Thornton Creek Draft Watershed Action Plan

Prepared by the
Thornton Creek Watershed Management Committee

Working Draft

Seattle Public Utilities

With a loan from
Washington State Department of Ecology

May 11, 2001 Version

Chapter 1

Introduction

This Action Plan summarizes a three-year planning effort developed by the Thornton Creek Watershed Management Committee. The mission of this Action Plan is to

- Restore the Thornton Creek ecosystem for the welfare of fish, wildlife and people
- Improve the quality of life in the watershed
- Prevent further degradation of Thornton creek watershed as population and development increase

This plan primarily addresses non-point pollution, which is pollution that comes from dispersed sources, such as homes, businesses, streets, and erosion. Excess storm runoff from development is also recognized as a form of non-point pollution. This plan goes beyond pollution control by integrating actions to improve stormwater management, to improve the overall biological health of the watershed, and to increase public awareness and stewardship.

Watershed-based planning has been recognized as one of the most effective approaches to reducing non-point pollution since the late 1980's. The planning process involves various responsible agencies and community stakeholders. This draft Watershed Action Plan will be formally reviewed by the public, all affected local agencies, affected Tribes, state and federal agencies. In addition, the Thornton Creek Watershed Management Committee will sponsor a public meeting to hear comments on the Plan.

Description of the Thornton Creek Watershed

Thornton Creek provides the natural drainage for its 7,263 acre (11 sq. mile) watershed. (A watershed is the land area, bounded by hilltops and ridges, which drains to a particular stream, river, or other water body.) Thornton Creek Watershed is located in northwestern King County between Puget Sound and Lake Washington (Figure 1). It is an urban watershed, partially situated in the City of Seattle, one of the oldest and most developed areas in the Puget Sound region, and partially in the recently incorporated City of Shoreline (figure 2).

An estimated 75,400 people live in the watershed, and thousands more work within its boundaries. The watershed is home to Northgate Shopping Center, America's first and oldest shopping mall. A three and a half mile stretch of Interstate 5, the State's busiest highway, with daily traffic of over 187,000 cars, passes through the watershed. Vibrant communities, such as Lake City, are located in the watershed. As the Puget Sound region grows, additional people and buildings, wider roads and more community services will be located here.

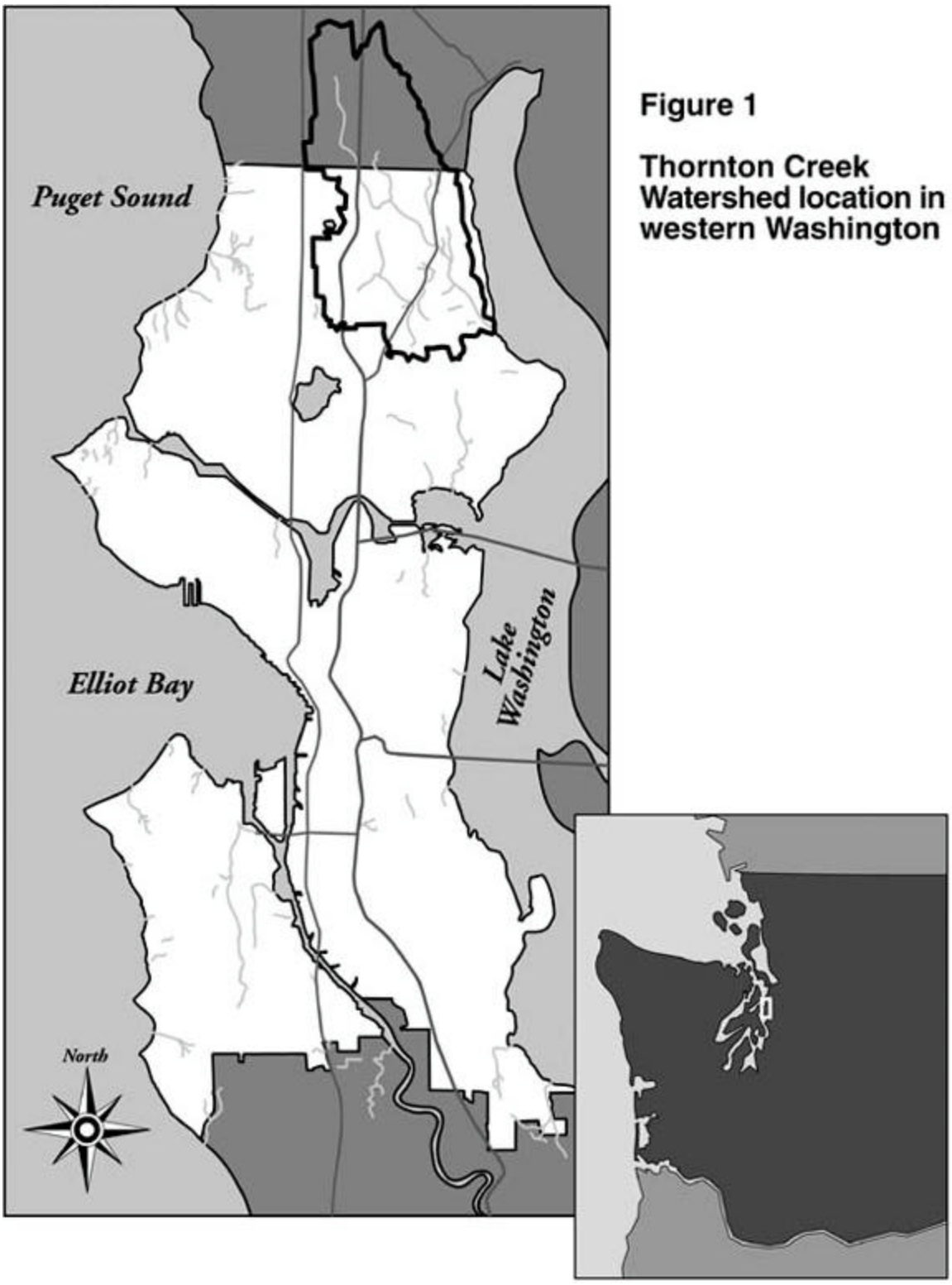
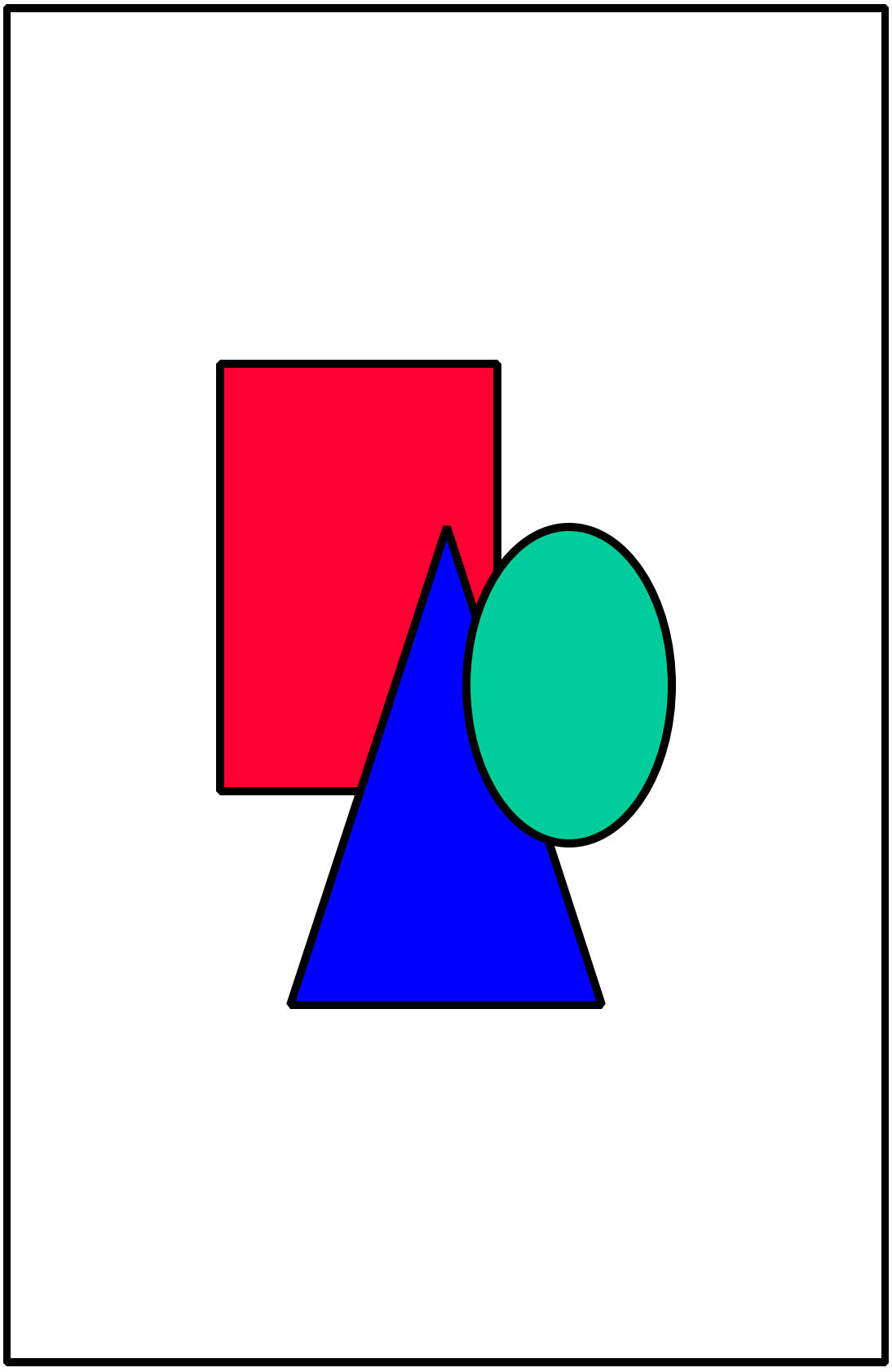


Figure 1

Thornton Creek Watershed location in western Washington



In many cities, people have been disappointed by the loss of their creeks as they were channeled into drainage pipes. Within Seattle, community groups have sought to raise millions of dollars to reverse this process and "daylight" piped creeks, returning them to the surface and recreating riparian corridors. As this watershed developed, most of Thornton Creek was spared the fate of being forced into a network of pipes. Over 90 percent of the creek's main channel – more than 15 miles – flows as surface water, above ground toward Lake Washington and eventually into Puget Sound via the Ballard Locks. Thornton Creek flows through more than 700 backyards and more than 15 parks and natural areas.

The community takes pride in this watershed. Despite heavy growth, this area has retained a more rural character than many other Seattle area neighborhoods. This is due in part to the creek, numerous parcels covered with large evergreen trees, and a lack of curbs and sidewalks. Thornton Creek watershed residents enjoy knowing a coyote family may move into the watershed to take up residence beside raccoons, river otters, and possums. Residents can see blue heron and the occasional bald eagle flying overhead. Some salmon still return to the creek to spawn, although not in their historical abundance. These symbols of the Pacific Northwest are located only ten minutes from downtown Seattle. However, the community is in jeopardy of losing these and other watershed treasures to future urban growth.

Thornton Creek Watershed Action Planning

The Thornton Creek Alliance (TCA) was instrumental in getting Seattle Public Utilities (SPU) to apply for and receive a Centennial Clean Water loan from the Washington State Department of Ecology (DOE, or Ecology) to develop the Thornton Creek Watershed Action Plan.

The watershed planning process involves several key steps that include:

- A watershed management committee
- A characterization report and water quality assessment
- An action plan
- Public participation

Watershed Action Plans have been adopted by Seattle City Council and approved by Ecology for two other Seattle watersheds, Pipers Creek in 1990 and Longfellow Creek in 1992. Since then, millions of dollars have been spent implementing many recommendations made in these plans.

Watershed Management Committee

The Thornton Creek Action Plan was written by a group of residents, state, tribal, city and county governmental agency representatives, and community, education, and business leaders, with staff support from SPU. Participating individuals and

organizations are listed on the first page of this Plan. Organized as the Thornton Creek Watershed Management Committee (Committee, or WMC), these people began meeting monthly in the summer of 1997. They reached consensus on a vision of the watershed's future and have spent many hours examining the condition of the watershed and considering what new actions are needed. Throughout the development of the Action Plan, the Committee sought advice and suggestions from people within the watershed.
The mission of the Committee is to restore the Thornton Creek ecosystem for the welfare of fish, wildlife, and people and to improve the quality of life in the watershed.

Public Participation

One of the Committee's first steps was to develop a public participation plan to ensure that anyone interested would have a voice in the process. The committee began by sending a newsletter to every household in the watershed in fall 1997 informing residents about the Action Plan process and inviting them to add their names to the mailing list.

In 1998, the Committee hosted a four-part lecture series at North Seattle Community College. Lecture topics included urban streams, salmon, local wildlife, nature-scaping (a type of landscaping using native plants), and "green" gardening tips. In June 1998, the committee held a public meeting to present background information about the watershed and problems found in the watershed.

The Committee formed partnerships with two local non-profit groups, the Thornton Creek Project and the Thornton Creek Alliance, to reach additional interested citizens. The Thornton Creek Project is a cooperative educational network among watershed schools, which uses Thornton Creek as its central focus. Thornton Creek Alliance is a grass roots umbrella organization formed by people living and working within the Thornton Creek watershed who are dedicated to preserving and restoring an ecological balance in the watershed. Numerous workshops, watershed tours, demonstrations at the Northwest Flower and Garden Show, and student assemblies were held. Numerous work parties encouraged people to see the watershed streamside parks and participate in their restoration. A web site, www.thorntoncreek.org, was developed by the Thornton Creek Project along with an on-line community library.

As a fun outreach component of the Action Planning process, a Thornton Creek Celebration was held at Matthews Beach Park on Lake Washington during a crisp, sunny, fall day in late September 1999. The celebration included work parties along and near the creek, distinguished speakers, the band "Thornton Creek," refreshments, educational booths, and family entertainment. The festival celebrated work done by watershed volunteers, and introduced visitors to the exciting work happening in the watershed. Organizers from the City of Seattle and the community hoped to establish the gathering as an annual event.

The *Committee* used additional outreach efforts during the development of the Action Plan to keep people informed of progress and encourage them to participate. The following methods were used, and will be used:

- A newsletter sent to people on the project mailing list.
- Public meeting to present implementation strategies.
- Educational workshops, work parties, and watershed tours advertised in local newspapers and to people on the project mailing list.
- Semi-annual updates mailed to local community groups.
- A web site www.thorntoncreek.org

Characterization Report

The Committee developed a Watershed Characterization Report, describing the character and condition of the Thornton Creek watershed in several parts, and published the report November of 2000. The first half of the report describes existing conditions. It presents geophysical, biological, historical, and demographic information on the watershed; and assesses the aquatic and terrestrial resources and water quality of Thornton Creek and its tributaries.

The second half of the report describes and evaluates actions that are currently under way to address problems in the watershed. These actions include laws, regulations, programs, incentives, maintenance and educational activities that currently work to protect the watershed. The Committee chose to present these actions as they relate to stormwater management, non-point pollution, habitat, and education/stewardship.

The final chapter summarizes the values and benefits the creek provides to the community, and sets the stage for the Action Plan by summarizing the challenges that remain in the way of restoring this watershed.

A set of maps, the *Thornton Creek Riparian Corridor Maps* (September 1999), were prepared as a companion document to this report. This map contains 14 sets of orthographic photographs matched with GIS layers showing the stream, parks, streets, parcels, and buildings. The maps were annotated to show areas with good habitat, steep slopes, problems, storm drains and other information.

The *Thornton Creek Watershed Characterization Report* and the *Thornton Creek Riparian Corridor Maps*, can be found at King County and City of Seattle libraries throughout the watershed, as well as the downtown Seattle library and several libraries at the University of Washington. North Seattle Community College and Shoreline Community College libraries hold copies as well. Perhaps most accessible, the Report can be found on the Seattle Public Utilities website in PDF format at the following address: <http://www.ci.seattle.wa.us/util/ThorntonCreek/default.htm>

Action Plan

Using the background information and problem analysis in the Characterization Report, the Committee developed this action plan to outline specific steps needed to control sources of non-point pollution and improve habitat and biological diversity. The Action Plan includes recommendations on enhancement of existing improvements and regulations, new projects, public awareness and education programs, water quality monitoring, maintenance activities, and community action.

The Action Plan describes specific actions, budgets, and schedules for implementation of the recommendations. Most importantly, it will include letters of concurrence, or commitment, from sponsoring agencies and organizations. When completed in 2001, the plan will be submitted to the Seattle and Shoreline City Councils, and Ecology for approval. Largely, the Cities of Seattle and Shoreline will implement the plan; however, other governmental agencies, volunteers, non-profit organizations, businesses, and individual landowners may complete other actions.

Setting Priorities

The Watershed Management Committee felt it was important to send a strong message to potential plan implementers about Committee priorities among chapters and among individual recommendations within chapters.

Ranking Chapters

In March 2000, the WMC set the order chapters would appear in both the Characterization Report and the Action Plan, understanding readers may interpret the first chapters as the most important. Although the WMC feels the plan's success hinges on a coordinated set of actions drawing from all plan chapters, the WMC started the documents with the issue they felt most needed attention in the watershed: stormwater. Therefore, chapter order, as voted by the WMC: Stormwater, Non-Point pollution, Habitat, Education and Stewardship, Regulation and Enforcement, Implementation, Monitoring.

Ranking Recommendations within Chapters

The Watershed Management Committee further refined their priorities within the plan by ranking individual chapter recommendations and setting "core" recommendations.

In Spring 2001, subcommittees for each action plan chapter ranked recommendations within chapters either "high", "medium", or "low," using criteria developed by the WMC. The closer the recommendation came to satisfying all four criteria below, the higher it was ranked.

Criteria which must be considered first (established 1-23-99 by the WMC committee):

1. The recommendation should further one or more goals, and not contradict any of the goals.

2. The recommendation takes into account the cost, what we get for the cost, and the cost of not doing it. We must consider how we'll get the most "bang for the buck," and alternately how much might be lost if the action isn't taken.
3. The recommendation must pass the "fist of five" (a voting method)
4. The recommendation must address the root problem, not just the symptoms.

Only after running each recommendation through these questions will it be subject to additional, more topic-specific criteria established for each section, e.g. habitat, stormwater, non-point etc.

Core recommendations

After each subcommittee ranked individual recommendations (action items), another subcommittee, consisting of one representative from each chapter, met to designate core recommendations, or actions of maximum urgency and importance.

A core recommendation is an action item that the WMC feels is of the highest importance and without which the plan could not be successful. Core recommendation status was given only to actions that haven't been implemented yet. Some actions that are considered core by the WMC did not make the list because the program or project was currently being implemented, paid for, or initiated by a local agency or organization. The core recommendations were compared to the foundation of a building, upon which other actions could be built over time, but without such a foundation, may fail or not happen at all. The core recommendations therefore represent the key actions to make this plan a success.

Table 1. Core recommendations

Chapter	recommendation	Description
Stormwater	A3	Modify City policies, codes, regulations, procedures and designs to promote infiltration.
	B2	Improve existing and create new regional detention facilities
	C3	Improve local stormwater collection systems
	E1	Promote water conservation, detention, and infiltration
	E2	Offer assistance to improve private management of stormwater
Non-Point Pollution	B3	Collect additional information on locations and frequency of exceedance of state standards for water temperature and dissolved oxygen.
	D1	Conduct an outreach and inspection program for priority commercial, multifamily, industrial, institutional and government-owned sites within the watershed.
	D2	Require source control best management practices (BMPs) be applied as appropriate to all construction sites in the watershed.
	E2	Continue, and improve where necessary, existing programs to inform the public about non-point pollution and how they can reduce it.
Habitat	A2	Help streamside property owners control erosion and improve habitat.
	A4	Conduct fish and wildlife surveys.
	C1	Develop guiding principles for in-stream restoration done by Seattle, Shoreline, or community groups.
	C3	Improve Thornton Creek Stream flows
	C5	Inventory, enhance, and maintain areas with good riparian corridor habitat.
Education and Stewardship	A1	(A) Create and produce a color brochure, which describes the watershed, (B) create welcome signs and creek crossing signs, and (C) create murals.

	B1 (A) (D)	(A) Watershed Interpretive Specialist (D) Watershed Education Coordinating Group.
Regulation and Enforcement	A1	Ensure proactive enforcement of existing watershed regulations
	A2	Enforce the Critical Areas Codes for each jurisdiction.
	A3	Advertise ways to report environmental problems.
Implementation	A1	Establish a permanent Thornton Creek Watershed Oversight Council
	A2	Develop and sustain the Thornton Creek Watershed Oversight Council
	A4	(A) Provide adequate staff to support the Thornton Creek Watershed Oversight Council and maintain communication. (B) Provide a Basin Steward/Watershed Coordinator (1 FTE).
	B1	Coordinate and integrate the Watershed Action Plan with other existing and future plans and improve efforts to coordinate plans.
	C1	Report regularly to the Watershed Oversight Council
Monitoring	A3	Monitor effectiveness of Capital Improvement Projects and other watershed projects affecting the health of Thornton Creek.
	A4	Develop ways of monitoring the impact of privately sponsored habitat improvements and flood relief projects along Thornton and its tributaries.

Chapter 2

Understanding This Document

Action Plan

This Action Plan contains specific actions, budgets, and schedules to restore this watershed. Strategies are presented as follows:

- Stormwater management
- Non-point pollution prevention
- Habitat improvements
- Education/Stewardship
- Regulations and Enforcement

In addition, Watershed Action Plans need to find ways to make the recommendations happen and assess whether the actions are working. Additional strategies are presented to address:

- Plan implementation
- Monitoring, analysis and evaluation.

Organization of Action Plan chapters

Each of the seven chapters of action plan strategies listed above begins with a problem summary or description of challenges on the chapter topic (e.g. stormwater, habitat, regulations and enforcement etc.) followed by a brief overview of current solutions to those problems and challenges. Following this, the Thornton Creek Watershed Management Committee has created a goal statement for each chapter. The goal statement is followed by objectives to reach the goal. Under each objective, recommendations that address the objective —or "action items"—are detailed in outline form.

How to Read Action Plan Recommendations (see example below)

- Title: Action Plan recommendations are listed in outline form under each objective, beginning with the title and description of the recommendation.

- Implementer: The "implementer" of the recommendation follows the description. The implementer is the agency, organization, or group responsible for initiating and managing the actions called for in the recommendation. There may be more than one implementer.

- Estimated Cost: The estimated cost for implementing the recommendation is listed next. Costs are broken down by individual implementer, and include the total lifetime cost of the recommendation unless listed as "ongoing" or as "existing budgets." "Ongoing" indicates a program or project planned to

continue indefinitely, and "existing budgets" indicates a program or project currently funded, or scheduled to be funded, by the implementer.

- Funding Source: Funding for recommendations may come from a variety of sources: City agencies, the County, non-profit organizations, or grant sources, to name a few. Where possible, the source of funds is listed.

- Schedule: Each recommendation has an implementation schedule, determined by the priorities of the Thornton Creek Watershed Management Committee and the resources of the implementer. Programs and projects that already exist are listed as "ongoing." Otherwise, the scheduled date establishes when an implementer is requested to begin work on the recommendation. Certain recommendations are more specific, listing the date by which a recommendation shall be complete or a program fully operational.

- Priority: Recommendations were given priority rankings of high, medium, and low using criteria established by the WMC. "Core" recommendations – actions of highest and most urgent priority – are also indicated here. (See page XX for an explanation of the ranking process, including core recommendations)

Example:

A1. Create maps showing infiltration (recharge) areas.
USGS: Complete efforts to map areas within the watershed that are suitable for infiltration. Also identify which areas are unsuitable due to poor soils, steep slopes, or other factors. Share maps with local governments.
DCLU and Shoreline PADS: Use these maps when examining drainage plans. Make these maps available to interested community groups.

Implementation:	USGS, DCLU, Shoreline
Estimated Cost:	USGS - $20,000 DCLU - $20,000 Shoreline PADS - $5,000
Funding Source:	USGS Hydrological mapping budget DCLU – existing budgets in land use department Shoreline Engineering Services budget
Schedule:	USGS completing a project in 2001 DCLU – 2002 Shoreline – 2010
Priority:	High

Benefits and Beneficial Uses of Thornton Creek

Thornton Creek provides a wealth of benefits to all the people, plants and wildlife living in and around the creek and in the watershed. The *Committee* began this planning process by identifying these benefits.

