NATURAL RESOURCE MANAGEMENT PLAN

CITY OF KIRKLAND

NATURAL RESOURCE MANAGEMENT

2003

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Adopted _____, 2003

Prepared by

City of Kirkland's

Natural Resource Management Team

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I. Executive Summary

Natural resources include vegetation, land, air, and water systems that are valued by people and serve to enhance the community. They directly contribute to the physical, mental, spiritual, and economic health and well-being of people and are essential to the survival of other species found in the City of Kirkland.
There are 3 compelling reasons for managing natural resources in Kirkland: (1) the Community's vision requires it, (2) the law requires it, and (3) without it, natural systems and features that can be community assets become liabilities instead. There is a clear connection between today's everyday activities and the quality of life that will be possible for future generations.

Effective natural resource management recognizes the complex interdependencies of natural systems and the fact that human impact to one natural system affects the others as well. This indicates the need for a comprehensive, coordinated approach to natural resource management.

The purpose of this plan is to provide direction for future actions that will improve natural resource management in Kirkland. To this end, the plan articulates guiding principles, identifies practical problems and opportunities specific to Kirkland, then lists strategies to implement the City's goals relating to natural resource management.

The Natural Resource Management Plan is intended to function as an intermediate plan that supplies additional depth to the broad, overarching goals expressed in the Kirkland Comprehensive Plan in order to guide future City practices, programs, projects, and regulations. Although the Natural Resource Management Plan focuses on Kirkland, it also identifies the need to look beyond Kirkland's boundaries to coordinate with other entities that share these natural systems.

A variety of tools are needed to manage natural systems, because the systems traverse private and public property lines as well as jurisdictional boundaries. The most certain approach to effectuate the management of water, land, and vegetation resources as desired by the City, would be achieved by City acquisition of all affected properties followed by proactive application of best management practices. However, budget constraints make it infeasible for the City to purchase and maintain all of Kirkland's natural resource areas. Instead, the most valuable areas should be identified and prioritized for acquisition. Management of the remaining areas should be accomplished through a combination of public involvement and education, incentives, regulation, and enforcement. Of these, public involvement and education should be emphasized most, due to the considerable cumulative impact of the actions and choices of individuals, institutions, and businesses in Kirkland.

Implementation of this plan is expected to occur in many future steps. As each new action is raised for consideration, it will be examined in depth to analyze costs/benefits and alternatives and to ensure consistency with this plan.

II. Introduction

A. What Are Natural Resources And Where Are They Located In Kirkland?

Natural resources are those elements that remain in their natural state as well as once-natural elements that have been manipulated by humans, that citizens appreciate, enjoy, or in some way value. Among these elements are green growing areas, parks, open space, trees, water resources, wetlands, stream corridors, shorelines, and wildlife habitat. Less obvious components include air and climate.

Natural resources can be grouped into three categories:

- Water systems, which include streams, lakes, wetlands, stormwater runoff, groundwater, and shorelines
- Land systems, which involve soils, rocks, and plants, as well as the underlying geology and topography (In cities these systems are sometimes termed 'the urban forest'.)
- Air systems, which involves air quality, microclimates, and macroclimate (e.g., global warming)

All three categories are interdependent. Any impact to an element within one category affects natural resources in the other two categories as illustrated in the figure on the following page.

For example, removal of trees from a stream bank can lead to erosion of streamside soil, because tree roots are no longer anchoring the slope. Not only is valuable soil lost from the streamside plant community, but water quality is degraded by the eroded soil and by loss of contaminant absorption by the trees, so fish and wildlife habitat may be impaired. Stormwater runoff will likely increase, perhaps causing floods, since trees and soils potentially absorb most runoff. Removal of trees also affects air quality, temperature, and microclimate, since trees provide oxygen, moderate air temperature, intercept and absorb precipitation, then return water to the atmosphere.

This complexity of interaction is the reason that effective natural resource management must be done comprehensively – with careful consideration for the multiple impacts of any one action.

An inventory of the type and location of Kirkland's natural resources is included in the Natural Resource Management Plan: Phase 1 and is summarized in the maps on the following pages. See Appendix B for sources of map data and disclaimers.

AIR

FEATURES:
climate, air
ISSUES:
climate change (a.k.a. global warming) and air quality

INTERACTION:
- Vegetation depends on climate
- Vegetation moderates temperature & affects climate
- Vegetation cleans the air
- Precipitation affects land stability

INTERACTION:
- Precipitation & evaporation cycle water
- Climate affects the amount and temperature of water

LAND

FEATURES:
soils, topography, geology, and vegetation
ISSUES:
stability, erosion, land cover type (pervious vs. impervious), vegetation type and health, organic soils.

