need for chemicals. Additionally, plants harvested and/or cultivated through wildcrafting can be re-planted in restoration projects. Pilarski advocates the replanting of native plants with multiple beneficial properties, including medicinal applications. He figures that the utilization of these plants in restoration projects would not only bolster native plant populations, but would also serve to help people. In other words, we could have our cake and eat it, too. Pilarski has defined permaculture, derived from “permanent agriculture,” as a land use system that promotes stability in society, utilizes resources in a sustainable way, and preserves wildlife habitat and the genetic diversity of wild and domestic plants and animals. Harvested or salvaged plants could be transplanted into permaculture agricultural areas, which use non-chemical means to grow crops. For example, ladybugs are used in lieu of pesticides to control aphids.

As more and more people accept alternative medicines and look to nature for treatments and cures, wildcrafting is becoming increasingly popular—both the act of wildcrafting itself and the plants made available to the general public. Michael Pilarski is among the wildcrafters who actively teaches others about the trade, offering much insight and information to the Pacific Northwest’s medicinal plants. He and other wildcrafters foresee the depletion of wild plant stocks, hence urge ethical collection of plants. Additionally, Pilarski notes that wildcrafting can be applied to restoration efforts, through salvaging, removal of unwanted non-native species from a restoration site, and re-vegetation of an area with native medicinal plants.
APPENDIX B:

Water Resource Inventory Area 1

Water Resource Inventory Area 1

WRN 1 Nooksack Watershed Management Project

Over the past few years, people have become increasingly aware of and concerned that high utilization of water resources in Washington watersheds has significantly reduced in-stream flows for fish and other users. In response, various actions have sought to address water use issues by looking at the watershed scale, a watershed being an area where surface-water drains into a common body of water—a lake or stream. For instance, in 1998, Washington was divided into 62 water resource inventory areas (WRIAs), the Nooksack watershed being WRIA 1. Similarly, the 1998 Watershed Management Act (WMA) has sparked local activity to monitor and manage the water resources of the Nooksack drainage basin.

The WMA urges and provides funding for local watershed planning. Such planning must assess current water availability and project future water allocation capacity. The WMA stipulates that if local representatives of the WRIA can (1) work together to make scientifically sound assessments of the problems; (2) collaborate to form a Planning Unit; (3) make agreements between affected parties; (4) adhere to federal, tribal, state and local laws; and (5) create a comprehensive watershed management plan and implementation strategy, then state agencies will observe locally determined decisions. "Initiating Governments"—including (for WRIA 1) the City of Bellingham, Public Utility District No. 1, Whatcom County, the Lummi Nation, and the Nooksack tribe—establish the watershed plan for their WRIA. Additionally, the U.S. Geological Survey has provided both technical information and funding.

The watershed analysis approach chosen for WRIA 1 is comprised of two phases. The first phase, which is presently underway, entails the compilation and assessment of currently available hydrologic data. This data will be used in the second phase for a quantitative evaluation of ground- and surface-water resources throughout the watershed.

To assess water resources, the Initiating Governments must examine the hydrologic conditions of the watershed combined with human influences in the area. WRIA 1 has two hydrologic zones: upland areas with steeply graded streams that cut through bedrock, and lowland areas with slightly graded streams that cut through glacial and interglacial sediments. Recharge of the aquifers comes primarily from precipitation. The Nooksack River, the primary surface-water resource, is fed largely by precipitation, discharge of ground water, and glacial
meltwater. Most residents of WRIA 1 live in the lowland areas. Land-use activities include 
municipal development, agriculture, industry, and recreation. Not surprisingly, the lowlands 
surface-water system has been significantly modified by people: drainage systems have reduced 
the number of swampy areas, which help regulate water volumes by storing excess water during 
times of high precipitation and slowly releasing water during times of drought; the Nooksack 
River has been redirected in places to minimize flood damage; and a diversion from the Middle 
Fork supplements Bellingham’s water supply.

In predicting future water allocation resources, the Initiating Governments must 
formulate a water budget. This budget must account for water inputs (precipitation, water stored 
in aquifers) and outputs (runoff, water pumped from wells, evapotranspiration—the water 
evaporated from soils and wet plant surfaces and water transpired by vegetation). Land use 
practices can significantly influence evapotranspiration rates, surface-water runoff volume and 
timing, and recharge of the ground water systems. For example, pavement diminishes 
evapotranspiration, increases runoff, and limits aquifer recharge. Consequently, land-use must 
be analyzed in making a model to quantify WRIA 1’s current and future water budget.