The Committee examined the list of beneficial uses developed by Washington State for Class AA Streams (WAC 173-201A) listed below.

- Fish and shellfish habitat (includes salmonid and other fish migration and spawning, rearing, and harvesting of fish and shellfish)
- Wildlife habitat
- Recreation
- Water supply (Thornton Creek used only for irrigation)
- Stock watering (not applicable due to the urban nature of this watershed)
- Commerce and navigation (not applicable due to the size of Thornton Creek)

After reviewing these beneficial uses, the *Committee* felt this list did not clearly describe the numerous benefits and potential benefits that Thornton Creek and its watershed provide. The *Committee* created its own list, which added benefits related to natural resources, community and quality of life, education and refuge. Many of these uses have been impaired or threatened by non-point pollution and other effects of urbanization.

These benefits guided the Committee in developing goals, objectives and strategies for the Action Plan.

Table 1 Potential Benefits Provided by Thornton Creek and its Watershed, WMC 1998

Water and Air Resources

- A year round supply of clean water.
- A natural drainage system for the watershed.
- Wetlands that provide flood control and water quality improvement. .
- Groundwater recharge.
- Maintaining air quality through cooling of air, release of oxygen, and absorption of carbon dioxide

Fish and Wildlife Habitat

- A diverse habitat for plants, birds, fish, amphibians, and mammals that is scarce in an urban environment.
- Food, shelter, nesting, spawning, and rearing areas necessary for resident and migrant species.
- A linked corridor to the Lake Washington and Puget Sound ecosystems.
- Environmental maintenance such as insect control by birds.

Community

- A focus for building community ties between humans and the larger community of life.
- A focus for pride, identity, and ongoing cooperation among community members, businesses, government, and schools.
- A means for improving the economic vitality of the watershed, since the landscape attracts people to businesses and public amenities.

Education

- An "outdoor classroom" for students and the general public to discover (or rediscover) nature.
- An opportunity for trying new creek and habitat restoration techniques.
- A focus for community based learning in schools and other educational settings.
- A way to appreciate the watershed's unique cultural and ecological heritage.
- An accurate indicator of the health of the watershed.

Refuge and Recreation

- A sanctuary for connecting with nature, for inspiration and tranquility, for retreat and for spiritual renewal.
- A place for hiking, fishing, bird watching, exploration, and play.
- A refuge for species pushed toward local extinction and recovery of native plant colonies.

Water Supply (Irrigation)

- Only the Jackson Park Golf Course uses the creek as a water supply to irrigate the grassy areas of the golf course.

Over the three year planning period, the Goals and Objectives of the WMC evolved along with the committee's work. Based on the benefits of the watershed above, the results of research completed for the Characterization Report, and a refined set of Action Plan strategies, a final set of Goals and Objectives was achieved.

Goals and Objectives of the Watershed Management Committee

STORMWATER MANAGEMENT

Stormwater Goal: To mimic natural flow patterns, minimize stormwater related habitat damage, and reduce flooding.

We will accomplish this goal by doing the following:

Stormwater Objective A.	Increase groundwater recharge (infiltration) and reduce the amount of impervious surfaces.
Stormwater Objective B.	Increase detention throughout the watershed on both private and public properties.
Stormwater Objective C.	Improve maintenance of public stormwater conveyance system
Stormwater Objective D.	Improve the process of evaluating, selecting, designing, implementing, and managing, capital investments in Thornton Creek watershed.
Stormwater Objective E.	Improve private management of stormwater and runoff.

Total: 25 recommendations

NON-POINT POLLUTION

Non-point Pollution Goal: To restore water quality in Thornton Creek and its lakes and wetlands to meet, or be better than, the state's water quality standards.

We will accomplish this goal by doing the following:

Non-point Pollution Objective A.	Improve existing non-point pollution prevention programs in Seattle and Shoreline to ensure that they are being applied to the Thornton Creek Watershed in the maximum extent possible.
Non-point Pollution Objective B.	Improve water quality.
Non-point Pollution Objective C.	Reduce pollutant discharges from public facilities
Non-point Pollution Objective D.	Reduce pollutant discharges from commercial properties
Non-point Pollution Objective E.	Reduce pollutant discharges from residential properties

Total: 32 recommendations

HABITAT

Habitat Goal: To protect and improve habitat for native fauna and flora within the Thornton Creek Watershed, and to provide opportunities for people to connect with nature.

We will accomplish this goal by doing the following:

Habitat Objective A.	Prevent harm to existing natural habitat
Habitat Objective B.	Improve migration corridors for fish and wildlife
Habitat Objective C.	Improve the quality of habitat for fish and wildlife
Habitat Objective D.	Increase the quantity of habitat for fish and wildlife
Habitat Objective E.	Improve access for humans to appropriate natural sites

Total: 23 recommendations

EDUCATION AND STEWARDSHIP

Education/Stewardship Goal: To improve awareness of, foster pride and responsibility for, and create learning opportunities within the watershed.

We will accomplish this goal by doing the following:

Educ./Stewardship Objective A.	Increase basic awareness and appreciation of Thornton Creek and its watershed.
Educ./Stewardship Objective B.	Integrate watershed education into school programs at all levels. Maintain and improve existing programs
Educ./Stewardship Objective C.	Provide learning opportunities for the general public
Educ./Stewardship Objective D.	Promote stewardship.

Total: 18 recommendations

Regulation/Enforcement

Regulations & Enforcement Goal: To ensure that present and future regulations affecting the Thornton Creek Watershed are fully enforced.

We will accomplish this goal by doing the following:

Regulatory Objective A.	Improve enforcement of existing regulations
Regulatory Objective B.	Strengthen land use and development regulations

Total: 14 recommendations

Implementation

Implementation Goal: To ensure timely and effective implementation of the Thornton Creek Watershed Action Plan, consistent with priorities identified in the Plan and ongoing direction from interested citizens and stakeholders. Implementation should begin upon Department of Ecology concurrence with this action plan.

We will accomplish this goal by doing the following:

Implementation Objective A.	Provide watershed oversight.
Implementation Objective B.	Improve coordination and plan integration.
Implementation Objective C.	Track and report progress.
Implementation Objective D.	Update this plan regularly

Total: 13 recommendations

Monitoring, Analysis and Evaluation

Monitoring, Analysis and Evaluation Goal: To accurately gauge Action Plan effectiveness by gathering regular, reliable progress reports and data on the creek and watershed through a variety of methods, public and private, and make it available to all interested parties.

We will accomplish this goal by doing the following:

Monitoring Objective A	Monitor the health of the watershed to assure Plan recommendations are having the desired effect.
Monitoring Objective B.	Monitor implementation of the Plan's recommendations (see chapter 8, section C)

Total: 6 recommendations

DRAFT
Chapter 3

Stormwater Recommendations

Problem Summary

Stormwater plays a crucial role in determining the health of this watershed, impacting water quality and habitat. Half of this watershed is paved or covered with buildings. This high level of impervious surface causes stormwater to rapidly run into streams, without much opportunity to be caught in vegetation or soak slowly into the ground. Stormwater carries pollutants to the stream and excessive flows also contribute to sediment and turbidity problems. High flows damage habitat by eroding stream banks and wearing down natural channels. Homes and property along the creek experience flooding during large storms. Flooding also motivates people to install flood control structures in an attempt to minimize the amount of land being flooded. Often, these measures alter the natural drainage patterns, further aggravating the problem.

Much of the property in the Thornton Creek watershed was developed before stormwater detention was required. Land developed and built upon without sufficient stormwater controls leads to increased flood occurrences. Flooding will increase due to an increase in impervious surface from development, preventing vegetation and soil from absorbing water. Because impervious surfaces cause the stormwater to reach nearby creeks all at once, the streams will carry higher flow levels, but for shorter periods of time. This results in scouring of the creek bed, high sediment levels, downstream flooding, degradation of stream banks, flushing salmon eggs and juveniles out of the system, and lower summer flows because the soil no longer stores rain water for gradual release.

Current Solutions

There are a few basic ways to address stormwater problems: improve conveyance, increase storage and reduce runoff volumes. Seattle and Shoreline use all three.

Improve conveyance: Many neighborhoods have informal drainage, where stormwater runs across lawns, along the side of roads and into ditches and pipes. Maintaining ditches and identifying and removing bottlenecks, such as undersized culverts, can improve movement of stormwater. An existing by-pass pipeline conveys high storm flows out of the creek from the confluence of the North and South Branches directly to Lake Washington. Existing programs, such as street sweeping and public trashcans, reduce the amount of litter that can wash into the creek.

Increase storage: Regional detention ponds, such as Meadowbrook Pond store stormwater from a large upstream drainage area and release the water back into

the stream at a slower rate. Public projects to control flooding need to balance fish protection with the need to control stormwater flows. Currently, some components of public projects are compatible with both, while others conflict. Local building codes require on-site detention for new construction and remodels. Current regulations may be sufficient to mitigate the impacts of future development, but do not address the high level of development that has already occurred. Although this accommodates damages from new sites, it isn't effective for the older buildings.

Reduce runoff volume: This is achieved by reducing impervious surfaces and increasing infiltration. The City of Seattle and City of Shoreline permit infiltration of property runoff, but it's challenging given the soils in the watershed, set back requirements and avoidance of steep slopes.

A hydraulic and hydrological study of Thornton Creek was completed in spring 2001. Sophisticated computer models were developed to predict flood prone areas and to identify sections of the stream with flow velocities causing rapid erosion. This study evaluated various flood control strategies and their abilities to improve habitat and instream conditions. The results will guide future capital improvement projects. Seattle and Shoreline involve citizens in identifying and developing CIP projects.

Acknowledging the challenges ahead and the current character of the watershed, the Watershed Management Committee has formulated a Stormwater goal and objectives for the future of the Thornton Creek Watershed.

Stormwater Management Goal and Objectives

Stormwater Goal: To mimic natural flow patterns, minimize stormwater-related habitat damage, and reduce flooding.	
We will accomplish this goal by doing the following:	
Stormwater Objective A.	Increase groundwater recharge (infiltration) and reduce the amount of impervious surface.
Stormwater Objective B.	Increase detention throughout the watershed on both private and public properties.
Stormwater Objective C.	Improve public stormwater conveyance system.
Stormwater Objective D.	Improve the process of evaluating, selecting, designing, implementing, and managing, capital investments in Thornton Creek watershed.
Stormwater Objective E.	Improve private management of stormwater and runoff.

Stormwater Action Plan Recommendations

Stormwater Objective A: Increase groundwater recharge (infiltration) and reduce the amount of impervious surface.

A1. Create maps showing infiltration (recharge) areas.
USGS: Complete efforts to map areas within the watershed that are suitable for infiltration. Also identify which areas are unsuitable due to poor soils, steep slopes or other factors. Share maps with local governments.
DCLU and PADS: Use these maps when examining drainage plans. Make these maps available to interested community groups.

Implementation: USGS, DCLU, Shoreline

Estimated Cost: USGS - $20K
DCLU - $20K
SPU - $125,000 2000-2003
Shoreline approximately $5,000

Funding Source: Currently funded by multiple participating agencies.

Schedule: USGS completing a project in 2003
DCLU – ASAP
Shoreline – 2003

Priority: High

A2. Research and promote infiltration techniques.
Research methods and technologies being developed to promote infiltration of stormwater runoff. Share findings with developers, designers and neighborhood groups throughout the watershed. Seattle and Shoreline: Develop demonstration sites to showcase infiltration, for example, the SEAStreets program. Use infiltration in City projects, for example building remodels and new sidewalks and ditches. Include infiltration techniques in Best Management Practices (BMP) manuals and updates.

Implementation: SPU, Shoreline, UW

Estimated Cost: SPU – Demonstration projects included in Capital Improvement Fund budgets annually. (SEAStreets 1 estimated cost roughly $800,000, for example)
UW – Existing budgets and research

Shoreline – Included in Capital Improvement Fund budgets annually. (Expected annual expenditures to range in the $10,000 for projects, $1,000 for BMP materials range.)

Funding Source: SPU – Drainage fees, grant funds
Shoreline – CIP budget

Schedule: SPU -- Ongoing
Shoreline – ongoing through 2003
UW – ongoing

Priority: Medium

A3. Modify City policies, codes, regulations, procedures and designs to promote infiltration; enforce revisions.

Within five years, use watershed wide hydrologic studies, geotechnical maps (see A1 above), and other appropriate information to identify target areas or a set of site specific criteria where infiltration may add invironmental benefits without increasing land slide risk. Revise City policies and regulations to require and promote infiltraiton where appropriate on both public and private properties. Promote voluntary participation in implementing and maintaining infiltration techniques where appropriate and incorporate findings in public information such as the Stormwater Code Technical Requirements Manuals.

Infiltration strategies to be studied for implementation include but are not limited to:

a. Evaluate design measures for reducing impervious surface on existing public land in targeted infiltration areas. Propose programmatic and regulatory changes to encourage impervious surface reduction designs in public street right-of-way improvement projects, sports area recreation projects, and surface parking area projects to demonstrate how infiltration approaches can be used and maintained effectively. Recommend successful approaches to private property owners.

b. Design and evaluate infiltration technology, including technologies that allow for partial infiltration, on public and private land. Modify the Seattle Stormwater, Drainage and Grading Code (and/or Technical Requirements Manuals) to require and promote these technologies where appropriate and enforce Code changes. Evaluate potential benefits of implementing a stormwater management incentive program for landowners that might include offering technical assistance or other means of implementing infiltration technology in targeted areas or on sites that meet specific criteria.

c. Based on experience gained in (a) and (b) revise the Land Use and Critical Areas codes as needed. Examine for effectiveness in meeting STormwater Objective A:

- Not allowing variances to short plat or sub-divide lots in the Thornton Creek Watershed in critical areas and in targeted infiltration areas.
- Requiring infiltration designs, including treatment of run-off, for any increase in impervious surface during redevelopment.

d. Redevelop stormwater/drainage outfalls and public right-of-way street ends into Thornton Creek to provide infiltration for groundwater recharge and water quality treatment. Include both piped and ditched outfalls.

e. Purchase additional public property in targeted areas to improve groundwater recharge and stormwater run-off treatment of Thornton Creek as appropriate and when opportunity arises. Manage this property primarily for water quality, ground water recharge, and habitat benefits.

Implementation: Cities of Seattle and Shoreline (Seattle: SPU and DCLU working together – SPU is lead agency on stormwater management.

Estimated Cost: Seattle: $100,000 for initial design and code revision work. (Building upon 1999-2000 work already conducted to revise the Stormwater, Drainage and Grading Code and development of the "Flow Control Technical Requirements Manual" issued in 2000.) Additional funds for incentives, property acquisition, and demonstration projects – cost to be determined.
Shoreline: $50,000 for initial design and code revision work. Additional funds for incentives, property acquisition and demonstration projects – cost to be determined.

Funding Source: Seattle: SPU drainage and stormwater sources, SPU CIP for demonstration projects, potentially grant funds. Funding uncertain for incentives on private property.

Schedule: 2005 for initial studies and dmeonstration projects.
2010 for full implementation.

Priority: High – CORE

A4. Incorporate policies to promote pervious surfaces into new Neighborhood Design Guidelines or Subarea Design Standards developed by Thornton Creek Watershed neighborhoods and revise/amend existing neighborhood area design guidelines and/or design standards for those Thornton Creek Watershed neighborhoods that have them currently.

a. Work with the North District Neighborhoods' Neighborhood Plan Stewardship Committee and the Lake City Chamber of Commerce to see that policies to promote pervious surfaces are included as they develop Design Guidelines for Lake City.

b. Work with citizens and business organizations in the Northgate Overlay area to amend the Northgate Overlay design guidelines/standards to include policies to promote pervious surfaces.

c. Support the development of committees of neighborhood groups to receive land use bulletins and other related notifications from City departments.

d. Encourage neighborhood groups/sub-area groups to develop design guidelines/design standards for their neighborhood including design guidance to promote pervious surfaces/reduce impervious surfaces.

Implementation: DCLU to assign staff to support development of neighborhood design review guidelines.
Neighborhood Groups to initiate neighborhood design guidelines or sub-area design standards; to develop committees

Estimated Cost: $25K– 50K per neighborhood or sub-area to develop neighborhood design guidelines or design standards
Staffing costs for Cities of Shoreline or Seattle to support neighborhood design guideline/standard development.

Funding Source: In Seattle, DON's Neighborhood Matching Fund is a potential source for neighborhood groups

Schedule: Over the course of 10-15 years to complete neighborhood or sub-area design guidelines for all watershed neighborhoods; 2004 to complete new Neighborhood Design Guidelines for the Lake City Urban Village and revision to the Northgate Overlay Zone design standards.

Priority: Low

A5. Use creative alternatives to traditional sidewalks, curbs and gutters.
Seattle: Develop alternatives to traditional sidewalks, curbs and gutters that provide safe pedestrian passage and convey stormwater, while minimizing runoff and promoting open space. Open space needs may be achieved with swales, narrow pervious walkways and landscaping. Share these alternatives with Neighborhood Planning Stewardship groups for use in implementing their neighborhood plans. Incorporate the alternative designs into City standards.

Identify priority areas and develop a program to install these pedestrian walkways and swales in the Thornton Creek watershed on both residential and arterial streets.

Implementation: SEATRAN, SPU, Shoreline

Estimated Cost:

-
- Create and Evaluate Designs: $100,000 (Seattle)
- Construct and evaluate pilot projects: $1 M over several years
- Adjust standards: $100,000 per City
- Create program:
  - Estimated cost range for an Arterial Street with a concrete sidewalk with Drainage Ditch & No Parking adding 10% for landscaping, range from approximately $112,000 to 186,000 per 660' block, both sides of the street
  - Estimated cost range for a Residential Street with concrete sidewalk or asphalt walkway with low-cost curb adding 10% for landscaping and infiltration or culvert system, range from approximately $162,000 to $450,000 per block for sidewalks, drainage, and landscaping (2 sides of the street, 660' block); $156,000 to $460,000 per block for walkways, drainage and landscaping (2 sides of the street, 660' block).

Funding Source:

- Create and evaluate designs, provide demonstration projects: Design work and drainage construction costs in Seattle, SPU funds.
- Construction costs on arterials may be funded by Arterial Street Fund.
- Construction costs on residential streets traditionally borne by property owner. Seattle: SPU Local Drainage program may provide funding assistance for drainage portion on residential streets in the future.
  Shoreline: TBD

Schedule:
SEATRAN, sidewalks – 2000 and ongoing
SEATRAN, City code – Ongoing
SPU and SEATRAN – Ongoing
Shoreline – 2001

Priority: High

A6. Disconnect roof drains from the sanitary sewer.

Assess the impact of stormwater contributions to sanitary sewer overflows in this watershed. If impact is significant, develop a program to disconnect roof drains from the sanitary sewer and direct the runoff to infiltration or detention areas. Many homes in the watershed have roof drains tied to their sanitary side sewer. The sewers can overflow on rare occasions, such as in the winter 96/97 storms

when snow melt was accompanied by heavy rains. By diverting roof drains, sewers would overflow less often.

Implementation: King County, SPU, Shoreline

Estimated Cost: King County -- $30K
SPU -- $30K
Shoreline -- .1 FTE to investigate need, + .05 annually

Funding Source: To be determined.

Schedule: King County – within 5 years
SPU – within 5 years
Shoreline – 2002

Priority: Low

A7. Identify alternatives to infiltration facilities when it is incompatible with development or site conditions cannot accommodate it.
Require new development and/or redevelopment to provide alternatives to infiltration if on-site infiltration is not possible. Examples include more on-site detention, roof top gardens, greater vegetation cover, off-site infiltration or detention, cisterns, and financial contribution to a regional or public detention facility.

Implementation: SPU, Shoreline

Estimated Cost: SPU $50K
Shoreline – Existing budgets

Funding Source: To be sought

Schedule: SPU -- ASAP
Shoreline – ongoing

Priority: Medium

Stormwater Objective B: Increase detention throughout the watershed on both private and public properties.

B1. Increase on-site detention for new construction and redevelopment to the extent possible.
Modify Seattle and Shoreline drainage codes and manuals to increase the amount of on-site detention required for new construction and redevelopment.

Ensure WSDOT complies with local codes, policies, regulations, etc. and provides adequate detention or mitigates increased stormwater runoff resulting from their improvements, parking lots, and resulting changes to major commuting arterials.

a. Lower the threshold for drainage investigations/review of redevelopment and new development, using levels similar to those used in King County's policies and the Dept. of Ecology's proposed policies.

b. Revise software used by Seattle and Shoreline in calculating detention levels to reflect local weather patterns, such as large back-to-back storms. Seattle and Shoreline should require continuous event modeling similar to that used in the King County's Surface Water Design Manual. Use the County's Level 2 Creek Protection flow control standards or equivalent for new construction and redevelopments in the watershed.

Implementation: SPU, DCLU, Shoreline

Estimated Cost: SPU -- $25K
DCLU -- $25K with SPU
Shoreline – Existing budget
Discover and report potential costs for purchase, training, etc. for new software for each City

Funding Source: Existing budgets for City agencies

Schedule: Seattle – within 5 years of plan adoption
Shoreline – Ongoing

Priority: High

B2. Improve existing and create new regional detention facilities. Incorporate regional detention ponds as part of the basin-wide strategy to reduce flooding. Continue developing detention sites at non-traditional locations on public properties. Purchase and restore flood-prone property.

Develop detention ponds as a key strategy to control flooding without sacrificing other resources such as wetlands or open stream channels. Determine on a case-by-case location basis whether flood control or flow duration strategies should be used to control a range of flows in the spaces that are available. Use latest studies of the Thornton Creek watershed, including the ENTRANCO study, and work with the community to develop possible locations on both the north and south branches, prioritizing the upper watershed, for open surface detention facilities. When designing detention ponds, include provisions for human interaction, water quality improvements and habitat, including native plants and weed controls. Evaluate the success of these detention projects to reduce flooding and improve water quality, and their impacts on stream temperatures. Alter them as appropriate to improve their effectiveness.

Continue to develop multi-use sites where one activity can occur during dry weather, and the site can be used for detention during wet weather. Potential sites include soccer fields, schoolyards, and parks such as the old Maple Leaf School site at 32nd NE and NE 100th. Use hydraulic and hydrologic studies and models, community members and the Thornton Creek Watershed Council to identify and prioritize potential project sites. The existing detention ponds at the Jackson Park Golf Course and wetlands at the North Seattle Community College are good examples. Make detention/retention sites passive recreation and wildlife habitat areas with educational opportunities. When appropriate, add trails as part of their design.

As part of the CIP strategy, purchase and restore wetland functions to flood prone properties. Continue to acquire properties vulnerable to frequent flooding as they become available and then restore the floodplain to a more natural condition.

Implementation: SPU, Shoreline

Estimated Cost: Range from $56,000 (Meadowbrook project on DPR property maintained by volunteers over time) to $10 M or more including potential O&M costs up to $1 M per year. Depends upon size, regulatory requirements, site specific operations and maintenance needs, and volunteer availability and organization.

SPU – $1 million + (as available in future budgets)
Shoreline – Existing budget includes more than $400,000 in projects by 2002 plus annual maintenance costs.

Funding Source: Seattle and Shoreline CIP budgets

Schedule: Seattle – 1999 - ongoing
Shoreline – 2001 – ongoing

Priority: High – CORE

B3. Incorporate surface detention during Lake City Civic Core redevelopment.
As the Lake City Civic Core (library, fire house, community center, neighborhood service center, parks) between NE 123rd and NE 130th and between Lake City Way and 27th Ave NE is redeveloped, provide a landscaped detention feature into an open space component to help resolve local drainage problems and reduce runoff to the storm drain system that ultimately reaches Thornton Creek.

Implementation: Seattle DON and NDM lead

Estimated Cost: Seattle $25,000 part of construction budgets; $1 million + for detention area. (Total over $1 million).