WATER

FEATURES:
surface water (e.g., oceans, seas, lakes, streams, wetlands, shorelines), groundwater, aquifers, rain, ice and snow
ISSUES:
water quality, water quantity (flooding, wetland expansion, low stream flows), and groundwater recharge

INTERACTION:
- Soil stores & cleans water, so can reduce runoff if slopes are not too steep.
- Vegetation absorbs water, slows and cleans runoff, moderates water temperature, adds food & shelter for fish & wildlife.
- Water erodes land, depositing sediment into watercourses, which degrades habitat.
- Plants need water to survive.

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B. Why Manage Natural Resources?

There are 3 compelling reasons for managing natural resources in Kirkland: (1) the Community's vision could not be attained without it, (2) the law requires it, and (3) without it, community assets become liabilities.

1. Natural Resource Management is Needed to Attain the Community's Vision

a. Kirkland's Vision Statement
In the early 1990's, extensive community meetings were held to compile a Vision Statement and Framework Goals to serve as the foundation of the City's 1995 Comprehensive Plan. Major themes of the Vision Statement that addressed natural systems included:
- *Attractive, vibrant, inviting place to live & work*
- *Extensive park system/preserved open space/waterfront trails and vistas*

b. Framework Goals in the City's Comprehensive Plan
Related Framework Goals for the 1995 Comprehensive Plan included:
- *Maintain and enhance Kirkland's unique character.*
- *Protect and preserve environmentally sensitive areas and prominent natural features.*
- *Maintain and enhance Kirkland's strong physical, visual, and perceptual linkages to Lake Washington.*
- *Maintain existing park facilities, while seeking opportunities to expand and enhance the current range and quality of facilities.*
- *Maintain existing levels of service for important public facilities.*
- *Plan for a fair share of regional growth.*
- *Promote active citizen involvement in planning for Kirkland's future.*
- *Establish development regulations that are fair and predictable.*

c. Survey of Attitudes
In the City of Kirkland *Survey of Attitudes*, conducted May 2000, residents further expressed their views relating to management of Kirkland's natural resources:
- 81% indicated that environmental protection should be a top priority of the City
- 55% indicated that the current level of environmental protection was "about right", 20% believed that environmental protection should be increased, and nearly all who had this opinion supplied suggestions. Their recommendations included: more protection of natural habitats and wetlands; increased protection of water quality in general and the quality of the water and environs of Lake Washington; limiting development and preserving open space; supporting action programs for the environment; and controlling pollution from the geese.
- 65% indicated that the city should aggressively pursue acquiring more land for parks.
- Although growth and traffic problems were respondents' top concerns, the only issue the majority were willing to support as a bond issue was the development of six neighborhood parks.
- When asked to rate three different transportation strategies, only promoting the use of alternative transportation modes was given a high rating by a majority (68%).

B. Why Manage Natural Resources?, continued

d. Stakeholder Survey, Phase I of the Natural Resource Management Plan

In 2000, Adolfson Associates, Inc. completed an inventory on behalf of the City to serve as a foundation (Phase I) of the Natural Resource Management Plan. Part of the inventory focused on how Kirkland citizens, interest groups, and staff perceive and define natural resources, and how they think natural resources in the City should be managed. The inventory utilized stakeholder interviews and also summarized results of previous City survey efforts. Results included:

- Business, environmental communities, and neighborhood groups generally were not familiar with existing City natural resource management-related programs and plans, particularly maintenance activities. City staff members were only somewhat aware of programs and activities administered by departments other than their own.
- Preferred tools for managing natural resources on public land:
  #1 Education
  #2 Volunteer Programs
  #3 Capital Improvement Programs
  #4 Regulations
- Preferred tools for managing natural resources on private land:
  #1 Education
  #2 Tax incentives
  #3 Landowner recognition
  #4 Regulations
  #5 Volunteers
  #6 Funding for land acquisition
- Increased funding for natural resource management was supported by neighborhood groups, the environmental community, and by City staff. Grants were the preferred method. Non-City staff participants supported re-allocation of funds internally by the City. Some participants also recommended impact or developer fees.
- The City is managing parks well
- Most participants appreciated the City's efforts to protect streams and wetlands.
- City staff and neighborhood groups felt that of all the resources, tree management needs the most improvement (including street trees, trees on private property, and the urban forest as a whole).
- City staff and residents saw a need for a better coordinated approach to natural resource management.

e. Community Conversations

In 2002, 952 people participated in a series of Community Conversations held throughout Kirkland to see if any changes to the Vision Statement or Framework Goals were needed to update the Comprehensive Plan for the new horizon year: 2022. In answer to the question, "What do you like about Kirkland?" the following responses were ranked in the top 10:

#1 Parks – both diversity and number;
#2 Natural aesthetics of town: trees, plants, streams, and wetlands;
#4 City identity as a water-oriented town with many parks;
#6 Recreational programs; and
#7 Public waterfront access trails and parks.