The Nooksack Watershed Management Project aims to protect area water resources for 
present and future generations. Project planners are now assessing current water resource data. 
The Initiating Governments will ultimately use this data to balance competing demands for water 
across the entire WRIA.

Water Quality

As currently formulated, the Nooksack Management Plan primarily addresses issues of 
water quantity; however, an equally pressing concern is water quality. After all, even if there are 
sufficient water resources to support people and wildlife, those water resources are of little use if 
the water quality is impaired.

Typical water quality parameters—such as pH, turbidity, dissolved oxygen, coliform, and 
nitrates—measure the physical, chemical, and biological characteristics of a given body of water. 
Washington State has established a set of standards based on these parameters and devised a 
classification of state waters. Common sources of pollutants are either point (enter water from 
an outfall or discrete point) or nonpoint (travel in run-off and seepage). The National Pollution 
Discharge Elimination System (NPDES) regulates point sources; the NPDES process, which is
administered through the Environmental Protection Agency, issues permits that limit the kinds and quantities of pollutants a discharger can put out. Nonpoint sources are more difficult to control.

Much of the surface water in WRIA 1 is of good quality. However, logging, agriculture, and municipal and industrial discharges have impaired certain areas of the watershed. For example, agricultural run-off has caused high concentrations of coliform bacteria in the lower reaches of the Nooksack River, a violation of state standards. Coliform bacteria, such as escherichia and enterobacter, are indicators of water quality. Although they are relatively harmless, scientists have discovered that they occur in water supplies contaminated by harmful bacteria, viruses, and parasites.

Nooksack River

Take the Nooksack River as a case-in-point. The Nooksack is the largest, most important river system in WRIA 1. The river and its tributaries drain over 576 square miles of mountainous terrain with a total average runoff of 2,400,000 acre-feet/year, half of which is contributed by the North Fork. The upper sections of the three major forks are largely undeveloped. However, in the North Fork, the Puget Sound Power Company owns and operates a diversion, and some farming and grazing occur in the bottomlands. The Middle Fork diversion supplements Bellingham’s water supply. The city has a water right permit that allows it to divert up to 125 cubic feet per second from the river. Once delivered to Lake Whatcom, the city can store up to 20,000 acre-feet. This added water supply helps support local industry. The South Fork sustains farming and grazing activities in the lowlands. Near Deming, the three forks converge to form the mainstem, along which there is intensive agricultural activity. Additionally, a number of communities—including Lynden, Ferndale, and Everson—are located along this stretch of the Nooksack. Drainage ditches, loss of marshy areas, and increased run-off from more urban areas all impact water quality, exacerbating the influences of logging and agriculture up-river. Fecal coliform contamination is found at levels exceeding state standards throughout the watershed. Additionally, some waterways, such as Fever Creek, showed excessive amounts of metals (copper, mercury, and zinc).

Water quality concerns must necessarily be considered in any water resources management plan. Although the WRIA 1 contains relatively high-quality water at present, the
land use practices that reduce water quantity also impair water quality. Of particular concern is the presence of fecal coliform throughout the watershed, due largely to agriculture and dairy operations throughout the area. Thus, in addition to balancing competing water demands (water quantity), the Initiating Governments must formulate a plan to protect water quality in WRIA 1.

Sources

http://wria1project.wsu.edu
http://wa.water.usgs.gov/wria1
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Sources

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APPENDIX C:

Photos from the restoration project
November, 1999, Xenia Street Fever Creek restoration pictures

**Before Picture.** Curtis Wambach is looking daunted at the huge project ahead in removing the mountain of tangled tendrils of the Himalayan blackberries in this creek valley. NICE restored this neglected section of Fever Creek for the City of Bellingham.

**After Picture.** Throughout the day, nearly 100 volunteers cleared the mountain of tangled blackberry bushes, dug out thousands of blackberry roots, and planted 400+ native trees and shrubs from one gallon snowberry to 6 foot tall hemlocks.
May 2000: Before shot of the hedge row along the city-owned stretch of Fever Creek.
May, 2000, Xenia Street Fever Creek restoration "during" pictures

May 2000: Volunteer hard at work

May 2000: Two of the younger volunteers attacking blackberry root balls.
May, 2000, Xenia Street Fever Creek restoration “after” pictures

May 2000: Mulch will help suppress weeds and provide nutrients to growing plants.

May 2000: End-results along Al Davenport’s property...
May 2000: Mulch along the stretch of the city's property.

May 2000: An improved drainage ditch to channel this water (city stretch of the creek).
May 2000: After picture of the hedge row along the city-owned stretch of Fever Creek.