Funding Source: City of Seattle project budget

Schedule: during design phase of redevelopment (within 5 years)

Priority: Medium

B4. Create a flood easement program

Consider expansion of the flood easement program that targets specific flood prone properties throughout the basin. Use floodplain maps of private properties that have been updated based on the latest, most accurate modeling and recent hydraulic studies. Create flood plain easements and informal detention on specified properties. In return pay property owners for use of the flood easements. Also develop floodplain regulations that prevent the addition of any fill that would cause a loss of flood storage. Use this program as part of the overall drainage CIP program.

Implementation: SPU, Shoreline

Estimated Cost: SPU – $50K to begin, $25K - $50K annually
Shoreline $2,000 to evaluate idea

Funding Source: Seattle: SPU Drainage budget
Shoreline: City Drainage budget

Schedule: Seattle – within 5 years
Shoreline – 2003

Priority: Low

B5. Increase frequency of private detention system inspections.

Seattle: Inspect private, commercial and regional detention systems every other year prior to high flow seasons. Develop a certification and inspection program for private systems similar to that used by oil companies for oil furnaces.
Shoreline: Continue current program to inspect private, commercial and regional detention facilities annually.

Implementation: SPU, Shoreline

Estimated Cost: SPU – 1 more FTE
Shoreline – Existing program

Funding Source: SPU – Regular drainage and stormwater sources

Schedule: Seattle – 2000 (ASAP)
Shoreline – ongoing

Priority: Low

Stormwater Objective C: Improve public stormwater conveyance system.

C1. Improve maintenance to public stormwater conveyance system.
Reduce localized flooding by improving maintenance to the public stormwater system. Develop policies for installation and maintenance of ditches if they do not already exist. Provide adequate staff to inspect and maintain ditches, swales, trash racks, and culverts properly. Continue to provide ongoing training for maintenance staff on best methods for cleaning and maintaining ditches, swales, culverts, catch basins, detention vaults, curb gutters, and restored wetlands within public properties. The training should include an evaluation component.

Implementation: SPU, Shoreline with King County

Estimated Cost: SPU – $50K or .5 FTE
Shoreline $20,000

Funding Source: SPU -- regular O&M funding, grant funding for research
Shoreline – Drainage budget

Schedule: Seattle – ASAP
Shoreline – ongoing

Priority: Medium

C2. Map the existing storm drains, ditches and culverts in Shoreline
Collect data on the existing storm drains, ditches and culverts in Shoreline and incorporate this information into GIS. Identify portions of the drainage system which are currently inadequate and take steps to make appropriate improvements.

Implementation: Shoreline with consultant

Estimated Cost: Shoreline $100,000 initially + $5,000 annually

Funding Source: Allocated in current budget

Schedule: Shoreline – 2001

Priority: High

C3. Improve local stormwater collection systems. Address portions of the drainage system that are inadequate. Retain and increase open ditch systems and swales. Improve their ability to provide infiltration, flow reductions, and improved water quality. Avoid pumping and piping to convey stormwater to regional facilities. Use native vegetation around open surface conveyance systems. Use best management practices related to conveyance of stormwater. As regional detention ponds are developed, ensure systems and facilities used to convey stormwater to these ponds can effectively and safely handle the peak flow volumes.

Implementation: SPU, Shoreline with King County

Estimated Cost: SPU – Enhance existing programs and efforts
Shoreline – Enhance existing programs and efforts

Funding Source: Existing budgets

Schedule: Seattle – ASAP
Shoreline – ongoing

Priority: High – CORE

Objective D: Improve the process of evaluating, selecting, designing, implementing, and managing, capital investments in Thornton Creek watershed.

D1. Study flows in Thornton Creek.
Continue monitoring to verify flow predictions, provide flow data for locations not specifically addressed by computer modeling analyses, assess the performance of constructed CIP projects, compile long term data, and project the success of alternative solutions. Procedures should be defined as to how flow data will be gathered, catalogued, and made accessible to all interested users.

Implementation: SPU, Shoreline

Estimated Cost: SPU $400,000 + $40,000 initially, $5,000 over next five years
Shoreline $75,000 initial + $5,000 annually

Funding Source: SPU existing resources

Schedule: Seattle – Complete study in 2000, monitor flows ongoing
Shoreline – Study in 2000

Priority: High

D2. Thornton Creek Watershed Action Plan Oversight Council: review written criteria for drainage Capital Improvement Projects and other specific projects suggested through watershed planning process or neighborhood plans on a regular basis and provide feedback to City agencies. City agencies: use this criteria to evaluate drainage-related recommendations in adopted neighborhood plans, and include highest projects in capital improvement, drainage basin, parks comprehensive plans, and other municipal implementation plans. In Seattle, arrange for representatives of the Watershed Action Plan Oversight groups to have a regular representative on the Creeks, Drainage, and Wastewater Advisory Committee to SPU.

Implementation: SPU, Shoreline

Estimated Cost: SPU $5,000
Shoreline $3,000

Funding Source: Existing sources

Schedule: Seattle –2000
Shoreline – 2002

Priority: Medium

D3. City agencies: evaluate and report on effectiveness of drainage Capital Improvement Projects in the watershed and adapt or modify as necessary. Based on criteria developed for determining success of drainage related projects, provide an annual report that describes the status of projects and also recommends improvements. Project assessments and proposed improvements should be coordinated through a Basin Steward or similar staff position for implementation. The updates should also be presented to the Thornton Creek Watershed Oversight Council. Updates should be part of an annual report as recommended in the Monitoring section.

Implementation: SPU, Shoreline

Estimated Cost: SPU – Existing budgets, increase staff time for this task.
Shoreline – Existing budgets

Funding Source: Existing sources.

Schedule: Seattle – 2000 and ongoing
Shoreline – 2000 and ongoing

Priority: High

D4. Continue funding Drainage Capital Improvement Projects, including stormwater collection and retention facilities, implementing improved selection and design criteria, and improving collection systems.
Continue to make capital investments in surface water management to minimize flood damage while protecting habitat. Criteria for projects should include an appropriate balance between flood control and stream enhancement for allocation of resources, environmental costs, financial cost, lost opportunity value, and benefit to the streams' ecology. Address portions of the drainage system that are inadequate. Retain and increase open ditch systems and swales. Improve their ability to provide infiltration, flow reductions, and improved water quality. Avoid pumping to convey stormwater to regional facilities when feasible. (typing fragment, see C3.)
Use an array of solutions including detention, acquisition of flood prone properties, flood easements, water quality improvements, ground water recharge, and habitat improvements.

Formally involve the Thornton Creek Watershed Oversight Council in determining future drainage CIPs in this watershed.

Implementation: SPU, Shoreline

Estimated Cost: SPU $20 million
Shoreline $4 million

Funding Source: CIP budget as allocated by City Council

Schedule: Seattle – 1999 - 2006
Shoreline – 2000 – 2005

Priority: Medium

D5. Update stormwater manuals regularly.
Update manuals to include new research, products and technology.
Seattle: Continue to update stormwater manuals and stormwater plans at least every five years. Recommend that Seattle's manuals continue to reflect a stronger position towards preserving habitat and salmon-friendly regulations, despite any changes from state or federal governments to relax codes.
Shoreline: Develop a policy to update stormwater manuals every five years.

Implementation: SPU, Shoreline

Estimated Cost: Existing workloads and budgets

Funding Source: Existing budgets

Schedule: Reviewed regularly as mandated by law

Priority: High

Stormwater Objective E: Improve private management of stormwater and runoff.

E1. Promote water conservation, detention and infiltration.
Continue existing water conservation programs. Develop and distribute information to homeowners on what they can do on their property to reuse water, provide detention, reduce runoff, and increase infiltration. Examples include use of cisterns to collect runoff for use in garden areas later, special treatments to address runoff from decks; putting narrow gravel strips alongside driveways; recycling gray water; planting conifers; water efficient gardens; and alternatives for lawns, large patios, driveways, sidewalks, and other paved areas. Outreach efforts could include demonstrations at workshops, demonstration projects, tours and neighborhood focus groups. Determine areas of watershed that will have most benefit and target those for programs first.

Implementation: SPU, Shoreline (Shoreline Water District)

Estimated Cost: SPU – Existing budgets (example: $30K/year)
Shoreline – Existing budgets

Funding Source: Existing program budgets

Schedule: SPU – 2000 and ongoing
Shoreline – 2000 and ongoing

Priority: High – CORE

E2. Offer assistance to improve private management of stormwater
Seattle: Evaluate options to provide financial assistance to private property owners. Options include, but are not limited to, reduced stormwater fees, tax breaks for participation in infiltration programs, grants, low interest loans, technical advice, rebates on items such as rain barrels, and City provided materials for projects. Develop a program to provide assistance to businesses

and/or homeowners to better manage surface water runoff. The program should help off-set the costs associated with pollution best management practices, creek bank stabilization, reduced impervious surfaces, land slide prevention, erosion control, increased detention and infiltration.
Shoreline: Continue to offer reduced stormwater fees for properly maintained detention systems. Investigate single-family lot stormwater fee structure to provide incentives for reduced impervious surface cover and increased canopy coverage. Consider other financial incentives.

Implementation: SPU, Shoreline

Estimated Cost: SPU $50,000 initially, + $100,000 annually
Shoreline – Existing budgets

Funding Source: TBD

Schedule: SPU -- 2001
Shoreline – 2000

Priority: High – CORE

E3. Encourage citizens to help keep ditches and inlets clean to reduce localized flooding.
Educate homeowners and businesses on the importance of removing trash and leaf and branch litter from storm drain inlets, gutters and ditches and other simple measures they can take to improve their function. Use existing outreach methods such as Curb Waste Times, Block Watch, Spring and Fall Clean Ups, the Environmental Learning Center and Adopt-a-Street programs. Distribute brochures and sponsor demonstration projects.

Implementation: SPU, Shoreline, with support from TCA and Block Watch

Estimated Cost: SPU – Existing budget
Shoreline – Existing budgets

Funding Source: SPU Community Services budget

Schedule: SPU -- 2001
Shoreline – 2000

Priority: High

E4. Fall Clean-up Program

Reduce local flooding by developing programs to remove leaves and litter from storm drains, ditches and road-sides.
Seattle: Develop a Fall Clean-up Program similar to the Spring Clean Events in Seattle to motivate and provide incentives to homeowners to pick up trash, branch, and leaf debris in roads, gutters, sidewalks, etc.
Shoreline: Continue the Fall Clean Sweep program and include information on keeping drains and ditches clear. Currently the program focuses on recycling, household hazardous waste and yard waste collection and appliance disposal.

Implementation: SPU, Shoreline

Estimated Cost: SPU – $10,000 Shoreline – Existing budgets

Funding Source: Existing program budget

Schedule: SPU -- 2001
Shoreline – ongoing

Priority: High

E5. Promote re-use of cisterns and gray water. Promote re-use of gray water (wastewater from sinks and washing machines) and cistern/rain barrels to irrigate lawns and gardens in accordance with Seattle-King County Health Department guidelines. Use the appropriate and available public outreach approaches such as newsletters, workshops, and tours of model buildings and systems to promote this.

Implementation: Seattle: SPU
Shoreline: Planning and Development Services
King County: DNR

Estimated Cost: $10,000 annually

Funding Source: TBD

Schedule: design and implement by 2010

Priority: High

Draft
Chapter 4

Non-point Pollution Recommendations

What is Non-Point Pollution?

Non-point pollution comes from everyday activities, such as driving and vehicle maintenance, over-use of lawn and garden chemicals, pet wastes, runoff from construction sites, cigarette butts, and other litter. Pollutants from these activities are deposited on streets, rooftops, driveways, sidewalks, and other hard surfaces. When it rains, stormwater runoff carries these pollutants to nearby streams and water bodies. Non-point source pollution is also generated by agricultural and forestry practices, although these sources are not significant in the Thornton Creek watershed because houses, roads and businesses are the majority of land uses.

By contrast, point source pollution comes from specific, identifiable, large contributors, such as paper mills and other industries, as well as sewage treatment plants. While storm sewers usually discharge at a discrete point, they collect storm water runoff and its associated non-point pollution from dispersed sources as described above. During storms, combined sewer overflows (CSO's) may discharge untreated municipal sewage with stormwater from combined sewage systems in older neighborhoods. During the last 25 years, the pollution from point sources has been significantly reduced. Today, more than half of the remaining pollution entering Puget Sound comes from non-point sources.

Individual sources of non-point pollution are typically small and insignificant by themselves. However, when these sources are multiplied by the number of people and the amount of activity within an urban watershed like Thornton Creek, the scale of the problem quickly magnifies. Controlling and preventing non-point urban pollution requires individuals, agencies, and businesses within a diverse population to change their behaviors. To accomplish this, people must understand how their actions contribute to pollution and be moved to live and act in ways that don't pollute.

Non-point Pollution Regulation

In 1972, Congress passed the Clean Water Act, aiming to restore all of the nation's waters to a "fishable and swimmable" condition. Early efforts under this Act were designed to reduce pollution from point sources such as sewage treatment plants and pulp and paper mills. Despite significant reduction in pollution from point sources, water quality in Puget Sound and other bodies of water throughout the nation remained damaged by pollution. In response to the

ongoing and growing water pollution problem, Federal and state agencies moved their focus to non-point pollution.

In 1987, the Puget Sound Water Quality Authority developed The Puget Sound Water Quality Management Plan to confront increasing problems with water quality in Puget Sound. One major source of water quality degradation identified in this plan is non-point pollution. The Plan directed each county adjacent to Puget Sound to rank its watersheds in order to address non-point pollution issues. The Authority also adopted the "Non-point Rule," WAC 400-12, a regulation to direct the ranking and subsequent planning for individual watersheds, administered by the Washington State Department of Ecology (Ecology). Ecology also administers grants and loans from the Centennial Clean Water Fund (using revenue from a tax on tobacco products) to promote development of Watershed Action Plans. Ecology provides technical assistance and reviews and approves completed action plans.

The Washington Administrative Code (WAC) (Ch. 400-12, Local Planning and Management of Non-point Source Pollution) outlines the process local governments should follow to develop watershed action plans. The WAC also provides guidelines describing the content of an action plan. Generally an action plan consists of a watershed characterization report, a definition of the problems, goals and objectives to prevent and correct non-point pollution, specific control strategies, and an implementation strategy. The Action Planning process begins when a lead agency initiates the Plan by securing funding and convening a watershed stakeholder group, called the Watershed Management Committee (WMC) to guide and write the Plan.

Local government can play a role in reducing non-point pollution by both enforcing regulations and practicing best management practices. When aggressively enforced, local laws such as Seattle's Stormwater, Grading and Drainage Ordinance and Side Sewer Ordinance can be effective in this watershed. Through promotion of Best Management Practices (BMPs), local governments encourage businesses to adopt good housekeeping, storage and material handling practices to prevent pollutant discharges to stormwater. Local governments can improve their maintenance activities such as street sweeping, outdoor storage of materials, employee training, and reduced use of pesticides and fertilizers. Local stormwater utilities provide regional treatment devices, such as swales, filters, and oil/water separators to treat road runoff. Many drainage related capital improvement projects incorporate water quality treatment while controlling flooding.

Current Approaches

In 1997, Seattle developed a comprehensive Stormwater Management Manual that identified the multiple strategies the City was using to protect local

waterways. In 2000, Seattle revised its Stormwater, Drainage and Grading Code and issued four new technical requirements manuals.

Laws forbid the intentional or unintentional polluting of Thornton Creek and other streams and lakes. An effective program to reduce non-point pollution will require multiple strategies. Arguably the most effective, and difficult to achieve, is the voluntary change of individual behavior. As the tens of thousands of people in the watershed choose to "live lightly" by reducing the level of pollution produced by their cars, yards, homes and businesses, water quality in Thornton Creek will improve. Non-profit organizations and government offer programs on topics such as gardening naturally without reliance on chemicals, mass transit and bicycling, oil recycling and reduced use of toxic household chemicals.

Waiting for individual behavior changes takes time. Meanwhile, local government has many other programs designed to reduce non-point pollution. Local governments can improve maintenance activities such as street sweeping, outdoor storage of materials, employee training, and reduced use of pesticides and fertilizers. Local stormwater utilities provide regional treatment devices, such as swales, filters, oil/water separators to treat road runoff. Many drainage related capital improvement projects incorporate water quality treatment while controlling flooding.

Problem Summary

A. Existing standards are not always being met:

The State of Washington has defined designated uses, three of which apply to the Thornton Creek watershed: 1) fish and shellfish rearing, spawning, and harvesting, 2) wildlife habitat, and 3) recreation (primarily contact recreation and aesthetic enjoyment).

Federal and Washington State water laws are intended to protect the designated uses of a water body. The Washington State Department of Ecology (DOE) has established surface water quality criteria to protect these uses. The criteria include numerical limits and narrative statements. The State of Washington also has an anti-degradation policy that is not at present well suited to restrict land uses or surface discharges in urban watersheds. DOE is presently drafting changes to the State water laws (Chapter 173-201A of the Washington Administrative Code) to expand implementation of the anti-degradation policy and changing other criteria, such as specific temperature needs for various life stages of salmonids. No standards for freshwater sediments presently exist.

DOE has established numerical limits for dissolved oxygen, fecal coliform, pH, temperature, turbidity and some metals. Freshwater standards prohibit toxic, radioactive or deleterious materials in concentrations that could adversely affect beneficial uses. Also, the aesthetic values of the waterway should not be

impaired by the presence of materials or their effect, excluding those of natural origin, that offend the sense of sight, smell, touch or taste. Narrative standards are not clearly identified or consistently applied in Washington State. Those that have been identified provided a general assessment of the health of a water body in the form of biological indicators regarding the presence or absence of aquatic life forms and not allowing toxic substances to build up to toxic amounts.

B. Existing data for Thornton Creek:

When non-point sources such as automobiles, lawns and gardens, construction sites, pets, and home maintenance activities are multiplied by the thousands, natural resources are damaged. The sum of pollution from all these small, individual sources in the Thornton Creek watershed is concentrated in stormwater runoff and rinses into Thornton creek and its tributaries. Even in dry weather, pollutants find their way into the creek. Careless car washing sends soap down a drain. Mop water tossed out the back door flows into an inlet and then into a creek. Paint from a brush rinsed out with a hose in the driveway flows into the creek. A truck with a broken fuel line can leak diesel into the storm system. And swimming pool owners occasionally clean and empty their pools, flushing chlorinated water into the creek where it kills fish and a variety of organisms in the nearby environment.

Non-point pollution data have been collected sporadically over a number of years. These data include levels of fecal coliform, temperature, dissolved oxygen, pH, turbidity, metals, pesticides, and aquatic life (primarily insects and worms – sometimes called “benthic invertebrates”). The greatest amount of consistently collected data has come from sampling at the mouth of Thornton Creek.

The collected data provide a partial picture of some non-point pollution problems in Thornton Creek and give an indication of priority for applying solutions. Data collected regarding the levels of fecal coliform in Thornton Creek show that the Washington State standard is exceeded most of the time (98% of samples exceed the standard). Temperature and dissolved oxygen standards are exceeded at times during the summer, particularly on warm afternoons. The turbidity standard is sometimes exceeded during dry periods but more frequently during storms. Limited data exist on concentrations of metals in Thornton Creek water. Only zinc, lead and copper have been detected in all stormwater samples. Only the standard for copper has been exceeded. Pesticide data are also limited, and only diazinon has been detected at levels above freshwater aquatic life criteria.

Acknowledging the challenges ahead and the current character of the watershed, the Watershed Management Committee has formulated a Non-point pollution goal and objectives for the future of the Thornton Creek Watershed.

Non-Point Pollution Goal and Objectives

Non-point Pollution Goal: Restore water quality in Thornton Creek, its tributaries, and wetlands to meet, or be better than, the state's water quality standards.

We will accomplish this goal by doing the following:

Non-point Pollution Objective A.	Improve existing non-point pollution prevention programs in Seattle and Shoreline to ensure that they are being applied to the Thornton Creek Watershed in the maximum extent possible
Non-point Pollution Objective B.	Improve water quality.
Non-point Pollution Objective C.	Reduce pollutant discharges from public facilities.
Non-point Pollution Objective D.	Reduce pollutant discharges from commercial properties.
Non-point Pollution Objective E.	Reduce pollutant discharges from residential properties

ACTION PLAN RECOMMENDATIONS

Objective A: Improve existing non-point pollution prevention programs.

A1. Review the existing non-point pollution programs in Seattle and Shoreline to insure they are being applied to the Thornton Creek watershed to the maximum extent possible.

These programs include citizen-oriented programs (Natural Lawn Care, Green Gardening Program, Seattle Tilth, Household Hazardous Waste Drop-off, Green Cleaning and Green Cleaning Kits, Master Home Environmentalists, Green Car Wash, Water Quality Investigations, Adopt-A-Street, Septic System Management), business programs (EnviroStars, Industrial Materials Exchange, Waste Information Network, Inspection Programs) and government programs (Drainage, Street and Grounds Maintenance).

Implementation: SPU, Shoreline, and WOC

Estimated cost: ???

Funding Source: ???

Schedule: Study in 2002 and implement improvements in 2003 and beyond

Priority: High

A2. Meet the requirements of existing and future NPDES (National Pollutant Discharge Elimination System) permits.

Seattle and the Washington State Department of Transportation (WSDOT) should fully implement the stormwater management program already developed for NPDES municipal stormwater permits. (Seattle's Stormwater Management Program documents background information, identifies and prioritizes problems and programs citywide and in priority receiving water bodies, describes unmet needs, and provides a fiscal analysis).

Shoreline: When required by the Washington State Department of Ecology, Shoreline should develop stormwater management plans for NPDES in accordance with State requirements. (Smaller municipalities are not yet required to submit NPDES permit applications and stormwater management plans.) The Thornton Creek Watershed Council, in addition to the established public review process should review future stormwater programs and plans. Future programs should be consistent with the Thornton Creek Watershed Action Plan.

Implementation: SPU, Shoreline, WSDOT

Cost:
SPU – Existing workload
Shoreline – Existing budgets

Schedule:
SPU – Ongoing
Shoreline – 2001 and ongoing
WSDOT – Ongoing

Funding Source:

Priority: High

A3. Include the Watershed Oversight Committee in development of the stormwater management program and stormwater code development process for the NPDES permit for Seattle, Shoreline and WSDOT to assure Plan guidelines are followed.

Implementation: SPU, Shoreline, WSDOT and WOC

Estimated cost: None

Schedule: Depends on when Action Plan is completed and when present round of NPDES revisions are completed.

Priority: Medium

Objective B: Improve water quality

B1. Reduce and eventually eliminate fecal coliform exceedances.
Determine reasons for and sources of high fecal coliform counts in the Thornton Creek watershed and reduce, if not eliminate over time, the exceedance of State standards. A study is needed to identify the sources of the elevated fecal coliform levels in Thornton Creek. Determine if the source is human, domestic or wild animal. Develop a program to reduce the source of pollution. A citywide or regional water body bacteria study and city or region wide reduction program may be appropriate.

Implementation: SPU, Shoreline cooperatively or with regional study

Estimated cost: ???

Funding Source: SPU, Shoreline, and grants?

Schedule: Study by 2002; develop program and implement within 2 years.

Priority: High

B2. Search for and eliminate breaks, leaks and illicit sewer connections that discharge into Thornton Creek.
Continue to investigate potential illicit connections as well as breaks and leaks. When there is evidence of a misconnection, break, or leak, for example toilet paper in the creek or specific locations of high fecal coliform. Investigate the source and require property owners to correct the problem.

Make it illegal to dump or spill contaminants into the storm drain systems or have connections to the storm drain systems that discharge contaminants.

Implementation: SPU, Shoreline (also Ronald Sewer District)

Cost: SPU – Existing workload
Shoreline – Existing workload

Schedule: SPU – Ongoing
Shoreline – 2000 and ongoing

Funding Source: Existing program budgets

Priority: Determine following results obtained from B1

B3. Collect additional information on locations and frequency of exceedance of State standards for water temperature and dissolved oxygen.
Select appropriate sites for measurements throughout the watershed. Utilize student data where possible. Recommendations generated by this study should be added to the CIP list. Determine the reasons for exceeding the standards and reduce, if not eliminate over time, the exceedance of the standards.

Implementation: SPU, Shoreline, or regional agency

Estimated cost: SPU - $10,000 for study and equipment
SPU - $5,000 to develop program
SPU - $75,000 to implement program
Shoreline - $5,000 annual (ongoing) to implement program

Funding source:

Schedule: Study in 2001 - 02, develop and implement program 2003 – 2006

Priority: High – CORE

B4. Study intergravel temperature and dissolved oxygen in areas where adult salmon are spawning in the watershed.