The six most common responses relating to the major theme of protection for streams, wetlands, and trees were (in order of most common response):

#1 Protect our environment and our sensitive areas;
#2 Protect parks and trees;
#3 Manage growth to protect sensitive areas;
#4 Provide more community involvement and education;
#5 Decrease construction in order to protect sensitive areas; and
#6 Provide more neighborhood environmental stewards.

B. Why Manage Natural Resources?, continued

Other common Community Conversation responses related to natural resources were:

- "What do you dislike about Kirkland?"
  #5 Lack of convenient alternative transportation
- "What do you want our future neighborhoods to look like?"
  #1 Creative and/or denser developments
- "What changes do you want for the transportation systems?"
  #2 Alternative modes of transportation
  #3 Cleaner cars/buses using alternative fuels
  #4 City-owned inner city transportation service
  #5 More pedestrian improvements
  #8 More paths for bike & small modes of transportation
- "What changes in City services & facilities would you like to see?"
  #1 More land for parks and open space
  #2 Increase in park maintenance
  #5 Pedestrian improvements and trails
  #6 Marina upgrades (more boat ramps & boat parking)
  #7 User fees to help pay for parks and services

Clearly, the Community envisions healthy natural resources to be important components of Kirkland. Further, residents consistently acknowledge the need for the City to take steps to manage and protect those resources in order to ensure their existence.

2. Laws Require Natural Resource Management

Several laws and policies require and govern natural resource management. These include federal laws, such as the Clean Water Act and the Endangered Species Act, Washington State statutes, such as the Shoreline Management Act and the Growth Management Act, regional requirements, such as King County Planning Policies, and Kirkland's own adopted policies and regulations. The legal context is summarized in **Appendix A**.

3. Effective Natural Resource Management Transforms Liabilities to Assets

Natural resources, like trees, streams, and wetlands, can provide many important benefits to Kirkland when they are effectively managed. A healthy urban forest cleans the air, moderates temperatures, enhances aesthetics, can stabilize hazardous slopes, and absorbs great quantities of runoff, thus reducing erosion and flooding. Well-managed wetlands and stream corridors absorb, cleanse, and convey water, reduce flooding, support fish and wildlife, provide recreation, education, and enhance the aesthetics and liveability of Kirkland. Air quality is fundamental to a healthy natural and human environment. Clean air can promote economic growth as well as attract more tourists or new residents.

When natural resource systems are neglected or mismanaged, they become community liabilities. Increased incidence of landslides, floods, and tree failure result in increased risk of harm to human and other life, to property, and to vital City infrastructure. Loss of fish and wildlife habitat negatively impacts the economy, culture, biologic health, and desirability of Kirkland and of the region. As well, Kirkland could be subject to legal challenge for actions that threaten the habitat of anadramous fish (see section I.B.2 above). Poor air quality can impact ecological health and habitat. Unhealthful air conditions can increase stress levels and inhibit outdoor activity. It can also increase health care expenditures, as it negatively affects the well-being of infants, older people, and persons with respiratory disease.

C. Tools for Natural Resource Management

A variety of tools exist for managing natural resources:

- City practices and programs on public property
- Acquisition
- Public Education and Involvement
- Incentives
- Regulation/Enforcement on private and public property

A combination of these tools, using each where it will be most effective, will yield the best results overall. The strengths and shortcomings of each tool are discussed below, in the order the tools are currently used.

1. Regulation/Enforcement

To date, the natural resource management tool used most extensively by the City is regulation of natural resources on private property. This involves adopting and updating ordinances, administering regulations through permit review, and enforcing violations of the regulations.

Unfortunately, experience has proven this tool is less effective for natural resource management. The fact that most of the streams and wetlands on private property are located in back yards -- typically behind fences -- makes administration of regulations very difficult and severely limits successful enforcement.

Where regulations are used, it is essential to inform the public of the rules, the reason for the rules, and the consequences of violations. The publicity approaches listed below (see Public Education) should be used along with direct mailings to professionals, such as businesses providing environmental consulting or tree cutting services.

The finest regulations, however, can not be effective unless:

a. The public is educated about the requirements and purpose of the regulations.

b. Enforcement is ensured by:
   - the support of the City Council
   - authorization provided in the code, and
   - the dedication of adequate staff resources

   and

c. Great care is taken to ensure that variances (or any code authorized modification of the science-based standards) do not singly or cumulatively reduce the intended level of environmental protection set forth in the adopted City Comprehensive Plan and implementing regulations. Once an avenue is provided for departing from the science-based standard, most developers will pursue that avenue, if they can realize greater economic gain. For example, as a result of the City's code provision that allows reduction of standard buffer widths, almost all buffers in the City are of sub-standard width. The criteria for buffer reduction were intended to allow the narrower buffers only when superior revegetation would compensate for the smaller width. However, it is becoming apparent that over time, required buffer vegetation is often overrun by invasive non-native vegetation. The trend is producing undersized buffers of minimal value throughout the City.