Implementation: SPU, Shoreline or regional agency

Estimated cost: ???

Schedule: Solve high winter & low summer flows and high temp. and low DO problems first.

Priority: Low

B5. Determine methods to measure turbidity throughout Thornton Creek.

Potentially train creek side residents to collect samples during storms and downstream of construction sites along or in the creek.

Implementation: SPU, Shoreline, or regional agency

Estimated cost: ???

Schedule: Reduce high stormwater flow first

Priority: Low

B6. Establish a program to periodically sample Thornton Creek for levels of phosphorus and nitrogen.

Implementation: SPU & Shoreline, or regional agency

Estimated cost: ???

Schedule: If cost of such a program is low, implement within 3-5 years

Priority: Low

B7. Continue to periodically review the literature for standards for metals.

Review the revised DOE standards for surface waters when they are final to determine how non-point pollution recommendations in the watershed my need to be changed.

Implementation: Watershed Oversight Council

Estimated cost: Existing funding

Schedule: Depends on when DOE surface water standards revised

Priority: Moderate

B8. Continue periodic monitoring of the benthic index of biological integrity (B-IBI) to determine if improvements in water quality result in a subsequent increase in the index. (Benthic refers to something occurring at the bottom of a column of water.)

Implementation: SPU, Shoreline or regional agency

Estimated cost: ???

Schedule: Depends on how quickly water quality improvements are fully implemented

Priority: Low

B9. Fund a research study to determine the impact of sediment contamination on the biological productivity in Thornton Creek.

Implementation: SPU & Shoreline and/or regional agency

Estimated cost: ???

Schedule: Depends on how quickly water quality improvements are fully implemented

Priority: Low

B10. Determine and rank the potential non-point pollutants in the watershed and their sources according to the extent of their impairment of beneficial uses and contribution to water quality degradation.

Conduct periodic monitoring and evaluation of the major pollutants to determine the effectiveness of Plan actions and modify the actions as needed. (See *WAC 400.12-515(3)(e))*

Implementation: SPU

Estimated cost: ???

Schedule: ???

Priority: Medium

Objective C: Reduce pollutant discharges from public facilities.

C1. Eliminate the use of Diazinon on public properties (e.g. schools, parks, around public buildings, street and highway right-of-ways).

Implementation: Cities of Seattle, Shoreline and Seattle and Shoreline School Districts

Estimated cost: ???

Schedule: May have already happened

Priority: High

C2. Determine what pesticides and herbicides are being used by public agencies in the Thornton Creek watershed, particularly those that are not sold by home and garden stores in King County, and reduce, if not eliminate, their use over time.

Implementation: Cities of Seattle and Shoreline, King County

Estimated cost: ???

Schedule: May already be happening

Priority: High

C3. Change maintenance activities for public facilities

a. Continue to improve ground maintenance practices in parks, schools, golf courses and other public land to reduce non-point pollution. Train City maintenance crews in water quality protection techniques and procedures. Promote integrated pest management practices, use organic fertilizers, reduce use of pesticides and herbicides and consider use of gray water for irrigation. (See Habitat for recommendations on water use and vegetation.) Evaluate impact of banning pesticide and herbicide use by city departments. Provide training to utility crews, such as water, fire hydrant and road repair crews, and park and school maintenance staff. Training should address ways to reduce pollution, erosion, and excess water runoff to storm water drainage and Thornton Creek.

b. Develop Operations and Maintenance protocols for each type of public stormwater drainage facility (detention ponds, in-stream improvements, ditches, managed wetlands, outfalls, etc.) The purpose of the protocols should be to guide maintenance personnel both in caring for the facility and in reporting changes to the facility and its environment to feed into an adaptive management design/re-design program for stormwater drainage facilities.

Implementation: City of Seattle,
City of Shoreline, Municipal Golf Association
with support from WA Toxics Coalition, and Audubon Society.

Estimated cost: Seattle – Existing budget
Shoreline – Existing budget + $5,000 annually

Schedule: Seattle – Ongoing program
Shoreline=2002 development then ongoing

Priority: High – CORE

C4. Evaluate current street cleaning methods in terms of their impact on pollution of Thornton Creek.

Evaluate current street cleaning methods used by the Cities on public roads in terms of their impact on polluting Thornton Creek. Study alternatives, create and implement best management practices to improve street cleaning methods to

significantly decrease pollution contributed from this source to the creek. Communicate the resulting best management practices to the private sector to improve private maintenance of private roadways in the watershed.

Implementation: Cities of Seattle and Shoreline (be definitive) (SeaTran?)

Estimated cost:

Funding source:

Priority: Medium

C5. Fund a research study to evaluate the effectiveness of devices installed to treat stormwater runoff from streets and parking lots.

Determine the "state of the art" knowledge and devices. Determine the priority pollutants for removal. Determine the most effective methods and devices available and implement those methods and devices when streets and highways are expanded (e.g., Aurora Ave, SR522 and I-5). (The Department of Ecology is collecting information from monitoring projects on the effectiveness of these devices relative to accepted methods, such as biofiltration swales. This information will be incorporated into future updates of Ecology's Stormwater Manual.)

Implementation: Cities of Seattle and Shoreline & WSDOT

Estimated cost: ?

Funding source: The City of Seattle already has an Ecology grant to evaluate the effectiveness of three different stormwater treatment devices designed for retrofitting into existing roadways.

Schedule: Begin work by 2002

Priority: High

C6. Identify additional potential road treatment sites based on drainage characteristics, traffic volume and land use.

Install appropriate devices/structures to pre-treat runoff before it enters the creek based on the study results in C5. Incorporate new treatment methods as they are developed.

Implementation: Cities of Seattle and Shoreline & WSDOT

Estimated cost:

Funding source:

Schedule:

Priority: Medium

C7. Support and promote use of public transit systems and other alternative modes of transportation.

Buses, light rail, car pooling, biking and walking all reduce the number of vehicle miles and lower the need for more and/or wider streets and parking. Support public rapid transit system stations, additional bike trails and adequate park and rides in the watershed. Conduct public educational campaigns about the value of using public transportation to reduce non-point pollution. (Maybe "every ride you take. . . saves another salmon", or similar approaches.)

Implementation: Cities of Seattle, and Shoreline; King County

Estimated Cost: Seattle – Existing workload
Shoreline – Existing workload
King County – Existing workload

Funding Source: Existing budgets

Priority: High

C8. Incorporate water quality improvements into CIP projects.
When developing stormwater/drainage CIP projects, make every effort to include water quality improvements as the project is developed and maintained. Examples of potential features that could be included: oil/water separators upstream of constructed wetlands, sediment traps upstream of detention ponds, aeration pumps in detention ponds, planting of wetland or streamside vegetation.

Implementation: SPU, Shoreline

Estimated Cost: Varies, part of CIP budget (millions)

Funding Source: CIP budget for individual project

Schedule: Ongoing

Priority: High

C9. Remove trash and sediments from detention ponds.

Develop maintenance programs and conduct maintenance on publicly owned stormwater ponds and wetlands. Maintenance should include activities such as dredging of accumulated sediments, site inspections, trash removal, and vegetation care.

Implementation: SPU and Shoreline

Estimated Cost: Seattle - Annual maintenance of Meadowbrook Pond alone has been running nearly $300,000 in its establishment phase.
Shoreline - $10,000 annual maintenance (ongoing)

Funding Source: Seattle: Annual budget

Schedule: Per specified maintenance schedule. Minimum interval 10 years

Priority: High

Objective D. Reduce pollutant discharges from businesses.

D1. Conduct an outreach and inspection program for priority commercial, multifamily, industrial, institutional and government-owned sites within the watershed. Identify practices that contribute to stormwater pollution, including housekeeping practices, fleet maintenance, hazardous waste, material storage and spill prevention. Inspect priority business and make recommendations to business owners. Document recommendations and improvements. Shoreline plans to visit businesses in the watershed with a message on recycling and can add information on water quality. SPU will inspect businesses primarily for stormwater management. Report findings to the Thornton Creek Watershed Oversight Council and community.

Implementation: SPU Community Services and Shoreline

Estimated cost:

Funding source: Community Services budget

Schedule:

Priority: High – CORE

D2. Require source control best management practices (BMP's) be applied as appropriate to all construction sites in the watershed.

Implementation: DCLU and SPU and Shoreline (be definitive)

Estimated cost:

Funding source:

Schedule:

Priority: High – CORE

D3. Develop and implement a program to address pollutant discharge from mobile business.

Continue to develop a program to reduce non-point pollution associated with mobile businesses, such as carpet cleaners, pressure washing companies, landscape and garden companies. Communicate water quality messages to these groups that explain appropriate best management practices. Develop a program for mobile businesses to be water quality certified. Increase SPU and Shoreline staff support for the Interagency Regulatory Agency Coordination (IRAC) program.

Implementation: Cities of Seattle, Shoreline, and Interagency Regulatory \ Agency Coordination (IRAC) with support from participating cities and King County

Estimated Cost: SPU $25,000 to inspect 150 businesses ENDORSE
Shoreline $8,000 to inspect 50 Businesses

SPU: .1 FTE for IRAC work, Shoreline .1 FTE

Schedule: 2000- ongoing

Priority: High, if assessment shows that this is a problem

Objective E. Reduce pollutant discharges from residential properties.

E1. Establish a program to encourage the discontinuation of Diazinon use on private property.

Implementation: Cities of Seattle and Shoreline

Estimated cost:

Funding source:

Schedule: May already be happening

Priority: High – CORE

E2. Continue and improve where necessary existing programs to inform the public about non-point pollution and how they can reduce it.

Strategies may involve direct mailings, newspaper ads, workshops, TV and radio ads. Include a way to evaluate the program success at changing behaviors. Although these programs are city-wide or regional, provide additional focus in the Thornton Creek watershed. These programs should address:

1) lawn and garden practices – Natural Lawn Campaign, pesticide reduction, mulch mowing, native plants.
2) automotive maintenance – oil recycling, hazardous waste drop-off for other automotive chemicals, reminders about well tuned cars and fixing leaks, and vehicle washing.
3) increase promotion of "Clean Car Wash" fund raising techniques – loan "kits" so nonprofit groups can divert soapy water to the sanitary sewer.
4) storm drain stenciling.
5) household hazardous waste – continue education efforts to encourage less reliance on hazardous materials and promote proper disposal.
6) proper disposal of pet waste.

Implementation: City of Seattle (SPU
City of Shoreline
King County

Estimated Cost:

Funding Source:

Schedule: 2000-ongoing

Priority: High – CORE

E3. Complement the regional non-point pollution messages by targeting the Thornton Creek watershed.

Complement the regional non-point pollution messages by targeting the Thornton Creek watershed. Incorporate and/or support existing programs such as the Master Home Environmentalist, storm drain stenciling, natural lawn care, "green" car washing, Salmon Friendly Gardening, and Enviro Stars.

Include in the work plan of the Watershed Interpretive Specialist for Thornton Creek watershed the role of finding ways to increase use of these programs within the watershed -- tailoring and targeting citywide or regional programs and resources to this watershed. In addition, the Watershed Interpretive Specialist should coordinate with appropriate staff and community organizations to "cover the watershed" by building upon programs available both through the City of Seattle and the City of Shoreline. (CROSS REFERENCE WIS)

Implementation: City of Seattle (SPU
City of Shoreline

Estimated Cost:

Funding Source:

Schedule: 2000-ongoing

Priority: Low

E4. Explore the feasibility of developing a Thornton Creek watershed incentive program to encourage participation throughout the watershed's residential areas in activities to decrease non-pollution.

The inspiration for this idea comes from Tampa Bay's Yard Stick program. Participants get "inches" for watershed friendly actions. When a participant reaches 36" (out of a possible 100"), the participant receives recognition and an ornamental yard stick in the front yard. The Thornton Creek program should use appropriate incentives adapted to the Puget Sound area and use friendly competition to encourage participation. This program should promote activities that: increase ground water recharge, reduce use of hazardous materials, rely on natural lawn care, reduce automotive related pollutants, support local wildlife, create more native habitat, etc. It would also include new elements such as point of sale reminders about oil recycling, brochures at equipment rental locations and workshops and local nurseries/hardware stores. The program should include outreach efforts in languages commonly spoken in the watershed, such as Russian, Spanish, Vietnamese, Laotian, Cambodian and Korean.

Implementation: City of Seattle (SPU)
City of Shoreline
Thornton Creek Alliance (?)

Estimated Cost:

Funding Source: Potential grant funding

Schedule: 2003 - 2004

Priority: Medium

E5. Continue existing programs to inspect, repair, and replace on-site septic systems.

Seattle (SPU): Continue existing Seattle program. In Seattle, there are four properties that have septic systems in the watershed. These sites are inspected annually, if the system isn't functioning, the property owners are required to repair it or hook up to the sanitary sewer. Seattle funds a position within the Seattle King County Health Department that includes monitoring Seattle septic systems as necessary.

King County: Implement the recently adopted program changes to the on-site septic system program. Keep the Thornton Creek Watershed Oversight Council informed of changes that impact the watershed.

Implementation: Seattle/King County Health Department, SPU

Estimated Cost: SPU: No new cost
King County: existing program budget

Funding Source: Existing budget

Priority: Medium

E6. Promote lower use of pesticides, herbicides and fertilizers.
Continue to promote reduced use of pesticides and herbicides as part of the Natural Lawn Campaign and similar outreach efforts. Reduce use of chemicals by city parks maintenance crews and contractors.

Implementation: Cities of Seattle and Shoreline

Estimated Cost: Existing budgets

Funding Source: Existing budgets

Schedule: Ongoing

Priority: Low, provided E2 covers issue

DRAFT
Chapter 5

Habitat

Existing Conditions

Habitat for native plants and animals is one of the most critical elements for reducing flooding and preventing non-point pollution from entering our streams and wetlands. Good habitat provides suitable growing conditions for native plants and food, shelter and cover for fish and wildlife. The highly permeable soils are usually rich in organic matter and readily absorb water from storm runoff and precipitation, slowly releasing it into our streams and wetlands.

As the water passes through the soil, many (but not all) pollutants are filtered out. Some are retained in the soil, others are taken up by the plants. Some plants are able to use the pollutants in their own metabolic processes, others chemically convert them into innocuous compounds, and some species merely store the pollutants in their tissues, releasing them back into the environment when they die and decompose.

Remnants of rich natural resources still remain in the Thornton Creek watershed to the delight of local residents. Towering conifers, shady fern covered ravines, occasional sightings of a great blue heron, bald eagle, river otter, beaver and coyote, and returning salmon and trout spawning in the creek contribute to the appeal of the Thornton Creek Watershed for area residents. These resources provide habitat as well as providing important breathing spaces for area residents and visitors. Local parks provide a refuge for wildlife and a retreat for people. The creek system connects many of the parks and provides a wildlife “corridor” through this developed urban watershed.

Today cutthroat rainbow trout and sculpins are commonly found in the creek. Juvenile coho and chinook salmon inhabit the creek, along with some returning adult coho, chinook, steelhead, and sockeye. Fish resources have been damaged by high creek flows; reduced and damaged habitat; limited food supplies; lack of refuge, degraded spawning and rearing areas; barriers; temperature and dissolved oxygen problems; bank erosion, and impaired water quality.

Problems and Challenges

Due to Thornton Creek watershed’s urban character, much of the historical, native wildlife habitat is gone. Only four percent of the watershed land area remains in public park ownership. These parks contain mature deciduous forests that are reaching the end of their life span. They are not being replenished with young conifers as would happen in a natural succession process. Wetlands are physically and functionally retreating due to encroaching development and increased building density and continue to be denuded, filled, or degraded despite regulatory protections. Native plants are out-competed by exotic species such as Himalayan blackberry and English ivy that have become invasive in this climate zone.

While Thornton Creek is the largest urban stream system in the Seattle-Shoreline area, like other urban streams it does not currently offer prime habitat for fish and wildlife. The land along Thornton Creek and its tributaries is largely privately owned. This means that an estimated 850 (Seattle) -1000 (total) landowners actually own the riparian areas and creek beds. (The water in Thornton Creek and its tributaries is a "water of the State" in public ownership.) Consequently, improving habitat for wildlife and fish in the Thornton Creek area urgently requires active partnership among private and public property owners and managers.

Very recent research indicates that urban creek systems including the Thornton Creek system, do have a role to play in helping fish and wildlife stocks to recover. While a return to "pristine" forest conditions in the major urban areas of the Thornton Creek watershed is unlikely, the cumulative effects of incremental improvements to wildlife habitat in urban areas make valuable contributions to the health of fish and wildlife stocks. Adding habitat improves conditions directly and preserves and improves migratory corridors through developed areas linking the undeveloped areas so fertile for fish and wildlife. This developing understanding of the value of restoring habitat in urban settings is just beginning to gain acceptance by city, county, state, and federal regulators.

Government programs intend to protect habitat in many ways – through laws, policies and programs. The Growth Management Act (GMA) seeks to manage growth in most Washington counties through the adoption of local comprehensive land use plans and development regulations. The GMA emphasizes protection of natural resources including wetlands, and waterbodies in development of comprehensive plans. The GMA protects regional resources by directing growth toward urban areas such as Seattle. Within the watershed, the Northgate area has been identified as an urban center, and Lake City is designated a hub urban village, both prime growth areas. In coming years, both areas will see an increase in high-density housing and commercial growth.

Current approaches

Local building laws, such as the Environmental Critical Areas ordinance, seek to protect stream corridors and wetlands by providing buffers and restricting development. These and other local land use laws attempt to balance private property rights with environmental protection and variances are sometimes issued.

Very recently, the federal government has listed wild chinook salmon and bull trout runs in the Puget Sound region as endangered under the Endangered Species Act. The Thornton Creek watershed drains to the Thornton Creek system and into Lake Washington, water bodies used by the endangered chinook salmon runs. New restrictions, permits, and research about chinook salmon are emerging now and habitat restoration in the Thornton Creek watershed will likely be important to chinook salmon recovery. Currently, permitting for making changes including repairs to areas defined by the federal agencies as potential chinook habitat has slowed due to the additional review mandated by ESA.

Four percent of the watershed is public parkland, therefore efforts to improve habitat will require enthusiastic partnership between government and watershed property owners. Programs such as backyard sanctuaries, native plant landscaping, and tree planting are sponsored by non-profit organizations and local government. Seattle Parks and Recreation Department, volunteer and service groups, and individual property owners are key partners in habitat restoration.

Local stormwater utilities include habitat enhancement elements in their flood control projects and work with other public agencies to improve habitat on public land. However, most of Thornton Creek flows through privately owned property. Programs designed to make the latest watershed science available to watershed residents continue to be developed and expanded.

One of the richest resources in the watershed is the hundreds of active and concerned residents who are working to restore the creek and upland habitats. Hundreds of volunteers, including creekside residents, donate time to remove trash, invasive plants, and replant with native plants. These groups and individuals also find ways to include habitat enhancement in public and private projects located in the watershed.

Acknowledging the challenges ahead and the current character of the watershed, the Watershed Management Committee has formulated a habitat goal and objectives for the future of the Thornton Creek Watershed. In addition, the WMC has developed a list of known sites that we believe need attention. These identified sites are listed as illustrations through the recommendation sections below and a complete list with more detail is attached at Appendix C.

Habitat goal and objectives

Habitat Goal: To protect and improve habitat for native fauna and flora within the Thornton Creek Watershed, and to provide opportunities for people to connect with nature.

We will accomplish this goal by doing the following:

Habitat Objective A	Prevent harm to existing natural habitat
Habitat Objective B	Improve migration corridors for fish and wildlife
Habitat Objective C	Improve the quality of habitat for fish and wildlife
Habitat Objective D	Increase the quantity of habitat for fish and wildlife
Habitat Objective E	Improve access for humans to appropriate natural sites

Habitat

Action Plan Recommendations

Habitat Objective A: Prevent harm to existing natural habitat.

A1. Restrict development in riparian corridors and wetlands.

Develop ways to revise ordinances and better define reasonable use in order to reduce the number of variances to the minimum buffer for streams and wetlands. Continue to allow variances such as setbacks or increased height to promote wide buffers. Look at creative alternatives to retain riparian corridors, preserve vegetation and promote use of native plants and conifers to provide habitat as well as stormwater absorption.

Implementation: Seattle: DCLU, City Council,
Shoreline: Planning & Development Services (PADS)

Estimated Cost: $70,000 for staff time to develop codes, programs.

Funding Source:

Schedule: by 2005

Priority: High

A2. Help streamside property owners control erosion and improve habitat.
Develop a program to assist streamside property owners. Include opportunities for people who have wetlands or seeps on their property.

a) The program could include elements such as a handbook for using streamside landscaping for bank stabilization, habitat improvements, workshops, organized tours of successful projects, and where to get help for large scale bank erosion (government and private companies). The emphasis should be on bioengineering alternatives that provide habitat benefits as opposed to traditional stream bank hardening.
King County Water and Land Resources Division published a detailed handbook for streamside property owners entitled "Streamside Savvy" (March 2000) that may serve as the handbook requested above or may become a starting point for crafting a new handbook for Seattle's urban creeks.
b) Conduct workshops for property owners to assist them in making choices about controlling erosion and improving habitat.
c) Continue looking for ways to develop options to provide financial support to help property owners pay for bioengineering for bank stabilization and erosion control projects on private property.

(See also Chapters 3 and 4 for other ways of assisting property owners to manage stormwater.)

Implementation: SPU, Shoreline

Estimated Cost: SPU: $100,000 + as budget allows
Shoreline: $2,000

Funding Source: Potential grant funding for technical workshops and handbook

Schedule: implement program by 2005. Continue existing efforts.

Priority: High – CORE

A3. Encourage builders to retain areas of native vegetation on their site and to use natural techniques to manage storm water. Develop viable, attractive incentives for builders to exceed current regulations to protect natural features such as trees, wetlands, streams, and riparian corridors, resulting in more undisturbed land at the building site. Create more flexible planting (landscaping) codes for new and re-development that encourage developers and builders to preserve existing native plants already on site and that encourage the use of native plants as appropriate where new landscaping is required. (See also Chapter 3, Stormwater). Developer and Builder incentive programs would reward practices such as:

- Substitution of pervious for impervious surfaces in projects
- Including more open space around projects than currently required
- Creating wetland restoration projects
- Use of "green building" and sustainable building techniques

Incentives might include a discount on building permit costs, variances to allow additional building height, *reducing number of required parking spaces,* and other incentives to be developed.

Implementation: DCLU, City of Shoreline (Seattle and Shoreline City Councils)

Estimated Cost: $25,000

Funding Source: Allocate from DCLU and PADS budgets

Schedule: implement by 2005 and then ongoing

Priority: High

A4. Conduct fish and wildlife surveys

Conduct ongoing fish and wildlife surveys in Thornton Creek and it's tributaries to identify which species are present and where they are found. Develop an appropriate schedule for surveying. Discourage use of electro-shocking as a means to count fish. Use the survey information to prioritize CIP drainage and parks related projects, as a tool for determining habitat property acquisitions, and to improve programs affecting fish, wildlife, and vegetation. Share the information with the public and the Thornton Creek Watershed Oversight Committee. When surveys are to be done, adequate public notice prior to the survey should be provided to creekside property owners whose property will be visited during the survey.

Implementation: SPU

Estimated Cost: SPU – $150,000 initially + .1 FTE annually

Funding Source: Continue allocation from Resource Management budget

Schedule: Began in 1999

Priority: High – CORE

A5. Develop a central wetland contact in the watershed.

Currently, citizens with questions on wetlands may be referred to DCLU, Parks, King County or other places. Establish a central place for citizens to call for wetland information. This central place should be able to give advice on identifying wetlands, protecting wetlands, development and wetlands, wetland mitigation efforts, wetland restoration projects, frog ponds and the like.

Implementation: Find a lead, check Washington Wetlands Wetnet as a possibility, also King County DNR

Estimated Cost: 1 FTE ($70 – 80K)

Funding Source: Potential grant funding, possible King Conservation District? potential contribution by SPU and others

Schedule: by 2005

Priority: Medium

A6. Publicize opportunities for private land owners to receive credit and assistance to conserve private open space.

Advertise and promote programs such as conservation easements, King County's Public Benefit Rating System (a program offering tax incentives to property owners who willingly leave portions of their property in a natural state). Use previously identified outreach methods such as newsletters, annual events, etc.

Implementation: Community groups and Cities of Seattle and Shoreline make opportunities available in other programming

King County DNR
Land Conservancy
Trust for Public Land

Estimated Cost: $20,000 for materials

Funding Source:

Schedule: 2000-2001

Priority: Medium

Habitat Objective B: Improve migration corridors for fish and wildlife.

B1. Remove fish passage barriers

Identify all adult and juvenile fish barriers in Thornton Creek and major tributaries and remove or repair them to allow for fish passage.Use research and data gathered by Washington Trout in the Thornton Creek system (and any research to follow) to facilitate efficient removal of barriers in accordance with Washington state law as enforced by the Washington Department of Fish and Wildlife.

Implementation: Seattle: (public land) SPU lead
Shoreline: (public land) Public Works
On private property: Washington Fish & Wildlife lead, work by private property owners

Estimated Cost: WA Trout work cost to date??? CCC costs to do work to date??

Funding Source: For Seattle: Drainage CIP
For Shoreline: CIP budget
For private property: property owners

Schedule: Ongoing

Priority: High

SPU Note: Fish barriers are against state law, therefore agencies are required to make removal of these barriers a priority in their CIP programs.

B2. Look for collaborative ways between public and private property owners to enhance and promote connectivity of migratory corridors for wildlife within the

watershed .

Consult Washington Fish and Wildlife, the Seattle Urban Nature Project, Seattle's Urban Wildlife and Habitat Management Plan, King County Wildlife Program, and other studies as they become available to determine which species still migrate through Thornton Creek watershed and their patterns of migration. Use the information as a guide for determining important green belts both along Thornton Creek and its tributaries, as well as through the watershed intersecting the Thornton Creek system. Decide if there are species that could be encouraged to return to the watershed if measures were taken to restore certain elements of their migration habitat. Use Habitat Chapter recommendations such as A1, A3, A4, A7, A8, C3, C5, D1 and other collaborative approaches to preserve green belts, riparian corridors, and
other habitat areas found necessary for successful and/or continued wildlife migration.

Implementation: SPU, City of Shoreline

Estimated Cost: .1 FTE annually ($8 – 10K)

Funding Source: Existing agency budgets

Schedule: 2002

Priority: High

Example projects for objective B: (see appendix X for list)

- Beginning at the mouth, remove the first five fish-passage barriers on public reaches of Thornton Creek as identified in SPU/Washington Trout's Thornton Creek surveys of 1999-2001.
- Connect and expand riparian corridors in Jackson Park Golf Course stretch of creek.

Habitat Objective C: Improve the quality of habitat for fish and wildlife.

C1. Develop guiding principles for in-stream restoration done by Seattle, Shoreline, or community groups.

Develop guiding principles for City, TCA and Action Plan restoration projects. These guiding principles would be used to prioritize potential projects and shall be further refined

and developed as the applicable science evolves and contributes to better understanding of the Thornton Creek Watershed. The defining goal of such guiding principles is to seek constant progress towards recovering as much as possible of the watershed's historical ecological function.

As a basis for this work, proposed projects or programs should be subject to the following questions:

- Does it address a problem that is causing immediate or imminent harm to salmon (as a keystone species indicating stream and watershed health)?
- Does it improve, protect, or restore an ecological process, or processes, that can sustain and improve ecological functions, both in the project area and elsewhere in the basin?
- Compared to other possible projects in the basin, are its benefits relatively vulnerable to being degraded or minimized by other conditions in the basin (e.g., stormflows, water quality)? If so, are these other conditions being addressed? Should they be addressed prior to construction of this project?
- Does it address a known limiting factor for salmon? Compared to other possible projects in the basin, will it benefit a relatively large number of salmon?
- Does it promote connectivity of habitats? What is the quality of the connected habitats?
- Will it benefit multiple species? Aquatic and terrestrial? Compared to other possible projects in the basin, will it benefit a relatively large number of these species?
- What is our confidence that the project will achieve the benefits predicted for it? How do those benefits compare to the costs? If there is unusually great uncertainty that he benefits will be achieved, are there still important lessons that can be learned from constructing the project as an experiment?
- Does it incorporate principles of adaptive management (i.e., target monitoring to determine whether the project is accomplishing the goals set for it)?

Implementation: SPU, Shoreline

Estimated Cost:

Funding Source: SPU: Resource Management Budget
Shoreline: TBD

Schedule: Complete draft principles within 2 years of action plan adoption

Priority: High – CORE

C2. Host a Thornton Creek Watershed Urban Fish Workshop.
Invite local fish experts to a workshop to discuss salmon fisheries Thornton Creek and other urban streams. Develop restoration goals and identify important restoration actions. Discuss guiding principles (see C1 below) and make appropriate revisions.

Implementation: Thornton Creek Project (convenor) (Ask them!)

Estimated Cost: fish panel -- $2,000 for staff and materials

Funding Source: grant funding, possibly SPU Step Grant or other source

Schedule: 2002

Priority: Medium

C3. Improve Thornton Creek stream flows.

a. Encourage people not to use water rights or to reduce the amount of water taken from the creek. Protect minimum stream flows by reducing legal and illegal water removals from the creek. If needed, set minimum stream flows for Thornton Creek. Inform the public that it is unlawful to use creek water to irrigate lawns and gardens without water rights and the effect this has on creek inhabitants.

Implementation: Department of Ecology, SPU, Shoreline, and TCA for assistance

Estimated Cost: $25,000 annually

Funding Source:

Schedule: Develop and implement by 2005

Priority: High – CORE

b. Specifically, reduce water withdrawal by Jackson Park Golf Course. The golf course currently withdraws 2/3 of the flow in the North Branch for approximately eight hours per day for half the year. The golf course may consider any of the following methods: improved, hi-tech irrigation system, more drought tolerant grass, city water, use of stormwater or other idea.

Implementation: Municipal Golf, DPR, SPU

Estimated Cost: See chapter 3, stormwater recommendation D4

Funding Source: Drainage and Wastewater fees/SPU CIP budget

Schedule: Existing, planned SPU project to create new ponds and use new technology to reduce water withdrawal at Jackson G.C. should be implemented by 2002 and additional methods employed by 2005

Priority: High – CORE

(See also Chapter 3, stormwater, for more recommendations relating to stream flow)

C4. Improve in-stream conditions on public land. Develop off channel rearing ponds and refuge for over-wintering trout and salmon as well as amphibians. Add habitat diversity to pools located on public property. Consider adding more large woody debris and/or artificial habitat structures at appropriate locations. Recently several of these projects are underway (Meadowbrook Pond, Meadowbrook Creeklet, tributary at Matthews Beach, Paramount Park, Park #6).

Implementation: SPU, Sea. Parks, Shoreline

Estimated Cost: Seattle: $250,000 + annual maintenance costs.
Shoreline: $20,000 + annual maintenance costs.

Funding Source: Seattle: Drainage CIP ("Urban Creeks")
Shoreline:

Schedule: Ongoing

Priority: High

C5. Inventory, enhance, and maintain areas with good riparian habitat.
Note: Currently projects may be limited to public property.

a) Improve vegetation by removing noxious and other invasive plants and planting native plants, especially conifers, on public land. Include "street ends" when considering public land. Maintain these sites. Use these areas as starting points for restoration projects so that areas of good habitat continue expanding. (Note: Seattle Urban Nature Project conducted field surveys and mapped vegetation on public land in 2000.)

Implementation: Community Organizations (such as WA Native Plant Society)
Local Creek Stewardship Groups (SPU, DPR, TCA)
Conservation Corps and other similar organizations

Estimated Cost: $25,000 initially + $5,000 annually

Funding Source: Grants

Schedule: 2000-2005

Priority: High – CORE

b) Monitor these sites over time. Evaluate the success of these projects when designing new ones. Address repairs or revisions if needed. Share findings with Watershed Oversight Council.

Implementation: City of Seattle
City of Shoreline
Seattle Urban Nature Project

Estimated Cost: Seattle: $50,000 annually

Funding Sources:

Schedule: 2000-2005

Priority: High – CORE

C6. Use a variety of programs to encourage native plant use.

Promote native plants and nature-scaping in the watershed. Native plants provide food, shelter and nesting opportunities for native wildlife. Native plants thrive in the Northwest and require less fertilizer, pesticides and water. Native plants may be used to reduce long term maintenance costs. Native plant programs could include the following:

- Workshops and/or garden tours on native plant landscaping.

Potential sponsor: WA Native Plant Society

- Native plant landscape handbooks with lists of native species for upland and riparian zones, or other appropriate activities.
  Potential sponsor: King County and Dept. of Ecology currently publish these handbooks.

- Create a "Native Plants Week", promoted in nurseries, etc. coordinating with environmental groups.
  Potential sponsor: WA Native Plant Society, Seattle Audubon. Public notification through the Thornton Creek Watershed Oversight Council, TCA and others.

- Create a website that shows a native plant garden in different seasons and identifies plant names and where to buy them locally
  Potential sponsor: UW Department of Landscape Architecture, other local college, or WA Native Plant Society.

- Develop workshops and/or information about frog/amphibian ponds and habitat.
  Potential sponsor: WPZ Herpetology Dept. and Keepers, UW (Klaus Richter), NSCC

- Create Native Plant gardens in high-traffic and visible areas such as popular nurseries and traffic circles.
  Potential sponsor: NDNSC, TCA, SEATrans, WA Native Plant Society, Sky Nursery

- Participate annually in the Northwest Flower and Garden Show with demonstrations that promote native plant landscapes.
  Potential sponsor: Possible collaboration between Seattle Audubon, WA Native Plant Society, TCA, TCP, interested nurseries and growers.

- Continue to promote use of native plants in Park properties.
  Potential sponsor: Seattle and Shoreline Parks Departments

- Use the Environmental Learning Center to showcase native plant gardens.
  Potential sponsor: SPU (if ELC developed)

- Expand Nathan Hale and Shorecrest High Schools' existing horticulture program to include more native plants.
  Potential sponsor: TCP and TCA currently assist Kate Reedy at Nathan Hale.

Implementation: Watershed Oversight Committee would encourage

Estimated Cost: $25,000 annually + grants as available and volunteer hours.

Funding Source: TBD by implementer

Schedule: 2000 and ongoing

Priority: Medium

C7. Increase the number of trees and understory shrubs.

Use local government programs to increase the number of trees and shrubs in the Seattle-Shoreline area. Encourage tree planting by volunteer groups, homeowners, and businesses in the watershed. Protect Large Trees through the City Tree Ordinance. Use several strategies to increase the number of trees and shrubs in the watershed and regionally. These strategies include:

a) Add "Net increase in tree cover, especially conifers" to Shoreline and Seattle city goals.

Implementation: Seattle: Seattle City Light, Seattle Parks, SEATrans
Shoreline: Shoreline Parks or other appropriate departments

b) Promote street tree use on unimproved streets. Encourage citizens to take advantage of the free tree programs.

Sponsors: Seattle City Arborist and Dept. of Neighborhoods

c) Improve tree program coordination in city departments with respect to tree cutting, pruning, planting.

Implementation: City of Seattle, Urban Forester, City Arborist, Seattle City Light, SEATrans
City of Shoreline, City Arborist or Urban Forester

d) Promote and advertise programs for enhancing tree planting and care, such as Seattle's Tree Steward Program.

Sponsors: Seattle and Shoreline City Arborists, Plant or Tree Amnesty organizations

e) Green" north end streets as described in the neighborhood plans. Support and help implement the North District Neighborhood Plan and the Northgate Comprehensive Plan to "green" boulevards, parking lots, around commercial areas, and plant street trees using non-invasive species, opting for native species where appropriate. (Applies to Seattle only.)

Implementation: Seattle: SEATRAN lead with Dept of Neighborhood assistance

f) Work with non-profit groups to supplement trees in the watershed. Coordinate with Heritage Tree Programs to promote more trees in Seattle.

Implementation: Seattle: Urban Forest Coalition

g) Support neighborhood grant applications for purchasing trees and shrubs.

Sponsor: TCA with possible agency assistance for training purposes.

h) Protect large trees during site development and discourage topping of live trees. Develop a program that includes pruning alternatives to topping as well as provisions for inspection and enforcement. The program should use incentives.

Implementation: Seattle – DCLU "protect during development"
Program: Urban Forest Coalition

Estimated Cost: TBD by implementers

Funding Sources: TBD by implementers

Schedule: Continue existing programs, begin new efforts by end of 2002

Priority: High

C8. Remove and control noxious and invasive weeds.

Noxious and invasive weeds cause problems for the Thornton Creek watershed. The weeds often out-compete native plants. The invaders may not provide suitable alternatives for food, shelter and nesting for native wildlife. In addition, invasive species may form mono-typic stands and decrease the diversity of flora in the watershed. There are a number of recommendations to reduce noxious weeds. Seattle Urban Nature Project information (maps) are available to pinpoint and guide removal of invasive plant species on public property and pinpoint locations for revegetation projects using native plant species when possible.

These include, but are not limited to:

a. Identify public property invaded by exotic weeds such as blackberries, morning glory, English ivy, and Scot's Broom. Utilize research and data acquired by King County Noxious Weed Board.
Implementation: Seattle Urban Nature Project (for Seattle)

b. Augment volunteer work parties by hiring summer crews to remove invasive plants and replace with native plants.
Implementation: Seattle: DPR and SPU
Shoreline: Shoreline Parks Department

c. Reduce noxious weeds along Interstate 5.
Implementation: WSDOT, local volunteer groups

d. Provide training on noxious and invasive weeds to City staff and local groups such as the Master Gardener program, and Spring and Fall Cleanup event participants.
Implementation: King County, Washington State Extension Program

e. Post information messages at local P-Patches and the Environmental Learning Center.
Implementation: Community Groups

f. Increase funding to noxious weed control board if possible.
Implementation: King County

g. Clarify local jurisdictions legal responsibility as it relates to noxious weed control and enforce.
Implementation: King County Noxious Weed Control Board

h. Support local stewardship and periodic work parties to remove and control noxious and invasive weeds throughout the watershed on public properties. Also support efforts by groups of watershed residents who hold workdays to coordinate removal of invasives on properties adjacent to theirs.
Implementation: Seattle and Shoreline Parks, SPU, King County Noxious Weed Control Board

Estimated Cost: Varies. As determined by implementer

Funding Source: TBD by implementer

Schedule: Ongoing

Priority: High

C9. Develop programs to reuse trees that are cut down.
Develop a program to transport and store cut trees. Use these trees as Large Woody Debris in creek restoration projects. King County has a program that could serve as a model. A place to store tree trunks is needed as well as a means to transport trees from donor sites to the storage yard.

Implementation: TCA, with Parks and SPU

Estimated Cost: $25,000 annually. Buying/leasing storage space initially + transport and labor annually

Funding Source:

Schedule: 2000 and ongoing

Priority: Medium

C10. Develop North Seattle Community College programs to protect wildlife.

a) Begin and maintain a feral cat-capturing program at NSCC. Feral cats are a problem at NSCC; they kill a large number of birds and other animals.

b) Install snags (not treated with creosote) and plant trees in and around the NSCC pond. These could provide additional bird habitat.

Implementation: NSCC

Estimated Cost: $25,000 initially

Funding Source: Grants

Schedule: Begin in 2002

Priority: Medium

Example projects for objective C: (see appendix XX for list)

- Restore wetlands such as:
  Twin Ponds Park in Shoreline
  North Seattle Community College
- Re-create and enhance forests to create secessional conifer forests in places such as:
  Thornton Creek Parks 1, 2, 6
  Sand Point Way Open Space
- Create fish refuge areas , prioritizing salmon bearing reaches.
- Seek ways to work with creekside private property owners to increase instream diversity on their land.
- Seek ways to improve habitat quality on private property

D1. Continue to purchase wetland and creekside property for habitat value.

As funds are available, purchase natural areas alongside Thornton Creek. Work with the WMC and future Oversight Council to develop a priority list of sites. Refer to the list of sites developed by the WMC and found in Appendix XX. Oversight Council will have the option to re-prioritize the site list as necessary. Put a high priority on wetlands and areas with good habitat. In addition to habitat value, potential locations should be evaluated for detention and/or water quality benefits, and a willing seller.

Implementation: SPU, Sea. Parks; support from WMC or Oversight Council

Estimated Cost: SPU, Parks -- As funding is available
Shoreline -- $125,000 in Paramount Park + Avail. Funding annually for new sites.

Funding Source: As available in City budgets

Schedule: SPU, Parks – Ongoing

Priority: High

D2. Restore, create or re-create wetland habitat

As funds are available, purchase and maintain existing wetlands, and historic wetland sites, for protection or restoration. These wetlands and sites should be used for re-

creation, to increase wildlife refuge, provide natural rainwater detention, improve water quality and increase groundwater recharge and infiltration. Alternatively, help owners of existing wetlands set up conservation easements to protect the wetlands. Identify locations and sizes of existing and former wetlands in the watershed. Set criteria for selection of wetland sites to be preserved, restored, created, or re-created and develop an ongoing program to care for the selected sites.

Implementation: SPU, Sea. Parks, City of Shoreline; support from WMC or Oversight Council

Estimated Cost: SPU, Parks -- As funding is available
Shoreline – As funding is available

Funding Source: As available in City budgets

Schedule: SPU, Seattle Parks, Shoreline – Ongoing

Priority: High

D3. Develop a donation program.
Develop a program to accept land donations to Seattle and Shoreline Parks Departments.

Implementation: Sea. Parks

Estimated Cost: Sea. Parks -- $10,000 annually to administer
Shoreline -- .2 FTE initially + 1 FTE annually

Funding Source: Grants

Schedule: Sea. Parks – Ongoing
Shoreline – 2003

Priority: Low

D4. Establish a Thornton Creek Conservancy to seek funding for purchase of property along the creek corridor and near local wetlands

Implementation: TCA to explore

Estimated Cost:

Funding Source: numerous – TBD

Schedule: Establish by 2005, ongoing effort

Priority: Low

Example projects for objective d: (see appendix XX for list)
Past land acquisitions have included:

- Purchase of two residential properties near Meadowbrook Pond for use as future detention, habitat enhancement, wetlands or other ecological functions.
- Purchase and removal of house at NE 125th St. and 35th Ave NE. Site converted to detention facility by SPU.

Habitat Objective E: Improve access for humans to appropriate natural sites

E1 Inventory and evaluate trails within the Thornton Creek Watershed

Inventory, evaluate, and study existing public properties throughout the watershed that provide a potential for non-damaging public access. Update this inventory and evaluation on a regular basis.

The Thornton Creek Watershed Management Committee does not support a riparian trail system on private land along Thornton Creek.

If needed, alter existing trails to provide minimum impact, including adding boardwalks, decommissioning trails, building or maintaining bridges, and directing visitors to designated trails instead of creating their own. Continually study new materials and techniques for using trails with minimum impact that still allow the public to have appropriate access to the creek. Public properties and trails suited to public access should be inventoried regularly. Evaluate and update trail maintenance guidelines regularly to incorporate new materials and techniques to minimize the impact of public access.

When proposals for new or changed access to trails and creekside open space are proposed, the following criteria shall be met:

- Affected creekside and riparian property owners will be involved in the process.
- The Thornton Creek Watershed Oversight Council will be consulted to help determine that no harm or irreparable damage is done to the creek, riparian buffer, or adjacent property.
- Trails and affected open spaces will be adequately and regularly maintained.

Any sites or projects proposed for new or changed access should be prioritized based on the support, or potential support, of property owners directly adjacent to sites under consideration.

Implementation: Seattle and Shoreline Parks Departments

Estimated Cost: Seattle: $50,000 to inventory and evaluate public areas for non-damaging creek access.
$50,000/year to maintain open spaces in Thornton Creek Watershed.
Shoreline: inventory and evaluate as evolving programs allow

Funding Source: Existing budgets

Schedule: Begin in 2002

(See also Chapter 6, Education and Stewardship for additional recommendations about access by students.)

Chapter 6

Education and Stewardship Recommendations

Problem Summary

A recent phone survey of residents in the watershed found that half the people contacted couldn't name Thornton Creek or its tributaries when asked to identify a creek near their home. The success of the Action Plan depends on residents being more aware of the watershed and committed to protecting and restoring the creek and watershed. The next goal of outreach efforts will focus on residents less aware of watershed issues.

The ultimate goal of awareness and education is to create stewards. But first, people have to be aware of and appreciate a thing before they will want to take care of it. So the first challenge is to make watershed residents aware of the creek and watershed, the benefits it offers, and the impact people have on the creek. The real challenge is to get people to change their behaviors.

Current Solutions

Local residents learn about the watershed in a number of ways. Articles in local papers, community meetings, workshops and lectures, newsletters and even welcome signs alert residents that live in the Thornton Creek watershed. More than thirty schools are located in the watershed and many have programs that incorporate the creek, for example, Salmon in the Classroom, storm drain stenciling, creek and wildlife monitoring. Even writing, art and history classes use the creek as a learning focus.

Two non-profit groups, the Thornton Creek Alliance and the Thornton Creek Project, have been terrific partners in developing the Watershed Action Plan. These organizations are dedicated to informing and involving the adults and children of this community. Several local government groups also support stewardship. Seattle's Adopt-a-Park program organizes many efforts to plant native trees and shrubs and control invasive plants. Seattle Public Utilities Urban Creeks Legacy program involves residents in understanding and caring for creeks.

The Watershed Management Committee has formulated an Education and Stewardship goal and objectives for the future of the Thornton Creek Watershed.

Education and Stewardship Goal and Objectives

Education/Stewardship Goal*:* To improve awareness of, foster pride in, encourage responsibility for, and create learning opportunities within the watershed.

We will accomplish this goal by doing the following:

Educ./Stewardship Objective A*.*	Increase basic awareness of and appreciation of Thornton Creek and its watershed.
Educ./Stewardship Objective B*.*	Integrate watershed education into school programs at all levels. Maintain and improve existing programs.
Educ./Stewardship Objective C*.*	Provide learning opportunities for the general public.
Educ./Stewardship Objective D.	Promote stewardship.

Total: 18 Recommendations

Education and Stewardship Action Plan Recommendations

Education and Stewardship Objective A: Increase basic awareness of and appreciation for Thornton Creek and its watershed.

A1. (A) Create and produce a color brochure, which describes the watershed, (B) install welcome signs and creek crossing signs, and (C) create murals.
Create a color brochure, which highlights the watershed's best features, and lists ongoing efforts to maintain and improve its health. This brochure should include a "super map" of the watershed. The brochure could be poster size and should use artistic and technical cartographic techniques. It could include things like parks and "right places" for public access to the creek. Distribute it to watershed residents. Ideally this brochure could be developed in multiple languages found with in the watershed and appropriately distributed. (There are approximately 32,000 homes in the watershed.)

Install and maintain good signage, in appropriate locations, marking entrances to the watershed and creek crossings. These signs will welcome drivers/bikers/walkers into the watershed. Some signs will help people find the creek by marking locations where the creek crosses roads, including I-5. Respect for resource protection and private property should be made when deciding where to locate the signs. This recommendation requires new signs and moving any existing signs, which are currently misplaced. (Approximately 8 signs are currently located in the watershed, however, several signs are poorly positioned.)

Creatively use murals to welcome people into the watershed and convey the benefits of a healthy watershed. Locations in the watershed could be public or private (e.g. the concrete wall at NE 95th St. and Lake City Way). Work with Chamber of Commerce to

combine Business District and Watershed messages. Students could be the main artists for the murals with assistance from a professional to bring the images together.

A, C) Implementation for art projects: SPU and Shoreline

Estimated Cost: $10,000 design, $50,000 printing, $10,000 distribution

Funding Source: 2001 Potential to include in SPU/Seattle Arts Commission Joint Project ($50,000), other funding sources to be sought

Schedule: 2001-2004
Priority: High – CORE

B) Implementation for sign maintenance: Seattle (SEATRAN, SPU, DPR as appropriate), WSDOT, Shoreline

Funding Source: Existing funds

Estimated Cost: $20,000

Schedule: 2001-2003

Priority: High – CORE

A2. Develop an education program linked with Envirostars that is specific to the Thornton Creek Watershed. The program should educate business owners about environmentally sensitive disposal of paints and chemicals, low impact landscape maintenance practices, avoiding and reducing runoff and pollution from parking lots and impervious surfaces, and provide a recognition program for businesses who follow 10 or more of these practices. Work with Lake City and Northgate Chambers and business associations (Rotary, Kiwanis, etc.) to develop packets of creek-related information and contacts that they can distribute to new business owners as part of welcome packets.