It is problematic, though, to eliminate opportunities for flexibility from standards, because the presence of dynamic natural systems on private property leads to a seemingly infinite variety of problems. It is not feasible for code standards to anticipate and thoroughly address all the potential quandaries. The key is to provide flexibility from the standards prescribed by code, but only when such flexibility can only lead to outcomes that would meet or exceed the level of protection established by the prescribed standards. It is also crucial that cumulative impacts of such outcomes on natural systems be considered.

C. Tools for Natural Resource Management, continued

2. Acquisition

The most effective way to ensure that natural resource systems are managed consistently with City's intent is for the City to acquire the land they occupy and implement best management practices. Realistically, the City can not afford to purchase and maintain all valuable natural resource areas and features. Too, while some property owners want the City to pay for land that is constrained by environmentally sensitive areas, others object to having large areas of land under government ownership. The most widely acceptable approach would likely be for the City to identify the most valuable features or corridors, prioritize their acquisition, and – once acquired -- manage them according to best known practices.

The remaining natural systems and features that are not of highest priority will be best managed if (in order of effectiveness)

a. Property owners have been educated and involved in resource stewardship,
b. Incentives are offered for preferred stewardship practices, and
c. Regulations preclude activities that would be substantially harmful.

These tools must be combined to work well. For instance, incentives can support regulation and can be built into regulations (e.g. density bonuses for greater setbacks). Also, people must be educated about the availability of incentives and about regulations/enforcement.

3. Public Education and Involvement

Public education can be an effective tool if it clearly conveys the negative consequences that directly affect the consumer when lifestyle choices are made that harm natural resource systems. Without showing those "costs", education will not usually persuade people to act against their short-term self-interest in favor of others (e.g., as yet unborn generations and other species).

It is challenging yet essential to refresh the message periodically without losing the audience. Possible avenues for education include the City's internet site, utility bill inserts, airing educational videos as well as brief reminders on cable TV, publishing articles in the Kirkland Courier, the Neighborhood Connection, kiosks in City neighborhoods and parks, and programs in the local schools. A master list of information sheets and videos and other resources available for public use has already been posted on the City's website.

Public involvement should include seeking public opinion regarding improvements to City programs, policies, and regulations; assisting groups that volunteer for restoration work in City wetlands and stream corridors, planting trees, etc.; and cooperating with neighborhood associations, schools, and others (e.g., Salmon Watch volunteers and Master Gardeners) that undertake projects and/or inform others. The City may even want to consider initiating new programs, such as Environmental Stewards, to foster sound stewardship practices by residents.

Building understanding of natural resources in schools could be particularly fruitful. This endeavor would not only transmit the information to the next generation of responsible citizens, but would also potentially effect the current actions of many families through the influence of their children.

C. Tools for Natural Resource Management, continued

4. Incentives

Incentives can promote stewardship of resources on private land by rewarding sound natural resource practices. For those seeking to develop property, the strongest incentives can be:

- saving time in the permitting process
- increased development potential (e.g., increased number of units, reduced setbacks, increased height)
- saving money in the permitting process
- removing disincentives for good stewardship, such as lengthy, expensive, or uncertain permitting processes; and correcting code provisions that create unintentional barriers to preferred outcomes

For local residents, effective incentives might include:

- discounted utility rates
- vouchers for plant materials
- technical assistance for restoration or enhancement of natural areas
- cost sharing for restoration or enhancement of natural areas
- community recognition for good stewardship

Local business owners will most likely be motivated by:

- Awards and other forms of public recognition that might promote the growth of their business
- discounted utility rates
- discounted business license fee/tax
- vouchers for plant materials

Stakeholder input will be essential for successful selection of incentives. For many of the rewards listed above, provision of the incentive would require that some other standard be reduced (e.g., reduced revenue from permits or utilities, or reduced development standards for setbacks, height, density limits, etc.). Others require that City funds be used to cover the costs that are typically borne by private citizens or developers. Given the "costs" of providing incentives, a thorough analysis of pros and cons should occur as the City seeks feasible, effective incentives and works to implement them. In any case, incentives should not result in a net loss of environmental quality.