Implementation: King County, SPU Community Services Div.

Estimated Cost: Existing budgets, programs

Funding Source: Existing program

Schedule: 2001 and ongoing

Priority: High

A3. (A) Meet with all existing community groups (neighborhood councils, service organizations) to ask for their input and comments and to seek endorsement of the completed action plan. Ask them to identify one member as a liaison to watershed-related activities.

Implementation: Thornton Creek Watershed Management Committee or Oversight Council

Estimated Cost: Existing budgets for public agencies/volunteer

Funding Source: Volunteer

Schedule: 2000 and ongoing

Priority: High

(B) Work with athletic organizations to incorporate awareness of the creek into their activities.

For example, groups could rename events and call them the Thornton Creek Invitational Tournament, or the Thornton Creek Playoffs, etc. Provide incentives, such as baseball caps, tee shirts, golf balls with the Thornton Creek Watershed logo or message.

Implementation: Lake City Task Force, Chamber of Commerce, sponsoring businesses, with participation from athletic organizations.

Estimated Cost: $15,000 for “freebies” from business partners

Funding Source: To be sought

Schedule: 1999, ongoing

Priority: Low

(C) Create a brief public service announcement for viewing at local movie theaters during the “Coming Attractions.” This would ideally be a low-cost, high quality production with educational message similar to a PSA.

Implementation: Who?

Estimated Cost: $5,000 Grant or *pro bono* from video school

Funding Source: Video class plus movie theaters in the watershed

Schedule: 2000-2005

Priority: Low

(D) Work with Realtors to develop a "Welcome to the Watershed" information packet.
Work with realtors or title companies to distribute to "Welcome to the Watershed" packets to potential property buyers. A key piece in this packet could be the TCW brochure w/ super map. This packet could also include messages about City programs and conservation.

Implementation: Potential project for the Watershed Interpretive Specialist (see B1 below)

Estimated Cost: $5,000 to start; $1,000/year ongoing.

Funding Source: To be sought

Schedule: 2000

Priority: Medium

(E) Work with Northgate Mall to increase watershed awareness.
Work with Northgate Mall to identify opportunities to use the Mall as a means of conveying watershed messages to a large audience. Potential ideas include: donated kiosk space, use of open space for a creek festival, partnerships to adopt Park #6, displaying student watershed projects.

Implementation: Thornton Creek Watershed Oversight Council

Estimated Cost: To be determined

Funding Source: To be sought from private sources

Schedule: 2000 and ongoing

Priority: High

(F) Work with watershed restaurants to develop and use watershed information place mats possibly based on chapters from the student-created Rudy book.

Implementation: TCP, printing companies and restaurants

Estimated Cost: $2000 design (donation), $5,000 (donation)

Funding Source: To be sought

Schedule: 2000

Priority: Low

(G) Contact mail carriers, police officers, and Block Watch volunteers to serve as "eyes and ears" of the watershed. Provide training on how to spot and report violations.

Implementation: Who will lead? Project of Thornton Creek Alliance? Thornton Creek Watershed Oversight Committee?

Estimated Cost: $1,000 staff time

Funding Source: To be sought

Schedule: 2001-Ongoing

Priority: High

A4. Promote the "Master Home Environmentalist" program and incorporate additional watershed friendly tips.

Provide a "healthy home" analysis for watershed residents using the existing Washington Toxics program, "Master Home Environmentalist." Under this program, volunteers visit interested households to provide a healthy home analysis. Promote the use of existing alternative cleaning products, household hazardous material alternatives, landscaping practices that reduce pesticide and herbicide use. Expand program to include tips or advice on stormwater management.

Implementation: WA Toxics Coalition

Estimated Cost: $15,000

Funding Source: Expansion of current program, additional funding if needed to be sought.

Schedule: implement by 2005

Priority: High

A5. Promote appreciation for and care of local wildlife, plants, parks and open spaces. Use a variety of techniques.

a) Use brochures, maps, newsletters, newspaper articles, guide books and/or signs to acquaint residents with the features and locations of local parks and open spaces.
b) Use signage on garbage cans in parks, bus stops or benches.
c) Continue a Thornton Creek newsletter beyond the action-planning phase. The newsletter should include updates on the action plan, articles about local places, wildlife features, volunteer opportunities, water quality and others.

d) Enhance existing Thornton Creek web sites (www.Thorntoncreek.org) to connect the reader to volunteer opportunities and provide a current schedule of events within the watershed (tours, plantings, volunteer work, monitoring, school activities etc.).
e) Add interpretive signs to public spaces. Plan, design, install, and maintain, high quality, permanent, site specific interpretive displays. These should be located in public places such as parks. The purpose of the displays is for the reader to gain an understanding of the watershed and its features. The signs should fit together as part of a comprehensive project.

Implementation: Watershed Interpretive Specialist, potential for inclusion in the SPU/Arts Commission Project of 2001

Estimated Cost: unknown

Funding Source: To be sought, design and implementation of some portion of these recommendations could be included in the SPU/Arts Commission Project of 2001 ($50,000)

Schedule: implement by 2005

Priority: Medium

A6. Encourage residents to explore and learn about the watershed. Some activities include:

a) Offer guided nature hikes in watershed parks. Coordinate walks with local community centers, after-school programs, libraries or other public gathering places.
b) Provide several watershed van tours every year. The tours should invite people to come back and explore locations on their own. Tours should introduce participants to a new park or open space as well as educate people on watershed issues.
c) Improve trails. Some of the local parks are not identified as park property and trails are hard to find. Develop an overall trail policy that would guide future improvements. These improvements could include: identify trail heads with signs, improving existing trails to help keep folks and pets on the trail by using walkways, treated paths, bridges, viewing platforms, retiring old trail and relocating trails out of sensitive area (e.g. wetlands). Use BMP's to promote infiltration where possible.
d) Distribute the TCP "Right Places Guide." Thornton Creek Project's "Right Places Guide" identifies suitable locations for large and small groups to visit the creek. The Guide includes parking and access information.
e) Host an annual creek festival designed to increase awareness of the creek, celebrate its vibrancy and recognize volunteer work. This may overlap with a recommendation to host an annual "State of the Watershed" event which can be used to update the community on progress in watershed issues. (See the Monitoring Section).

Implementation: Watershed Interpretive Specialist

Estimated Cost: To be developed

Funding Source: DPR, SPU for City of Seattle, with private partners
Shoreline: build into programs as they develop

Schedule: implement by 2005

Priority: Medium

Education and Stewardship Objective B*:* Integrate watershed education into school programs at all levels. Maintain and improve existing programs

B1. Provide staff and organization to support education programs

A) Watershed Interpretive Specialist
Create an agency staff position responsible for initiating and coordinating outreach and non-advocacy education efforts in the general watershed community. Existing education materials would be used where appropriate and new materials developed as needed. Tasks would include: maintaining a program of on-going communication with watershed residents, including a newsletter, articles/ads in a regularly published local newspaper, and other appropriate means; helping to connect community restoration and monitoring projects with necessary technical assistance; development of previously mentioned super map/brochure and other previously recommended outreach programs. This person could be housed in the Watershed Learning Center and have some role in managing that center.

Implementation: City of Seattle and City of Shoreline

Estimated Cost: 1.0 FTE $90,000/year

Funding Source: SPU for .5 FTE, To be sought for additional .5 FTE

Schedule: 2000-2005

Priority: High – CORE

B) Fund Thornton Creek Project Manager, 10 month position.
This person manages all the various projects, events and volunteers that comprise the Thornton Creek Project, whose mission is supporting the use of local watershed in education making local community an essential element of teaching and learning. The focus of this project is primarily on watershed education in the public and private watershed schools in Seattle and Shoreline. Some of the work is already existing and would be ongoing, whereas some of the work is new in recommendations for watershed

education in schools. The Project Manager is one of four positions with the Thornton Creek Project and the only full time position that make the work of TCP possible. The Project Manager would work collaboratively with the Watershed Specialist where appropriate and both would lead or support implementation of recommendations from throughout the Plan. Among other things, this person would provide high quality, ongoing program workshops, tours and forum programs to help local educators, students, residents, and businesses understand the watershed, stewardship, and sustainable living issues. Though primarily focused on this watershed, the project cooperates with and supports educators throughout the City and County.

Implementation: City of Seattle (SPU), City of Shoreline, North Seattle Community College share support of this position over time

Estimated Cost: $43,000 (with cost of living adjustment each year)

Funding Source: 2000-2001 SPU, annual comparison of program interests between TCP and SPU to be conducted with mutual evaluation and setting of annual program goals and tasks

Schedule: 2000 and ongoing

Priority: High

C) Support and encourage ongoing funding for other three Thornton Creek Project Positions

1. Teacher "Schools Coordinator" (Annually Rotating), 0.5 FTE: $27,000 (with annual cost of living increase). Funding for this position varies each year depending on where the teacher is normally employed. (from either public or private schools). This person assists in accomplishing the work of the TCP, and focuses energy on Adult Learning opportunities and ensuring that we are best supporting educators. Person in this position is annually changing and responsibility for funding is annually rotated between NSCC, Seattle and Shoreline schools, and independent schools.

2. Teacher Director (Permanent), 0.25 FTE: $20,000 Funding currently comes from Lakeside School.

3. Technology Coordinator, 10 Month Internship: $27,000 (with annual cost of living increase). Funding for this position has come from King County, local businesses, and individual donors in the past, but could also include City of Shoreline. This person maintains the TCP technology Program, including all electronic forms of communication, the Community Library, GIS training workshops and in class use, the TCP website, and supervision of technology related volunteers.

Implementation: TCP lead (TCP is an institute of North Seattle Community College directed by a "Stewards' Council" of representatives from a wide range of public and private entities).

Estimated Cost: $74,000 annually (plus cost-of-living increases over time)

Funding Source: Shared by public agencies and private donors through TCP "Stewards' Council"

Schedule: Ongoing

Priority: High

D) Watershed Education Co-ordinating Group

As with all the recommendations in the action plan, ongoing assessment educational and public awareness efforts is important in achieving our goals. Initiate and maintain a committee, meeting regularly, with representatives of all groups involved with community and school education in Thornton Creek Watershed. The functions of this group would be agreeing on watershed education and awareness goals, sharing of information, fostering relations and communication between groups, assessing the impacts and outcomes of education efforts and adjusting efforts accordingly. Recommended projects include but are not limited to:

a) [was f below] Assess public school transportation needs for watershed based activities, develop a plan and fund transportation for class field trips, because transportation is a significant barrier to participation for public watershed schools. This would augment, not replace, current walking and bicycling field trips that some schools take.

b) [was e below] Ensure that Professional Development funds are available to watershed teachers to defray the cost of watershed workshops/symposia etc.

c) [was B6] Promote use of Thornton Creek watershed by watershed area higher education programs. Ideas include, but not limited to:

(1) University of Washington classes from such programs as Fisheries, Landscape Architecture, Information Science, Education, Carlson School of Public Affairs, etc.
(2) Work with vocational programs in local community colleges, high schools, and private institutes to offer watershed relevant opportunities to the community, such as a day when automotive students will inspect your vehicle for free to check for any fluid leaks.
(3) Include watershed based projects in appropriate courses at schools at all levels in the watershed suchas student research, compiling a "Fisheries History" of the watershed, including watershed-based themes in developing literature or art projects, or researching the effectiveness of k-12 student learning with watershed-based activities.

Implementation: TCP as convenor

Estimated Cost: .1 FTE (for staffing, additional costs for projects)

Funding Source: Grant funding will be sought, may also be funded in part by SPU as part of annual discussions of mutual interests with TCP

Schedule: 2002 to initiate

Priority: High – CORE

B2. Encourage and support the continuing development of a logical progression of watershed-related learning experiences in all watershed schools. Actions including, but not limited to:

a) Build a packet of enrichment activities that support Seattle and Shoreline Public Schools' "Essential Learning Requirements," in many disciplines such as science, social studies, and visual and language arts.
b) Make available an on going list of potential watershed based projects and topics of study for classes of any level.
c) Make available a list of current and possible stewardship projects for classes.

Implementation: Thornton Creek Project and SPU with support and participation of Seattle and Shoreline Public School Districts, private schools, and higher education institutions.

Estimated Cost: Included in B1 estimated costs

Funding Source: Project funding will be sought for products, staffing could be funded as part of annual discussions of mutual interests by SPU

Schedule: Ongoing

Priority: High

B3. Provide systemic support for educators who connect their students with the watershed. Actions including, but not limited to:

a) Hold workshops aimed at cross-curricular/cross-grade teams of teachers from watershed schools - a minimum of once a year.
b) Maintain and improve annual series of workshops, forums, roundtables, and symposia for watershed teachers.
c) Expand and maintain current *network of one lead teacher per school* as conduits for communication between schools, the Thornton Creek Project.
d) Hold a meeting/roundtable with all school principals to help them know each other and see how educational involvement with the watershed can help their students

reach educational reform standards and satisfy the state environmental education mandate.

e) Continue to provide technological networks and technological support for teachers.
f) Host an annual gathering of teachers for celebration and connection.

Implementation: Thornton Creek Project with support and participation of Seattle and Shoreline Public School Districts and higher education institutions.

Estimated Cost: Included in B1 estimated costs

Funding Source: SPU and other agencies and private donors (see above)

Schedule: 2000 and ongoing

Priority: High

B4. Review regularly and enhance the Salmon-in-the-Classroom program to maintain its qualities, while doing more to help students and teachers build a more holistic understanding of issues of salmon and local creek health.

A) Adapt practices to be consistent with State and Federal salmonid policies, as well as with local conditions. Continuing efforts to better understand the genetic history of fish in Thornton Creek will be essential to ensuring this consistency.
B) Work towards equitable class participation at an appropriate grade level watershed wide, with adequate linkages to other watershed activities.

Implementation: SPU & WDFW

Estimated Cost: Existing budgets

Funding Source: WDFW

Schedule: 2000 and ongoing

Priority: High

B5. Integrate elements of watershed education into drivers' education courses. As a component of driver's education courses, help young drivers understand the linkages between driving and watershed health. Specifically, detail how cars contribute to non-point pollution, their effect on watershed environmental health, and demonstrate ways a car owner can minimize the pollution from their vehicle through large and small actions. The unit may be called "You and Your Car." First step would be including it in the

course material that is provided to students and instructors. Second step could be incorporating it into training of instructors so it is addressed in the classroom.

Implementation: TCP and SPU research and development
Estimated Cost: Unknown

Funding Source: To be researched, SPU with TCP partners to develop

Schedule: 2002-2005

Priority: Medium

Education and Stewardship Objective C: Provide learning opportunities for the general public

C1. Continue and expand existing programs offering learning opportunities, including:

A) Volunteer monitoring opportunities
(See Monitoring Section.)

B) Research and develop a "Watershed Learning Center" or Resource Centers (perhaps electronic) for the Thornton Creek Watershed. This project should focus on providing excellent informational resources about the Thornton Creek Watershed accessible both for public education and to support formal education in the watershed and beyond. Development of the project should include partners from all watershed-area educational and stewardship groups, representatives of public and private schools and libraries, and develop partnerships between appropriate City of Seattle and City of Shoreline departments. Initially, a program outline would be developed and current resources examined along with upcoming opportunities. Exploration will include current efforts to develop a Community Digital Library for the watershed as well as the needs of the watershed interpretive program to be developed (see above in this chapter). It is anticipated that initial development work will take a year or more, implementation will depend upon what is to be done. Construction of a physical center at Meadowbrook Pond remains one potential outcome.

Implementation: SPU will convene.

Estimated Cost: unknown

Funding Source: SPU with other partners over time

Schedule: implement 2003-2010

Priority: Medium

C) Develop and maintain several "Watershed Resource Centers." Situate these centers in accessible locations, such as libraries, community centers, and malls. The centers could offer the best of tangible and digital resources. These could be a tool for and motivated by the coming Salmon listing and Salmon Recovery Plans. Plans for a Watershed Resource Center could be incorporated into the plans for the new library around Northgate. The primary purpose of these centers is increasing public awareness and education on watershed issues, but they would also serve students doing research projects. Many of the resources that could be included are recommended elsewhere in this plan.

Implementation: Public Libraries in the watershed with support from TCP, WMC, and watershed education advisory group

Estimated Cost: $ 2,000 for resources/center

Funding Source: TBD

Schedule: 2002

Priority: High

D) Incorporate water quality and habitat messages into , multi-lingual multi-cultural outreach programs or formats and create new approaches to involving watershed people who are new to the U.S. in watershed educational programs.

Implementation: All agencies and programs

Estimated Cost: $2000 – 5000 per event

Funding Source: Each agency

Schedule: Ongoing

Priority: Medium

E) Provide information to managers of apartment complexes and educate owners about the creek. Host a workshop for managers promoting appropriate landscaping practices, pollution prevention and riparian buffers. Could adapt program used in Longfellow Creek Watershed.

Proposed Implementation: SPU to provide funding for ½ time (B1, A above). Working with apartment owners and managers perhaps through an Apartment Association and/or the Lake City Task Force in the Lake City area. Could be project of the Watershed Interpretive Specialist or a

special session of the citywide annual Creekside Living workshops.

Estimated Cost: $5,000

Funding Source: SPU for Seattle portion of the watershed, Other funders to be sought

Schedule: 2002

Priority: High

C2. Package existing information in accessible and friendly formats

A) Build on the several existing slide shows about the watershed to develop and make available a slide show about the watershed with annotation. Include aerial images showing the extent and rate of change in the landscape. The TCP Manager would compile the slide show with input from TCA and the Watershed Specialist. Expected audiences include watershed schools, local organizations, business associations, and the general community through education efforts of the Watershed Specialist. Cost would be for slide and annotation duplication, digitized images for Powerpoint style programs.

Implementation: TCP and TCA join leads

Estimated Cost: $5,000 (grants)

Funding Source: To be sought

Schedule: 2001

Priority: Medium

B) Develop and advertise a cassette tape audio tour of the watershed, similar to ones used for museum exhibits. It would be a resource that could be checked out from the library or other watershed resource center. Have the tour created by students. In addition to being a great learning opportunity for students, this would be a useful resource for community members interested in learning about the place they live. The level of use would depend on how well the resource is advertised and how easy it is to access.

Implementation: TCP, With participation from a school.

Estimated Cost: $1,000 (grant and/or donated time and materials)

Funding Source: To be sought

Schedule: 2001-2002

Priority: Low

C3. Document Watershed History

A) Oral History
Develop and use a system for collecting, storing, and sharing oral history information related to the watershed. Include cultural resources. Consider presenting it through a summer theater program for students and/or historic murals depicting change over time. Need for this work is ongoing and resources disappear with time.

Implementation: TCP with help from Shoreline Historical Museum and Public Libraries.

Estimated Cost: $7,000

Funding Source: City of Seattle Department of Neighborhoods, Neighborhood Matching Fund grant opportunity

Schedule: 2001

Priority: Medium

B) History of the Watershed Guide
Complete research, write, print and share a History of the Watershed resource guide similar to the one done for Green Lake. The guide would cover and integrate the evolution of the watershed's human and non-human communities. This involves collection and organizing existing information, and developing a coordinated approach to continuing to collect important historic information. Oral Histories research would be integral in developing a history of the watershed. Some research has already been done, so we are not starting from ground zero. Teachers and community members continually voice that this is desired and would be valuable to them because it would provide a foundation for all curricular activities.

Implementation: TCP would take lead on coordinating, using both paid and volunteer staffing. Watershed Education Coordinating Group

Estimated Cost: $40,000

Funding Source: City of Seattle Department of Neighborhoods, Neighborhood Matching Fund grant opportunity

Schedule: 2002

Priority: High

C4. Educate developers about the Thornton Creek Watershed and their role within it.
Provide notice to developers and property owners that the proposed project is in the Thornton Creek watershed and (if applicable) it is in a critical area. The intention is to provide a brochure that alerts developers that surface water drains to a stream and sensitive construction techniques are appropriate (and notify them of any available incentives for this action).

Implementation: DCLU, support from SPU and Thornton Creek Watershed Oversight Council

Estimated Cost: Develop brochure $3,000; distribute – existing budget

Funding Source: DCLU budget

Schedule: 2000 and ongoing

Priority: High

Education and Stewardship Objective D: Promote Stewardship

D1. Promote Stewardship.
Encourage residents and community groups to "adopt" sites within the watershed. Encourage community members to "make a difference" in the watershed by adopting park sites or changing their personal behavior. Local government should provide support through programs and technical assistance.

a) Continue to support and host work parties to remove invasive plants, restore/improve trails, reforest local parks, maintain restoration sites, and to restore native vegetation on public property throughout the watershed. Hold activities throughout the year, not just on Earth Day.
b) Provide support for community stream restoration projects. Community projects may require coordination of volunteers, technical assistance, tools, equipment and materials. Provide information about grant opportunities.
c) Improve and refine Adopt-a-Creek program. Enhance Thornton Creek Alliance's existing stream program to involve more local groups, block watch groups, and/or schools in adopting a stretch of creek. Volunteers would observe, monitor, report problems, host clean-ups, and help with restoration efforts.
d) Include "environmental crimes" in the work of existing crime Block Watch groups and Adopt-a-Street groups. Educate the block watch groups on how to spot pollution entering the streams, ditches, and storm water system and who to contact if such

activity is occurring. Help people understand the importance of "poop scoop" laws and their relationship to pollution of streams and water bodies.

e) Provide volunteer monitoring opportunities. (See Monitoring Section)
f) Encourage residents to "live lightly" by conserving, recycling, using mass transit, using less toxic lawn and garden materials, dispose of hazardous wastes appropriately, etc. (See non-point pollution section above.)
g) Continue to use Seattle'sAdopt-a-Park Programs to provide volunteers for work parties and restoration projects.
h) Implement reforestation/revegetation plans for Thornton Creek parks. Continue to implement Seattle's Thornton Creek Reforestation Plan. The work is organized by Seattle Park's urban forester and Adopt-a-Park program. Volunteers perform the work. Plant materials are purchased through grants.
i) Develop an Adopt-a-Park type program in Shoreline.

Implementation: Seattle Parks and Recreation Department and SPU for Seattle area City of Shoreline for Shoreline area

Estimated Cost: $60,000 annually
Shoreline: Adopt-a-Park program $20,000 (materials and staff)

Funding Source: Seattle: DPR sources and volunteers
Shoreline: Adopt-A-Park budget and grants

Schedule: 2000 and ongoing

Priority: High

D2. Use a variety of programs to encourage individual residents to make their yards, pets, and wildlife interactions friendlier to wildlife. The purposes are to encourage better habitat, reduce predation, and avoid helping unwanted guests (geese), pet interactions with wildlife. These programs include, but are not limited to:

a) Encourage watershed residents to be wildlife-friendly. Use the Environmental Learning Center/Resource Centers to promote wildlife themes through signs, brochures, displays and workshops. Use articles in newsletters. Develop an "Animals and Creeks" brochure.
b) Promote the Washington Department of Fish and Wildlife's Backyard Wildlife Sanctuary Program.
c) Promote "indoor" lifestyles for pet cats with the Cats Indoors! Campaign.

Implementation: WDFW, Seattle Audubon

Estimated Cost: $15,000 annually

Funding Source: TBD

Schedule: 2000 and ongoing

Priority: Medium

D3. Promote business support and recognition programs.
Promote King County's Enviro Star, Waste Information Network, Industrial Material Exchange and Business Partners for Clean Water programs. Encourage local businesses to participate in these programs. Could be combined with previous recommendation and extended to non-priority businesses. Agencies could make Thornton Creek watershed a target area.