5. City Practices and Programs

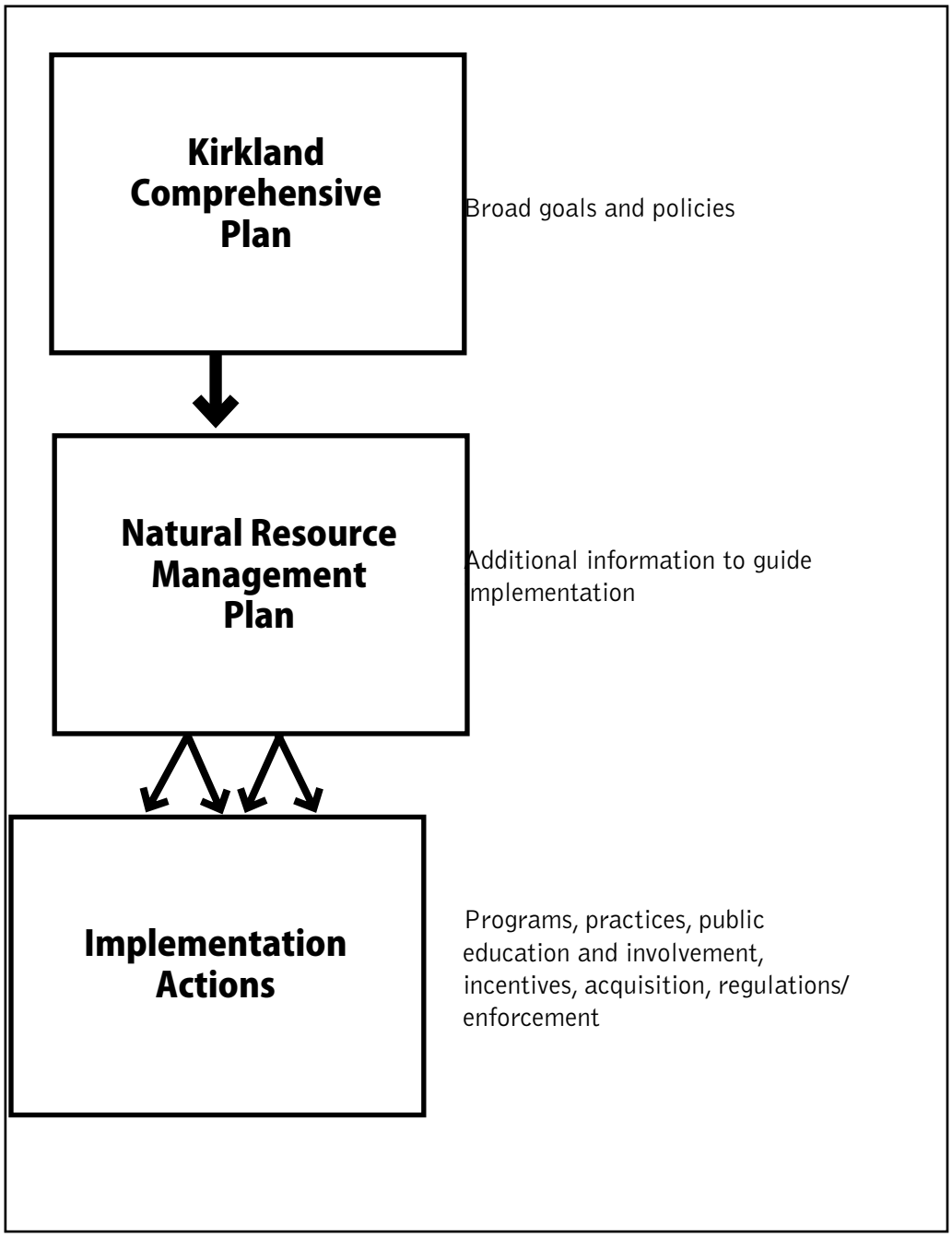
Various City departments manage natural resources in Kirkland every day through routine practices, such as maintaining public storm water facilities and trimming hazardous vegetation in the rights-of-way, and through programs, such as curbside recycling and coordinating habitat restoration projects.

In its role as proprietor, the City is responsible for providing and maintaining public services and facilities, including "green infrastructure" as articulated in adopted City policies and ordinances. In addition, the City is uniquely positioned to model sound stewardship practices in Kirkland parks and on other City-owned properties.

This plan gives direction for improvements to City practices and programs that would result in enhancing the value of these community assets.

D. Relationship of the Natural Resource Management Plan to other City plans

The Natural Resource Management Plan is intended to guide the City's actions for coordinated management of Kirkland's urban forest, water, earth, and air resources. It serves as an implementation tool, providing direction for the practices, programs, and regulations that will implement the goals and policies in the Kirkland Comprehensive Plan. Other City plans that relate to natural resources should be consistent with the Natural Resource Management Plan and should refer readers to it.



III. Guiding Principles

NOTE:
Each of the following Guiding Principles is based on Kirkland's policy, a legal requirement, and/or widely accepted current scientific knowledge or practices. The specific bases for each Guiding Principle are listed in **Appendix B**.