Implementation: King County - direct promotional material to this watershed in 2000-2002, discuss City of Seattle (SPU) and City of Shoreline partnerships

Estimated Cost: .1 FTE

Funding Source: King County

Schedule: Make Thornton Creek watershed a priority outreach area in 2001-2003

Priority: Medium

DRAFT
Chapter 7

Regulation & Enforcement
Recommendations Revised 3-15-01

Problems/Challenges

The many businesses, residences, and public properties in an urban watershed such as Thornton Creek are subject to an array of laws and regulations designed to protect water quality, critical areas, and public safety, to name a few. Many of these directly affect Thornton Creek. From federal laws such as the Clean Water Act and the Endangered Species Act, to local regulations, many laws and policies have been developed to protect natural resources. Local regulations include:

- Building and permit review (including SEPA),
- Land Use development codes
- Stormwater, Grading and Drainage Ordinance
- Environmental Critical Areas Policies and Critical Areas Code

The Watershed Management Committee (WMC) is concerned that existing regulations do not adequately protect stream resources from development. Environmental protection must be balanced among regulations, incentives and personal responsibilities. Present land use laws do not necessarily achieve this balance. The WMC is concerned that local cities do not always carry out their own policies and regulations in regards to creek and wetland protection as vigorously as they might.

WMC members are also concerned that existing regulations are not being enforced. Some agencies are seen as being less effective than others are, but for the most part, committee members felt that almost all agencies need to improve enforcement programs. In general, the WMC found enforcement programs to be under-funded and understaffed. Enforcement needs to occur during all hours to cover emergency response and provide for responding during hours when people with diverse schedules can be reached. Ideally staff should be able to respond quickly enough to stop activity and prevent damage, not just step in after damage is complete. Staff should also receive adequate training in environmental protection.

Current Approaches

Laws are continually developed and refined. Habitat protection, development codes, stormwater treatment and detention requirements evolve. In the last two years, Seattle has increased the number of staff to respond to development concerns and private detention system inspections. Seattle is developing an

enforcement protocol to penalize water quality violators. During the next few years, Seattle will prepare its second NPDES five-year permit application and stormwater update that is expected to be more comprehensive than the 2000 update. Seattle updated it's stormwater, Drainage and Grading Code and rewrote it's Stormwater Technical Manuals in 2000 to better address infiltration, detention, treatment and structural and operational Best Management Practices. When Shoreline became an incorporated city, it adopted many King County codes. Since then, Shoreline has evaluated the County codes and is revising them to offer more environmental protection.

Acknowledging the challenges ahead and the current character of the watershed, the Watershed Management Committee has formulated a Regulatory and Enforcement goal and objectives for the future of the Thornton Creek Watershed.

Regulatory/Enforcement Goal and Objectives

Regulations & Enforcement Goal*:* To ensure that present and future regulations affecting the Thornton Creek watershed are fully enforced.

We will accomplish this goal by doing the following:

Regulatory Objective A.	Improve enforcement of existing regulations
Regulatory Objective B.	Strengthen land use and development regulations

Regulatory and Enforcement Action Plan Recommendations

Regulatory Objective A: Improve enforcement of existing regulations

A1. Assure proactive enforcement of existing watershed related regulations.

a. Improve enforcement of the existing regulations, such as Seattle's Land Use Codes, Stormwater, Grading and Drainage Control Code, and Environmentally Critical Areas Ordinance, that pertain to stormwater, grading and filling, water quality and critical areas. Continue to permit variances that are most beneficial to watersheds and streams. Ensure adequate staff, trained in stream and wetland ecology are available for enforcement. Follow up on reports of possible violations and get back to the reporter within 48 hours. Provide coverage for emergencies that occur during evenings, weekends and holidays.

b. Continue on-site inspections for all permitted development to ensure proper installation of erosion and sediment controls and that permit conditions are met.

Improve communication among city staff working on creeks, citizens and with community groups. Make quarterly reports to the Watershed Oversight Council through the Basin Steward, or equivalent, summarizing trends, types of violations, and actions that will be taken to rectify the situation.

Implementation: City of Seattle: DCLU and SPU,
Shoreline: PADS

Estimated Cost: Existing programs in Seattle,

Funding Source: Seattle: Regular DCLU and SPU sources

Schedule: 2000 and ongoing

Priority: High – CORE

A2. Enforce the Critical Areas Codes for each jurisdiction. Specifically, enforce the portions of the Codes related to riparian corridors in the Thornton Creek Watershed.

Complete or update a riparian corridor map that has been based on the latest modeling and on watershed wide studies. Use this map to refine the Critical Areas Code for new construction or redevelopment within the Thornton Creek Watershed. Update the critical area maps to include known landslides, creeks and wetlands identified in the Thornton Creek Watershed Characterization Report and by subsequent inventories. Develop a process to continue updating Critical Areas maps in the future.

Implementation: SPU, DCLU, Shoreline

Estimated Cost: SPU -- $25,000 initially
DCLU -- $25,000
Shoreline -- .1 FTE to evaluate need

Funding Source: Existing budgets

Schedule: SPU – 2000-2005
DCLU – 2000-2005
Shoreline -- Ongoing

Priority: High – CORE

A3. Advertise ways to report environmental problems.

Increase efforts to promote reporting numbers and web sites for water quality, graffiti, illegal dumping, erosion, infill of wetlands, vegetation removal, and construction problems to residents in this watershed. Establish a hotline for calls received 24-hours a day/7 days a week that enables callers to speak to a person who will respond in a timely manner to complaints including notifying the original complainant within 48 hours. Train residents and/or community groups on how to spot violations, file accurate complaints, and effectively use the existing public process to comment on development.

Implementation: SPU, DCLU, Shoreline

Estimated Cost: SPU – Increase existing program
DCLU -- $5,000 annually. Start program if necessary
Shoreline -- .1 FTE for education

Funding Source: SPU – Community Services budget

Schedule: SPU – 2000 and ongoing
DCLU – 2001 and ongoing
Shoreline – 2001 and ongoing

Priority: High – CORE

A4. Revive the Interagency Water Quality Trouble Call/Emergency Response Network to provide coordinated response to reports from citizens and agency personnel in a timely fashion.

The Municipality of Metropolitan Seattle developed and coordinated an interagency water quality trouble call system and network of several agencies, 15 cities and jurisdictions within King County, south Snohomish County and North Pierce County during the 1980's and early 1990's. This program provided a coordinator, a manual for agencies participating in the network so that all appropriate responding agencies were notified quickly of reported troubles. In January 1991 Metro issued a revised Manual to networked members. Since King County absorbed Metro, the network and coordinating effort has ceased. Revival of the network or a similar network combined with the coordination and spill response capabilities would significantly reduce confusion on the part of citizens and agency personnel alike in reporting and responding to emergent situations threatening water quality.

Implementation: King County

Estimated Cost: (the staff as of 1991 Barbara Badget, Trouble Call Coordinator; David V. Galvin, Sr. Planner, Water Resources Section. We will need to research potential costs.)

Funding Source: To be researched

Schedule: ASAP and ongoing.

Priority: Medium

Regulatory Objective B: Strengthen land use and development regulations

B1. Review and modify the Environmental Critical Areas (ECA), Stormwater Drainage and Land Use codes to provide additional stream and wetland protection.

Based on watershed studies and findings, assess the protection provided by policies, codes and ordinances. Based on this assessment, evaluate potential long term benefits to streams and wetlands and costs of policy, code and ordinance improvement over time. Have DCLU and PADS recommend to their respective City Councils ways to strengthen codes where most effective for improving stream and wetland protection, providing fewer exceptions and clarifying definitions of reasonable use. Solicit information from citizens in the watershed and involve the Thornton Creek Watershed Oversight Council regarding changes to the Critical Areas and the Stormwater Drainage and Grading and other relevant Codes. The revised codes should require preservation of wetlands, riparian buffers, and flood plains, place restrictions on filling buffer zones, and put limitations on land clearing in specified sensitive areas. Additionally, provisions for specific detention measures, special setbacks, cluster housing strategies, landslide prevention and habitat restoration throughout the watershed draining to the creek should be created and implemented.

Implementation: SPU, DCLU, Shoreline

Estimated Cost: City of Seattle: -- $80,000 for staff annually, ongoing
DCLU -- $50,000 for staff
Shoreline -- $10,000 initially, + existing budget annually

Funding Source:

Schedule: SPU – Ongoing at normal interval
DCLU – Ongoing at normal interval
Shoreline – Ongoing at normal interval

Priority: High

B2. Restrict development in riparian corridors and wetlands.

Develop ways to revise ordinances in order to reduce the number of variances to the minimum buffer for streams and wetlands. Continue to allow variances such as setbacks or increased height to promote retention or restoration of natural buffers that comply with Critical Areas ordinances. Look for creative alternatives to retain riparian corridors, preserve vegetation and promote use of native plants and conifers to provide habitat as well as stormwater absorption.

Implementation: Seattle, DCLU, City Council
Shoreline, Planning & Development Services (PADS)

Estimated cost: $70,000 for staff time to develop codes, programs

Funding source:

Schedule: by 2005

Priority: High

B3. Look for opportunities to daylight piped or culverted streams and remove fish barriers.

a. Evaluate existing science and stream typing methods, inventory streams using the best methods and create guidelines and priorities to supplement information in the Critical Areas ordinance for where and when streams or reaches of streams should be daylighted. Re-evaluate guidelines and priorities periodically, no less frequently than every five years based upon reviews of existing science and inventories. Share these guidelines and priorities with the public and developers.

b. When new development or redevelopment occurs immediately adjacent to the identified riparian corridor, examine options for daylighting stream reaches and removing fish barriers based on Critical Areas ordinances and criteria and priorities in (a)

c. When new roads are proposed or old ones repaired and revised where they pass over a riparian corridor in the Thornton Creek Watershed based on the Critical Areas ordinances and priorities in (a), replace with state of the art fish passable culverts. At a minimum, upgrade existing culverts and design new ones that have the most minimal impact upon streams and their riparian areas.

d. Based on Critical Areas ordinance inventories and guidelines, work with private property owners to encourage daylighting of stream reaches identified in Critical Areas ordinances.

Implementation: Cities of Seattle and Shoreline

Funding Source: Existing funding. Develop as CIP budgets determined.

Schedule: by 2003

Priority: High

B4. Revise Design Review Guidelines to include environmental concerns.

Involve the Thornton Creek Watershed Oversight Council and other public in revising these guidelines to include the preservation and incorporation of natural resources such as streams, wetlands, and forest remnants. Encourage guidelines that result in greater transit and pedestrian use rather than automobiles. Encourage guidelines that promote reduction of effective impervious surfaces (e.g., structured parking, green building design, pervious pavement, roof top gardens, stormwater re-use etc.).

Shoreline: Develop Design Review Guidelines or their equivalent that includes environmental concerns.

Implementation: Seattle: DCLU,
Shoreline:

Estimated Cost: Seattle: DCLU -- $50,000 initially
Shoreline – Existing budgets

Funding Source:

Schedule: DCLU – 2001 and ongoing
Shoreline -- Ongoing

Priority: High

B5. Involve citizens in the review of notification procedures relating to development of new code or revisions to existing codes, and to development projects.

Shoreline presently offers an opportunity for citizens to review the notification procedures related to development and Code changes annually. Continue this opportunity and notify citizens widely about it.

In Seattle, encourage citizen involvement and widely advertise opportunities citywide to participate in reviewing notification procedures related to development and new codes or code revisions. Recommend notification procedures be reviewed no less frequently than every three years.

Implementation: City of Seattle, DCLU and City Council

Estimated Cost: Seattle and Shoreline $10K annually each agency

Funding Source: Existing agency budgets

Schedule: City of Shoreline, ongoing, annually
City of Seattle, DCLU, - 2001 and ongoing

Priority: Medium

B6. Incorporate policies to promote pervious surfaces into new Neighborhood Design Guidelines or Subarea Design Standards developed by Thornton Creek Watershed neighborhoods and revise/amend existing neighborhood area design guidelines and/or design standards for those Thornton Creek Watershed neighborhoods that have them currently.

a. Work with the North District Neighborhoods' Neighborhood Plan Stewardship Committee and the Lake City Chamber of Commerce to see that policies to promote pervious surfaces are included as they develop Design Guidelines for Lake City.

b. Work with citizens and business organizations in the Northgate Overlay area to amend the Northgate Overlay design guidelines/standards to include policies to promote pervious surfaces.

c. Support the efforts of neighborhood groups and their committees to receive land use bulletins and other related notifications from City departments.

d. Encourage neighborhood groups/sub-area groups to develop design guidelines/design standards for their neighborhood including design guidance to promote pervious surfaces/reduce impervious surfaces.

Implementation: Seattle: DCLU
Neighborhood Groups to initiate neighborhood design guidelines or sub-area design standards; to develop committees

Estimated Cost: $25K– 50K per neighborhood or sub-area to develop neighborhood design guidelines or design standards

Schedule: Begin work by end of 2002

Priority: High

B7. Continue to use citizen review committees to review city codes affecting surface water and water quality.

Solicit broad representation of citizens and stakeholders early in the development of any code changes affecting surface water and water quality. Use citizen review committees throughout the development process and include their reports in final evaluation of proposed changes.

Shoreline: Continue to use citizen committees to review city codes affecting surface water and water quality. Include the Thornton Creek Watershed Oversight Council in public review processes.

Seattle (SPU and DCLU): Continue to use citizen input in the development of city codes. Continue existing programs such as the Creeks, Drainage and Wastewater Advisory Council and public hearings. Include the Thornton Creek Watershed Council in public review processes.

Implementation: DCLU, SPU, Shoreline

Estimated Cost: SPU -- Existing workload
DCLU – Existing workload
Shoreline – Existing budget

Funding Source: Existing budgets

Schedule: SPU -- Ongoing
DCLU -- Ongoing
Shoreline -- Ongoing

Priority: High

B8. Modify City policies, codes, regulations, procedures and designs to promote infiltration where appropriate; enforce revisions. (See also Stormwater Chapter A3.) Infiltration strategies to be studied for implementation include but are not limited to:

a. Evaluate design measures for reducing impervious surface on existing public land in targeted infiltration areas. Propose programmatic and regulatory changes to encourage impervious surface reduction designs in public street right-of-way improvement projects, sports area recreation projects, and surface parking area projects to demonstrate how infiltration approaches can be used and maintained effectively. Recommend successful approaches to private property owners.

b. Design and evaluate infiltration technology, including technologies that allow for partial infiltration, on public and private land. Modify the Seattle Stormwater, Drainage and Grading Code (and/or Technical Requirements Manuals) to require and promote these technologies where appropriate and enforce Code changes. Evaluate potential benefits of implementing a

stormwater management incentive program for landowners that might include offering technical assistance or other means of implementing infiltration technology in targeted areas or on sites that meet specific criteria.

Implementation: DCLU, SPU, Shoreline

Estimated Cost:

Funding Source: Existing budgets

Schedule:

Priority: High

B9. Address short plat and subdivision impacts in the Thornton Creek watershed by:

a. Requiring drainage analysis, stream and wetland delineation, amount and type of vegetative cover to be removed, downstream impacts study, sediment control, and a site visit for any development or redevelopment, short plat, or subdivision to be allowed in the Thornton Creek watershed.

b. Allowing variances to short plat or subdivide lots in the Thornton Creek watershed that do not degrade shoreline and critical areas.

c. Encouraging developers of short plats and subdivisions to find ways to enhance the site such as implementing the Master Builder's "Built Green Handbook" (in development) or L.E.E.D. requirements of Seattle's Sustainable Building Initiative, building height limits, structured parking, etc.

Implementation: Cities of Seattle and Shoreline (Seattle: SPU and DCLU working together.

Estimated Cost: Seattle: $100,000 for initial design and code revision work. (Building upon 1999-2000 work already conducted to revise the Stormwater, Drainage, and Grading Code and development of the "Flow Control Technical Requirements Manual" issued in 2000.) Additional funds for incentives, property acquisition, and demonstration projects – costs to be determined.

Shoreline: $50,000 for initial design and code revision work. Additional funds for incentives, property acquisition and demonstration projects – costs to be determined.

Funding Source: Seattle: SPU drainage and stormwater sources, SPU CIP for demonstration projects, potentially grant funds. Funding uncertain for incentives on private property.

Schedule: 2005 for initial studies and demonstration projects
2010 for full implementation.

Priority: High

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Chapter 8

Implementation Strategy and Recommendations

Implementation of the Action Plan will happen in two stages of action: The first stage includes necessary review, approval, and concurrence from Plan implementers, city councils, and the Department of Ecology, allowing implementation to begin. The second stage is the process of enacting the action Plan recommendations, including recommendations written to guide implementation oversight, ensuring the Plan is carried out.

Stage one of Action Plan implementation focuses on the commitment that will be required of agencies and organizations responsible for the recommendations, and evaluation of the Action Plan.

Review and Approval Process

The Thornton Creek Watershed Action Plan is being prepared by the Watershed Management Committee (WMC). A Draft Action Plan will be circulated to the Department of Ecology, the member organizations of the Watershed Management Committee (WMC), the public, the Mayor and Seattle City Council, and the Washington State Department of Ecology (Ecology). The comment period for review of the Draft Action Plan will be 60 days, and will include a public hearing held at the 30-day mark, halfway through the 60-day period. The environmental checklist, prepared by Seattle Public Utilities in accordance with the State Environmental Policy Act (SEPA) will also be available for review during the review period. The checklist reviews potential environmental impacts resulting from implementation of the proposed Action Plan.

The Watershed Management Committee will revise the Draft Action Plan based on comments received during the review period. Agencies and organizations responsible for implementing the recommendations will be asked to submit letters indicating their support of the Action Plan and commitment to implement the Plan recommendations. These letters of concurrence will be included in the Final Action Plan that will be submitted to the Mayor, Seattle City Council, the City of Shoreline, and the Washington State Department of Ecology for approval.

Concurrence and Dispute Resolution

Ecology's guidelines for preparing the Thornton Creek Watershed Action Plan require a process for resolving disputes. Disputes over proposed recommendations in the Action Plan or responsibility for implementing the recommendations is intended to be resolved through the review, comment and revision of the Preliminary Draft Action Plan and the Public Review Draft Action Plan. Following revisions to the Action Plan, each potential implementing agency or organization will be required to concur with the recommendations prior to adoption of the Plan. Concurrence represents a second

opportunity to resolve any remaining concerns. Meetings will be held by SPU with the different implementing agencies and organizations to address remaining concerns.

It is intended that each implementing entity listed in the plan – federal, state, local, tribal, private sector, and individuals – concur with this watershed action plan. Such concurrence will impose costs, either increased budget allocations, or "opportunity costs" of changing "business as usual" and better utilizing existing resources.

Dispute Resolution

A. Dispute Resolution Process

During implementation of the action plan every effort will be made by Seattle Public Utilties, the Thornton Creek Watershed Oversight Council and lead implementers to work towards implementing recommendations in good faith. Concerns from any party regarding the plan should first be discussed between the affected parties above and the party voicing the concern in an effort to reach an agreement on the matter. If, after several attempts to reach an agreeable solution an agreement is not reached, the process detailed below should be used to resolve the matter.

The following dispute resolution is to be used only after all other methods of resolving concerns have been exhausted.

Should disputes arise in seeking concurrence or implementing the Thornton Creek Watershed Action Plan between implementing groups and the lead agency, Seattle Public Utilities, or between the Thornton Creek Watershed Oversight Council and implementing groups or the lead agency, the following process will be established to resolve them:

1. A letter describing the concern in as much detail as possible should be sent to the Chairperson of the Thornton Creek Watershed Oversight Council, c/o Cary Westerbeck (or future project lead for SPU) Seattle Public Utilities, 710 Second Avenue, Seattle, WA 98104. The letter should include the name, address, telephone number, and if available, e-mail address of the contact person who has the concern.

2. Following the above notification, a meeting to discuss the remaining dispute will be called by SPU. The meeting shall include the complaining party (to describe the complaint), an SPU (lead agency) representative, a representative of the implementing party under dispute (implementer), and one to three representatives from the Thornton Creek Watershed Oversight Council selected by the Oversight Council. The Oversight Council is to select as few representatives as they feel provides fair and representative participation for each instance. If the disputed action(s) is within the City of Shoreline, they will have the option of sending a representative as well.

3. Notification that a Dispute Resolution meeting is scheduled, when and where, will be made at the next Thornton Creek Watershed Oversight Council meeting after the complaint is received. Notification to the public should be made in advance of the dispute resolution meeting by posting a notice on the SPU website, and other general notification procedures that are readily available for public access from the watershed. Members of the public are invited to observe the Dispute Resolution meeting, but not to participate in the discussion.

4. The group listed above in 2 will meet to negotiate a resolution to the disputed action. Resolutions may involve agreements to change implementation schedules and budgets, plan language, or projects and programs originally agreed to in the action plan. The Watershed Oversight Council representative involved in the dispute meetings will report the proceedings to the Oversight Council at their next scheduled meeting.

5. If changes to the plan are requested due to dispute resolution agreements, the changes will be put in writing and submitted to the Department of Ecology, Seattle Public Utilities, the implementer, and if appropriate, the City of Shoreline, for approval.

The dispute resolution process detailed here applies only to disputes over contents of the Thornton Creek Watershed Action Plan recommendations and their implementation.

B. Process following an impasse

If the dispute resolution process does not result in agreement the following action may be taken. Executives or management from SPU, the implementer, and if necessary the City of Shoreline, and a representative of the Watershed Council will meet with the implementer to work out a resolution. If this process does not result in an agreement, this group will meet with the Department of Ecology and/or the Puget Sound Water Quality Action Team, at their availability, to reach an agreement.

C. Disputes involving science-oriented recommendations

If a dispute arises in which science or the use of scientific research, methods, or inquiry is involved or in question, an additional watershed scientist, or scientists, agreeable to the parties involved may be added to the above meetings for consultation.

D. Revisions to the action plan

In order for the Thornton Creek Watershed Action Plan to continue to be useful and successful, it will require periodic updates. Revisions to the plan may be considered after reviewing all updates and progress reports. Revisions will be subject to review by the Watershed Council, the public, affected lead implementers, Seattle Public Utilities, the City of Shoreline, and the Department of Ecology.. (See Section D, Recommendation D1 of this chapter below.)

A Call to Action

Following adoption of the Final Draft Action Plan by all affected agencies and implementers, stage two, implementation of Action Plan Recommendations begins. To ensure implementers and agencies adhere to their commitments, they are made

accountable to the Plan through implementation recommendations. Among the recommendations are strategies to oversee and check progress of the actions, improve coordination between agencies and organizations, increase communication with the public, establish digital (on-line) library, and provide additional staff to work on watershed issues.

Coordination

Many agencies and organizations work within the watershed. The Watershed Management Committee would like to see more internal communication and coordinationwithin city agencies, between Seattle and Shoreline and between Cities and King County. An agreement between Seattle and Shoreline to manage the Watershed Action Plan is needed. The Committee believes a Watershed Oversight Council, which includes representation from a broad group of stakeholders, should be convened to manage the Action Plan, communicate with decision makers and the community, and address future issues as they arise.

Funding Action Plan Recommendations

This watershed Action Plan will impose costs on local governments and agencies, private sector organizations, individuals, and a variety of other groups. Implementation of the Thornton Creek Watershed Action Plan is contingent on available funding and the ability of the individual implementing agencies to incorporate and prioritize the actions into their existing programs and budgets. It is estimated that over half the projected costs for implementing the action recommendations are currently projects or programs already begun, budgeted, or planned by the implementers named in the plan. Historically, potential revenue sources to meet the public sector costs include state and local general funds, the Centennial Clean Water Fund, the state revolving fund for low or no interest loans for clean water projects, state waste water discharge fees, the state superfund account, a variety of fees, federal clean water funds, and the National Estuaries Program. However, revenue constraints have delayed the implementation of many Action Plan Recommendations from previous watershed plans. Costs are likely to exceed available funding. The Thornton Oversight Council will be charged with actively pursuing ongoing funding for recommendations not covered by local governments and agencies.

Local and City governments will fund many of the recommendations in the Thornton Creek Watershed Action Plan. As the City of Seattle, and increasingly the City of Shoreline, broadens their efforts to address problems and issues raised in the plan, more of these Cities' resources will be used to implement the action items. Unlike many action plans of the past decade, this action plan reaches beyond the traditional action plan focus of non-point pollution. At the community's urging, this plan addresses stormwater control, habitat restoration for native plants and animals, community watershed education, and increased water quality and quantity monitoring. Local governments are finding that goals and objectives generated in action plans often mirror their own, therefore funding for many recommendations will be found within the implementer's current budgets.