A. Natural Resources -- General

1. THE VALUE OF NATURAL RESOURCES

Natural resources are considered to be community assets that significantly affect the quality of life in Kirkland.

In fact, human survival is dependent upon healthy natural systems.

Natural resources are of such value to our city, region, state, and nation, that there are laws at each of those levels to protect them.

Quality of life and indeed, life itself, is absolutely linked to natural resources. At the global level, they provide the air, water, food, and shelter necessary for human survival. At the local level, they also provide aesthetic, economic, recreational, educational, and cultural benefits that significantly contribute to Kirkland's livability. *(See Introduction for additional discussion of the importance of natural resources and their management.)*

Although Kirkland has rapidly grown to be the sixth densest city in Washington State[1], it still widely regarded as a very desirable community. This can be attributed to its well-designed, compact urban landscape in combination with its desirable natural attributes: Lake Washington, Forbes Lake, Totem Lake, streams, wetlands, parks, and trees. For many, Kirkland's natural resources provide relief that is essential to balance the density of our built environment and maintain quality of life.

2. INTERDEPENDENCE OF NATURAL SYSTEMS

Natural resources exist in complex, interrelated systems that need to be managed comprehensively in order to maintain the viability of each.

Actions that affect one feature of a natural resource system will affect other systems as well, because they are interdependent. In light of that fact, natural resources should be managed comprehensively, with an awareness of all of the impacts of each action.

3. BIODIVERSITY

Preserve Kirkland's remaining biodiversity and restore some of what has been lost by promoting public understanding of the City's local plants and animals and by managing Kirkland's natural and landscaped habitats in a way that enhances the City's biodiversity.

Biodiversity, which is defined as the rich variety of native plant and animal communities in a given area, is essential to provide food and shelter for migratory and resident fish and wildlife. Past and present threats to biodiversity include the introduction of non-native plants that displace indigenous plants, features of urban development that have resulted in loss and fragmentation of habitat; irresponsible pet management that seriously disturbs habitat integrity, and more generally, the negative effects of pollution on air, water, and soil. Kirkland cannot turn back the clock and return to its pre-urban environment, but the City can take actions to preserve its remaining biodiversity and restore some of what has been lost.

[1] Population, Land Area, and Density for Cities and Towns", April 1, 2002, www.ofm.wa.gov/pop/popden/city

B. Natural Resources - Management

1. BENEFITS OF NATURAL RESOURCE MANAGEMENT

Careful management of Kirkland's natural resources will maximize the environmental, economic, and social benefits they provide to the community and will decrease risk of harm to life and property.

Carefully managing natural resources will not only save money, salmonids, and Kirkland's lifestyle, it will also preserve a livable habitat for ourselves. Natural resources are more than community assets, they are our life-support system.

2. SUSTAINABILITY

For life as we know it to survive here, the physical resources and systems that support life must be maintained:

- **They can not be used up so that there is nothing left; and**
- **They can not be made unusable through degradation**

The health of plant and animal populations must be insured, whether they are considered as the human food chain or as a highly complex system that interacts with physical life-support systems (such as the atmosphere) in ways that are not well understood.

A sustainable society meets the needs of the present without sacrificing the ability of future generations and other species to meet their own needs.

Many communities integrate economic, social, and environmental concerns in planning for sustainability. A sustainable economy would provide a good quality of life for all residents without undermining the biological and physical processes of the environment upon which people depend, nor reduce the city's ability to ensure that the basic human needs of all its members are met.

3. MANAGE NATURAL SYSTEMS ACROSS BOUNDARIES

Natural resource systems cross property and jurisdictional boundaries. For that reason, it is important to manage them with a multipronged approach that will address both public and private lands. Too, responsible management requires interjurisdictional coordination. The influence of natural resource management extends beyond the physical location of the resources. Local action can have regional or even global impact.

The fact that natural systems extend beyond property and jurisdictional boundaries means that effective management cannot occur unless efforts are coordinated between all affected stakeholders and entities with jurisdiction. This kind of coordination is exemplified by current efforts to recover viable populations of salmonids. Kirkland is working in cooperation with about 30 of the other jurisdictions that occupy the Lake Washington/Lake Sammamish/Cedar River watershed to produce a watershed-wide conservation plan.

On a larger scale, the "Shared Strategy for Puget Sound" is a collaborative effort to help the 15 watersheds in the Puget Sound area to coordinate with each other and with appropriate agencies in producing their conservation plans, in order to create a comprehensive strategy that will recover wild Chinook salmonids throughout Puget Sound.

An even broader example can be seen in the effects local actions can have on the global scale, such as the effects that heavy automobile use and large-scale vegetation removal have on climate.

It is important that Kirkland continue to communicate and collaborate across boundaries to manage natural resource issues.

B. Natural Resources - Management, continued

4. INTEGRATE LOCAL, STATE, AND FEDERAL REGULATIONS FOR LAKES, SHORELINES, STREAMS, WETLANDS AND AQUIFER RECHARGE AREAS.

Due to the variety of essential functions performed by lakes, shorelines, streams, wetlands, and aquifer recharge areas, development and use of these areas is regulated. Many of these features are regulated under overlapping or conflicting Federal, State and local laws that require their protection, enhancement, and/or restoration.

Human and non-human species compete for land next to water for many reasons, ranging from survival to aesthetics. Careful management is required in order to maintain the viability of these critical resources facing multiple demands.

State and Federal laws require no net loss of the functions and values of lakes, streams, wetlands, shorelines, and aquifer recharge areas; enhancement of the habitat that anadromous fisheries depend upon, and restoration of the Lake Washington shoreline.

Review of proposed regulatory changes by the Natural Resources Management Team (made up of staff from various City departments) or other mechanisms (e.g. a checklist or review process) would aid in identifying a unified strategy for meeting the intent and letter of State and Federal regulations while meeting local needs.

For example, the City is currently participating in development of the WRIA 8 watershed conservation plan. The final plan will likely include suggestions for a mix of actions that include regulatory changes. Review of these proposals by the Natural Resources Management Team would help in determining how they affect City compliance with other laws such as the Growth Management Act, and in coordinating regulatory changes between the municipal code and the zoning code.

5. USE A MULTIDISCIPLINARY APPROACH

A multidisciplinary approach is required to effectively manage the interrelated natural systems.

Because any action that impacts one natural system affects other systems as well, it is vital that natural resource management be carried out as a multidisciplinary effort. At the present time, the Natural Resource Management Team, made up of representatives from Kirkland Parks, Planning, and Public Works staff, strives to provide coordination and communication across departments to facilitate effective natural resource management.

An important function of this interdepartmental team is to avert conflicts that naturally arise between City departments with differing missions and perspectives. For instance, the Planning Department's responsibility to require a "wild" vegetated buffer along a roadside stream can conflict with the Public Works Department's responsibility to keep roadways clear of visual obstructions. Currently, the interdepartmental natural resource service team works to smooth out potential conflicts in advance.

However, there is no dedicated budget provision for this teamwork. In the future, it would be advisable for the City to explore the feasibility of organizational changes in staffing and budget that would support the work currently performed by the team. Alternatively, Kirkland may benefit from following the lead of several other cities in our region by instituting a City division dedicated to managing natural resources. In that way, management of the City's natural assets would be removed from the conflicting and competing interests of various City departments, and budget and staff could be provided to more effectively address natural resource management as set forth in this plan.

B. Natural Resources - Management, continued

The City may also wish to consider formation of a Natural Resource Management Board that could study issues and provide input regarding potential City actions that affect Kirkland's natural resources. Such a board would need to be made up of members that collectively have interest in and knowledge of the many aspects of natural resource management. Formation of this board would necessitate dedication of sufficient staff resources to provide appropriate support (e.g., memos, exhibits, tours, and presentations).

(See also Guiding Principle G and Implementation Strategy 11 regarding funding natural resource management.)

6. USE A VARIETY OF MANAGEMENT TOOLS

- **City Practices and Programs**
- **Public Involvement and Education**
- **Acquisition of Prime Resource Land**
- **Incentives**
- **Regulation and Enforcement**

Because Kirkland's natural resources are located on both public and on private land, a variety of management tools are needed for effective natural resource management.

Move toward redirecting the City's resources toward public education and involvement, acquisition, and improvement of City practices on City land, rather than relying primarily on regulations.

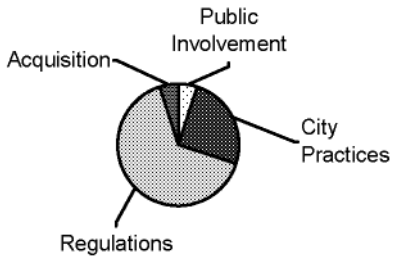
As discussed at length in Section C of the Introduction, the City's past reliance upon regulation and enforcement for managing natural resources on private land has been problematic. It leads to a fragmented approach, since management occurs when individual parcels develop, redevelop, or when a violation occurs. Too, the fact that most natural resources on private land are behind back yard fences makes enforcement very difficult.

Since about two-thirds of Kirkland's land is in private ownership, the success of natural resource management depends in large part upon the actions of businesses, institutions, and individuals. Public involvement and education is essential, incentives could help, and regulation/enforcement should be used to prevent/resolve degradation. Private properties containing very valuable natural resource features should be considered for acquisition by the City.