Implementation of Action Plan recommendations relies on approval from Seattle and Shoreline City Councils during their budget-making process. Allocation of funds to implement the recommendations and meet Plan schedules, timelines, and milestones is contingent upon Seattle and Shoreline City Councils' allocation of funds to the city agencies responsible for implementing individual recommendations. If expected funding is not available, original implementation schedules may require adjustment as necessary by implementers after review by and consultation with the Department of Ecology and the Thornton Creek Watershed Oversight Council. In this way, the Plan may require adaptive management techniques to ensure concurrence.

With the above issues in mind, the Watershed Management Committee established a Goal and objectives for Action Plan implementation, to provide a solid foundation for effective implementation of the Action Plan.

Implementation Goal and Objectives

Implementation Goal*:* To ensure timely and effective implementation of the Thornton Creek Watershed Action Plan, consistent with priorities identified in the Plan and ongoing direction from interested citizens and stakeholders. Implementation should begin upon Department of Ecology concurrence with this Watershed Action Plan.

We will accomplish this goal by doing the following:

Implementation Objective A.	Provide watershed oversight.
Implementation Objective B.	Improve coordination and plan integration.
Implementation Objective C.	Track and report progress.
Implementation Objective D.	Update this Plan regularly.

Action Plan Implementation Recommendations

Implementation Objective A: Provide watershed oversight.

A1. Establish a permanent Thornton Creek Watershed Oversight Council.

Establish a Thornton Creek Watershed Oversight Council (WOC) to oversee, integrate and coordinate efforts to improve the health of Thornton Creek and its watershed by ensuring that the Watershed Action Plan is implemented. The WOC will use adaptive management – studying current situations and the results of projects or programs implemented and then developing the next project or program based on that learning -- to identify and respond to issues arising in the future. Specific tasks of the Oversight Council are likely to include:

a) overseeing and coordinating Plan implementation,

b) identifying and supporting efforts to obtain funding and other resources,

c) developing partnerships (private and public) and promotingcommunity stewardship,

d) providing a forum to resolve plan implementation issues and to identify and resolve new issues or complications in Plan implementation,
e) reviewing and analyzing other plans related to the watershed to help promote consistency and compatibility with the Watershed Action Plan.
f) tracking and reporting on progress relating to plan implementation,
g) guiding basin steward priorities.

(See Appendix XX for a complete list of action items requiring Oversight Council involvement)

Implementation: Watershed Management Committee, SPU and Shoreline

Estimated Cost: 0.1 FTE from Seattle and/or Shoreline, 40 hrs/year from Oversight Council members

Funding Source: SPU Resource Management budget and River Network Grant

Schedule: begin at DOE approval, continuous thereafter

Priority: High – CORE

A2. Develop and Sustain the Thornton Creek Oversight Council

a. Council formation:

Representatives from SPU, Thornton Creek Watershed Management Committee, and the City of Shoreline will immediately initiate formation of the Thornton Creek Watershed Oversight Council upon adoption of the action plan. Watershed Management Committee members will be requested to accept membership in the Watershed Oversight Council initially to provide continuity between planning and implementation. Should a WMC committee member decline to join the Watershed Oversight Council, the initial members of the Watershed Oversight Council will discuss whether or not to invite the organization sponsoring the declining member to nominate a new representative to the Council.

(See Appendix XX for a complete list of action items requiring Oversight Council involvement)

b. Oversight Council representation

Initial members of the Watershed Oversight Council will develop criteria for full Council membership based on a combination of the skills needed to conduct the business outlined in this Plan by the Oversight Council and a focus on inclusiveness to represent

as many watershed points of view as possible. At a minimum, the initial review will consider whether initial membership includes representatives of all appropriate community groups, local governments, businesses, public agencies and associations, tribes, and citizens-at-large. The initial members will then request representation from selected groups and the public at large as needed to fill gaps. Nominees for these additional representatives on the Council will be submitted to the Cities of Shoreline, Seattle, and the Department of Ecology for their appointment.

c. The Watershed Oversight Council will develop by-laws to guide decision-making procedures of the Council and criteria for making decisions as appropriate.

d. Initially – at least during the first year after Plan acceptance by DOE– the Watershed Oversight Council will meet monthly.

Implementation: Watershed Management Committee, Watershed Oversight Council members

Estimated Cost: 40 hrs./ year from each Council member
(See A4 for staff support)

Funding Source: SPU, River Network grant

Schedule: Upon acceptance of the Action Plan by DOE, then ongoing

Priority: High – CORE

A3. Establish SPU as the lead agency for the Thornton Creek Watershed Action Plan and the City of Shoreline as co-lead:

a. The lead agency for the Thornton Creek Watershed Action Plan should be Seattle Public Utilities (SPU) with assistance from the City of Shoreline as a co-lead. The requirements of the lead agency are detailed in WAC 400-12. They include coordinating implementation among stakeholders, and annual reporting to Ecology noting progress toward Plan implementation and efforts.

b. As necessary, SPU will develop agreements with the City of Shoreline and other agencies and departments within the City of Seattle to expedite implementation of the Watershed Action Plan.

c. SPU will report status to the WOC at each meeting, maintain records of proceedings and actions taken, prepare annual watershed reports and organize public meetings. SPU will also provide facilitation services to the WOC if requested.

Implementation: SPU

Estimated Cost: 1.0 FTE (as part of A4 below)

Funding Source: SPU budget

Schedule: on-going

Priority: High

A4. Provide additional staff to coordinate and support the action plan

a. Provide adequate staff to support the Watershed Oversight Council and to maintain continuous excellent communication with and between citizens, interested groups, and implementers as the recommendations of this Watershed Action Plan are implemented.

Implmentation: SPU and Shoreline

Estimated Cost: Shoreline .1 FTE ongoing, Seattle: See b.

Funding: TBD

Schedule: ongoing

Priority: High – CORE

b. Provide a Basin Steward/Watershed Coordinator—1 FTE:
Provide a full time qualified staff position to coordinate and support this Action Plan by at least:

- Assisting the Watershed Management Committee in developing the Watershed Oversight Committee (see A2 above)
- Providing connections between agencies, citizens, community groups, and city departments.
- Coordinating outreach program and volunteers
- Tracking and coordinating implementation of Action Plan strategies .
- Supporting the work of the Oversight Council.

Implementation: SPU with partners (King County a potential partner?)

Estimated Cost: 1.0 FTE $80K per FTE

Funding Source: TBD

Schedule: 2002 and ongoing

Priority: High – CORE

Implementation Objective B: Improve coordination and plan integration.

B1. Coordinate and integrate the Watershed Action Plan with other existing and future plans and improve efforts to coordinate Plans. Coordinate and integrate the Watershed Action Plan with existing and future plans, including the Cities of Seattle and Shoreline Comprehensive Plans, Endangered Species Act plans related to the Thornton Creek watershed, North District Neighborhood's Neighborhood Plan, Capital Improvement Program (CIP) planning for both Seattle and Shoreline, WSDOT Plans, Northgate Comprehensive Plan, future Seattle Comprehensive Drainage Plan updates, NPDES related programming, King County Metro and other King County plans affecting the watershed, and all future Plans relating to the Thornton Creek Watershed. Regularly report coordination efforts to the Thornton Creek Watershed Oversight Council.

City of Shoreline and City of Seattle staff will provide regular notification and updates to the Oversight Council on plan updates that relate to implementing this Watershed Action Plan.

Implementation: SPU staff, Shoreline staff

Estimated Cost: .2 FTE

Funding Source: SPU Resource Management Budget
Shoreline integrate into planning budget as plans develop

Schedule: on-going

Priority: High – CORE

B2. Improve coordination between Seattle, Shoreline, King County, and within agencies and cities concerning the watershed, including water quality and quantity, restoration, protection, habitat, and related or similar issues.
Develop a formal agreement between Seattle and Shoreline, such as an Inter-local Agreement, that states the manner in which these two governments will work together, and sets forth mutual expectations of ways the Thornton Creek watershed will be protected. Additional formal Memorandums of Agreement will be established with the Muckleshoot Tribe, WSDOT, King County, and other agencies deemed necessary by the Watershed Oversight Council. Each city will develop internal coordination strategies

to communicate watershed issues to all interested departments. Particular attention will be paid to coordination on projects affecting water volume or water quantity, habitat protection and restoration and similar issues, stormwater, and detention. Coordination is intended to provide opportunity for these groups to collaborate and combine resources to realize the most "bang for the buck" on projects. Agreement and progress will be reported to the Thornton Creek Watershed Oversight Council.

Implementation: Seattle, Shoreline, Muckleshoot, WSDOT and others

Estimated Cost: Seattle and Shoreline – existing workloads and staff

Funding Source: TBD by participating agencies and organizations

Schedule: 2002 and ongoing

Priority: High

B3. Improve coordination between agencies and citizens

Combine efforts and build partnerships with public and private entities to address stormwater runoff related problems, including coordination, collaboration and communication between neighborhood, city, county and state levels. Improve communication and coordination between public agencies and government departments. Arrange standing meetings sponsored or facilitated by the Basin Steward, or equivalent, and representatives from SPU's Urban Creeks group and Shoreline's equivalent to discuss watershed related issues, coordination, and ESA policies.

Implementation: Seattle, Shoreline, King County, support from TCA, TCP, Thornton Creek Watershed Oversight Council

Estimated Cost: Seattle, Shoreline, King County – existing workloads and staff

Funding Source: Existing budgets

Schedule: Ongoing

Priority: High

Implementation Objective C: Track and report progress.

C1. Report regularly to the Watershed Oversight Council

The Cities of Seattle and Shoreline (and other agencies as appropriate) will report to the Watershed Oversight Council at each meeting on (a) current work and/or results of recommendations from this Plan, (b) upcoming Capital Improvement Projects planned related to recommendations of this Plan, (c) trends in emergency or spot improvement work, and (d) upcoming planning activities that relate to implementation of this Plan. These reports may be verbal.

Implementation: Cities of Seattle and Shoreline (representatives to the WOC)

Estimated costs: 5 hr/month preparation per City

Funding source: Existing funding

Schedule: As WOC develops

Priority: High – CORE

C2. Lead agency (Seattle, see A3 above), with the assistance of co-lead agency (Shoreline) should develop and consistently update a project management tool to track and monitor status of implementation of recommendations in this Plan. This tool will provide the ongoing information to assist in reporting in C1. and C3 and be a resource to the Basin Steward/Watershed Coordinator (A4 above).

Implementation: Cities of Seattle and Shoreline

Estimated cost: ?

Funding source: ?

Schedule: begin at acceptance of Plan by DOE

Priority: High

C3. Report regularly on watershed health to citizens and decision makers

Host regular watershed meetings (at least annually) to update the community on watershed health and progress on Action Plan implementation. The purpose of the meeting is to assess progress toward Plan's goals and objectives, hear community concerns, and share ideas and resources among the representatives

Create an annual "report card" (3-4 pages) aimed at an audience of community residents and businesses (based on the annual detailed report referred to in A1 above) that reports on progress made toward the goals of the plan over the last year, and "gaps" where the goals are not being met. The report card should include a summary of a few key performance indicators, such as stream health and water quality indicators, and describe accomplishments and difficulties in the watershed.

Implementation: Watershed Oversight Council

Estimated Cost: 0.1 FTE from Shoreline or SPU (Basin Steward Responsibility)

Funding Source: SPU budget (Basin Steward responsibility)

Schedule: 2002 and ongoing

Priority: High

C4. Support an On-line Library of information about the Thornton Creek Watershed

Support continued development and management of an interactive on-line library or Library Society that is dedicated to information about the Thornton Creek Watershed. Sponsors would participate on an advisory board, and provide material. Financial support for managing the library is also needed.

Implementation: Planning and development: TCP, UW, SPU
Ongoing development and operations: UW
Ongoing oversight: Community Digital Library Society

Estimated Cost: $50,000 annually guestimate

Funding Source: TBD

Schedule: 2001 and ongoing

Priority: Medium

C5 . Create technical support unit to improve management of streams and wetlands

a. Seattle: As part of a long-term commitment to streams and wetlands, create a technical support unit with staff who have expertise in wetlands, stream restoration, hydrology, geology and biologists. These staff members should provide services similar to those provided by King County's Land and Water Resources division, but with special expertise in urban systems. This group should focus on management of wetlands and streams within the City using innovative and state of the art techniques and adaptive management. This group should also coordinate with the basin stewards, or their equivalents (see education section for information on basin steward), relieving the stewards of responsibilities that are best handled with special expertise (e.g., evaluating possible improvements to non-point pollution programs, applying guiding principles to habitat projects, developing a Monitoring Panel, etc.). The unit should also help educate and train staff working with natural resources at DCLU, SPU, Parks and City Light. Clarify that the mission expands the role of the drainage utility to include wetland and stream management in addition to drainage and flood control mandates.

Shoreline: Provide recommended services mentioned above, but research use of consultants, King County services, and interlocal agreements with other public agencies.

b. Provide staff with watershed, wetland and stream training.

1. Ensure that staff of DCLU, SPU, Parks Dept., City Light, Shoreline Parks and PADS have wetland, stream and watershed ecology understanding and knowledge. Support attendance at conferences and work shops for Seattle and Shoreline city staff involved in stormwater management to help them keep up to date on emerging science and techniques.

2. Provide opportunities for staff conducting routine maintenance at public parks and facilities to learn about new techniques and research results as well as good watershed practices. Make sure they know where to report problems or violations of City ordinances when they see them and notify appropriate staff on the technical support unit of these problems or violations.

Implementation:	Seattle, Shoreline
Estimated Cost:	SPU – 5 FTE
	Shoreline -- $100,000 for consultants/interlocal agreements
Funding Source:	Drainage/surface water utility fees
Schedule:	Began 2001 and ongoing
Priority:	High

D. Update this Plan regularly.

D1. Keep track of progress and difficulties implementing this plan. (See Sections A and C above). Consider a thorough review at 3 years (but no later than 5 years) after implementation begins. A "thorough review" likely would lead to Plan amendments and course corrections and would require broad public review and lead agency approval as well as DOE concurrence.

Implementation:	Seattle
Estimated Cost:	TBD
Funding Source:	Drainage/surface water utility fees
Schedule:	First review 2005
Priority:	High

DRAFT
Chapter 9

Monitoring, Analysis and Evaluation Recommendations

Problems, Challenges, and Current Approaches:

The purpose of monitoring is to obtain information to guide decision-making. Monitoring, data gathering and analysis of that data are used to identify and prioritize problems, develop solutions, and measure success of projects and programs undertaken. This plan recommends monitoring programs and projects specific to the recommendations of this Watershed Action Plan itself, non-point pollution, stormwater management, wildlife and habitat, and public education/stewardship. Specific data collection and monitoring recommendations may be found in earlier chapters of this Action Plan and are cross-referenced below.

Some data has been collected about Thornton Creek over the past decade or so. However, systematic data collection over time is only just beginning, and analysis, synthesis and use of data collected has yet to be thoroughly developed and coordinated. This chapter specifically addresses the need for analysis, synthesis, and sharing of data as applied to monitoring and evaluating the recommendations of this Action Plan and applying new emerging information to adaptively manage both this plan and the projects and programs it recommends.

The City of Seattle has recently expanded its monitoring program to include monitoring instream CIP projects, fish resources and near stream habitat assessments. King County and the University of Washington along with many partners are assessing chinook salmon life cycles and habitat in Lake Washington and it's tributaries (including Thornton Creek) in connection with developing plans to provide for chinook now listed as an endangered species under the federal Endangered Species Act. The City of Shoreline has just recently hired a water quality specialist whose tasks will include monitoring programs in Shoreline. As this data is collected, data sharing and collaboration on analysis becomes an urgent issue.

The following challenges are emerging today:

- sharing information
- essential data analysis
- using data as a basis for decision-making
- ensuring high quality data
- a coordinated approach between all those collecting data in the watershed

Data collection is recommended in the following chapters:

Chapter 3, Stormwater, D1
Chapter 4, Non-point Pollution Recommendations, Section B.
Chapter 5, Habitat, C5.

Reporting to the Oversight Council is recommended in the following chapters:

Chapter 3, Stormwater, D3

Note also Chapter 5, Habitat, C1 "Develop guiding principles for in-stream restoration done by Seattle, Shoreline, or community groups".

Monitoring, Analysis and Evaluation Goal and Objectives

Monitoring, Analysis and Evaluation Goal*:* To accurately gauge Action Plan effectiveness by gathering regular, reliable progress reports and data on the creek and watershed through a variety of methods, public and private, and make it available to all interested parties.

We will accomplish this goal by doing the following:

Monitoring Objective A. Monitor the health of the watershed to assure the Plan recommendations are having the desired effect.
Monitoring Objective B. Monitor implementation of the Plan's recommendations. (See Chapter 8, Section C.)

Monitoring Objective A: . Monitor the health of the watershed to assure the Plan recommendations are having the desired effect.

A1. Develop and support a voluntary, coordinated watershed-wide Monitoring Panel.

Monitor Thornton Creek conditions as outlined in recommendations in Section B, Chapter 4 Non-point Pollution. Also, monitor other factors that influence water quality and create conditions for nurturing return of native aquatic fish and invertebrate species, understanding variability within the system, and identifying pollution "hot spots". Report all monitoring data collection and analyses to the Monitoring Panel.

Create a Monitoring Panel to coordinate monitoring efforts regarding creek and watershed health, water quality and quantity, land use, habitat and wildlife. Participants should include public agencies, universities, schools, professional and volunteer monitoring program staff.
a) Establish a Monitoring Panel that meets regularly

b) Develop objectives for this Panel.
c) Assess current efforts to monitor, provide quality assurance, compare, and share data.
d) Develop improved and shared protocols for gathering data.
e) Develop and implement a plan for a coordinated approach to monitor, analyze and communicate results.

Implementation: SPU to convene (Monitoring Panel would be citywide)

Estimated Cost: 20 hours/year per agency
SPU additional staff support to coordinate meetings
$50,000 annually for lead agency staff and supplies.

Funding Source:

Schedule: 2000 and ongoing

Priority: High

A2. The Monitoring Panel will develop recommendations to improve existing monitoring programs by sharing data, coordinating research and analysis, sponsoring monitor training, and improving protocols. The Monitoring Panel and members of the Watershed Oversight Council will meet with representatives of creek side residents to determine the best method for timely distribution of streamside data collected during monitoring.

Implementation: Monitoring Panel

Estimated Cost: These are vague estimates. Actual costs will depend on the recommended sampling methods.
SPU: Develop sampling plans – Being developed,
SPU sampling (on-going), does not include staffing
Shoreline: Develop plans (2000) $3,000
Shoreline sampling: $10,000/year

Funding Source:

Schedule: Seattle=2000 and ongoing
Shoreline=2001 and ongoing

Priority: High

A3. Establish baseline information for the Thornton Creek watershed

Continue collecting information under the existing watershed analysis program in Seattle and supplement that information, if needed, with recommendations from the

Monitoring Panel. As a starting point include baseline information for the watershed regarding the quantity and types of vegetative cover and impervious surfaces, and types and capacities of private and public detention systems. Use satellite imagery and aerial photography, supplemented with ground level verification where appropriate. For Thornton Creek include stream typing, fish passage barriers, and stormwater sediment loads (turbidity) at various locations to identify any locations contributing large amounts of sediment. Include the Shoreline portion of the Thornton Creek watershed in the baseline information collection.

Implementation: SPU and Shoreline with the Monitoring Panel

Estimated Cost: SPU: Increasing monitoring programs in 2000 forward; included In CIP budgets.
Shoreline: Existing budgets

Funding Source:

Schedule: Began in 2000

Priority: High – CORE

A4. Monitor effectiveness of Capital Improvement Projects (CIPs) and other watershed projects affecting the health of Thornton Creek.

a. Establish baseline information for the Thornton Creek watershed to be used to assist monitors in comparing their results to assess effectiveness. (Examine the Thornton Creek Watershed Characterization Report for initial information to compose such a baseline.)

b. Monitor the results of projects affecting water quality and habitat in the watershed and compare them with the baseline established in (a) above. Projects affecting water quality and habitat might include (but are not limited to) projects that relate to vegetative cover, impervious surface coverage, flood control, stormwater detention, and creek bank erosion.

Develop approaches to determine the effects of projects sponsored by public agencies (Capital Improvement Projects or CIPs) upon water quality and habitat in the Thornton Creek watershed, and conduct regular assessments which are then analyzed and the results used to inform continuing project design, retrofitting, and implementation of the Action Plan. Use this evolving body of knowledge to develop guidelines for projects to be conducted by public and private individuals and groups throughout the Thornton Creek Watershed. (Adaptive management.)

Implementation: SPU and Shoreline with the Monitoring Panel

Estimated Cost: SPU: Increasing monitoring programs in 2000 forward; included In CIP budgets.
Shoreline: Existing budgets

Funding Source:

Schedule: Began in 2000

Priority: High – CORE

A5. Develop ways of monitoring the impact of privately sponsored habitat improvements and flood relief projects along Thornton Creek and its tributaries.
Through the Cities Critical Areas procedures, track and monitor private improvements over time and report regularly to the stormwater agencies of each jurisdiction as well as the Monitoring Panel, Oversight Council and the public on findings

Implementation: Cities of Seattle and Shoreline

Estimated Cost: Startup costs about $50,000 in each city to set up program and train staff; after start-up hard to estimate

Funding Source:

Schedule: Start-up by 2005, then ongoing

Priority: Medium

A6. Support Citizen Monitoring and Data Gathering

a. Support citizen monitoring and/or data collection about Thornton Creek and its watershed by providing protocols and standards as developed by the Monitoring Panel, training on methods and techniques, equipment, supplies, technical assistance, volunteer recruitment and storage of hand written or typed documentation as well as computer data files. Integrate the data collected by trained citizen volunteers with data collected through other efforts in the watershed. Analyze the data to get a better understanding about the health of the watershed, success or failure of restoration efforts, and guidance for future restoration or continued implementation of the watershed plan. Make the results of the analyses available to citizen monitoring groups and the community (See also Chapter 8 and A6 in Chapter 9). Citizens should avoid privately owned properties during monitoring activities or request permission for access prior to their monitoring activities, taking care to minimize any impact they may have on private properties.

Implementation: SPU

Estimated Costs: $10-20,000 annually plus ½ FTE; range from $40,000-50,000

Funding Source:

Schedule: Program began in 2000

Priority: Medium

b. Provide support for educational monitoring activities within the context of school programs working in partnership with the Thornton Creek Project based on standards set by the Monitoring Panel. The school monitoring programs provide hands-on learning activities, familiarity with monitoring protocols, and opportunities to contribute to the store of general knowledge when protocols are used and supervised by technical monitoring staff of professional monitors. (See also the Education and Stewardship Chapter above.) Ensure that educators and students are aware of and respect the rights of private property owners who own segments of Thornton Creek as part of their property.

Implementation: TCP (Memorandum of Agreement with SPU)

Estimated Cost: Variable depending upon annual contracting ($20-50,000 annual)

Funding Source: SPU

Schedule: SPU support began in 1998

Priority: Medium

c. Provide data storage and distribution for citizen and school monitoring and data gathering activities.

Through the Monitoring Panel, develop data storage for citizen and school monitoring and data gathering activities.

Implementation: Monitoring Panel

Estimated Cost: No cost to volunteers and schools

Funding Support: SPU in part, other agencies such as King County or University of Washington to be sought

Schedule: Begin storage by 2003

Priority: Medium

A7. Develop an Index of Watershed Integrity (IWI) for Seattle's creeks. Use this index to help the public understand the "state of the creek" in Thornton Creek by publishing in readily accessible formats, distributing it widely, and revising as new information is available.

Using existing indices, such as EPA's Aquatic Habitat Indicators, and May's Quality Indices for urbanization and information gathered in Thornton Creek by various scientists, monitor watershed integrity by tracking trends in water quality, fish and wildlife habitat and populations, changes in behavior of watershed residents, and community stewardship. Distribute this "quick information" in format, such as a trading card or post card format widely throughout the watersheds.

Implementation: SPU and Shoreline

Estimated Cost: $30,000 to develop index 2000
$3,000 to collect additional data annually

Funding Source:

Schedule: Create in 2001. Update annually

Priority: High, provided A3 is implemented first.

B. Monitor implementation of the Plan's recommendations.

See "Track and Report Progress", Implementation Objective C, and Objective D in Chapter 8.