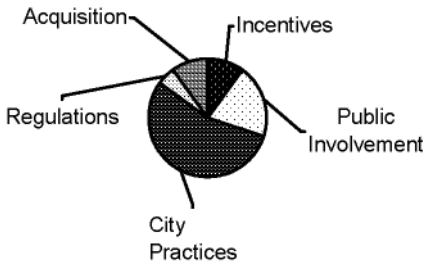
On City-managed lands, including easements and rights-of-way, greater emphasis should be placed on proactive management of natural resources by allocating sufficient City resources for tree maintenance programs, rehabilitation of streams and wetlands in our parks, and upgrading practices that relate to natural resources.

The following conceptual diagrams contrast the current use of management tools with the use of tools this plan recommends as preferable.

CURRENT TOOL USE



PREFERRED TOOL USE



B. Natural Resources - Management, continued

7. CONCENTRATE EFFORTS IN AREAS THAT WILL YIELD GREATEST BENEFITS

Look for opportunities to focus City resources (human and financial) in areas that will accomplish the greatest good, ecologically, for the cost.

Because there are always many valid needs competing for limited City funding and staff resources, it is vital that City projects, programs, practices, and regulations related to natural resource management be focused to yield maximum ecological benefit for the time and money involved. When implementing this principle, it will be pertinent to consider which of the natural resource management tools will be most effective in a particular case (e.g., acquisition vs. regulation).

Also pertinent are priority locations. For instance, more ecological benefit may be derived by concentrating stream restoration efforts within fish bearing basins, rather than in those without fish. The specific criteria and method to be used for prioritization could be selected by the City Council from alternatives that have been generated by qualified professionals and commented upon by stakeholders with diverse perspectives. The resulting criteria and process could then either be applied (1) proactively City-wide to identify priority locations for future actions, or (2) reactively on a case-by-case basis to evaluate restoration or acquisition opportunities as they occur.

(See also Guiding Principle III.B.9 and Implementation Strategy 10.)

8. MANAGING RESOURCES BY DRAINAGE BASIN

Where feasible, tailor management to fit the differing characteristics of drainage basins, neighborhoods, or other logical subareas.

Natural resource planning often takes place at the drainage basin level (see the City's drainage basins on **Map 5**). This is necessary to track and manage the continuous hydrologic regime (i.e., the drainage system of streams, wetlands, storm water, and groundwater) and its effects throughout its basin. Since the behavior of the drainage system is affected by other factors, such as the amount of impervious area and the amount of healthy soils and vegetation within the basin, it is often useful to manage other aspects of natural systems at the drainage basin level as well.

In 1998, the City tailored regulations for streams and wetlands to fit the City's drainage basins, in order to more appropriately protect the differing functions and values. Another logical application of basin-level management might be the City's urban forest.

Stakeholders have expressed interest in having vegetation management, such as tree regulations, customized to fit the differing character and concerns of various City areas. Drainage basins may be the most appropriate unit for differentiating vegetation management, because of the interdependence of water and vegetation systems. It would be useful to explore the possibility of overlaying neighborhood boundaries on drainage basin boundaries to see if further differentiation might be accomplished at the neighborhood level. In that way, features that bring character to specific neighborhoods, such as view corridors and mature native tree stands, could be considered in the management of the urban forest. This could also provide a catalyst for neighborhood identity, a sense of personal responsibility for natural systems, and an ethic of stewardship.

B. Natural Resources - Management, continued

9. ENHANCEMENT AND RESTORATION

The City should pursue opportunities for restoration -- or at a minimum, enhancement -- of natural resource features and systems where significant environmental benefits will be realized cost effectively.

The official listing of wild Chinook salmon of Puget Sound as a "threatened" species in 1999 by the Federal government is a widely accepted indicator of the decline of the natural environment in our region. Continuation of current practices would perpetuate the trend of progressive environmental degradation. In order to halt the decline, it is necessary that current practices be improved.

At the same time, restoration of habitat where significant ecological benefits would result is necessary. Where restoration of habitat is not appropriate or feasible, then it is important to take a step whenever possible to enhance the functionality as appropriate. For example, perhaps where complete revegetation of a degraded buffer is not feasible, a segment of fish-bearing stream could still be enhanced by introducing rounded gravel to the stream bed that would promote fish survival, as long as this is sufficiently supported by the other conditions present to provide benefit.

The City should pursue opportunities for restoration -- or at a minimum, enhancement -- of natural resource features and systems where significant environmental benefits will be realized. Such opportunities should be identified and:

a. Proactively pursued on City-owned properties, realizing that the City's own practices should serve to exemplify appropriate management of natural resources and providing adequate staff and budget to do so,

b. Included in scope and funding for Kirkland's CIP projects, and

c. Required to the maximum degree that is constitutionally allowed when development or redevelopment is proposed on private properties, and

d. Implemented in part by utilizing the opportunities presented by groups of volunteers and committing the staff resources necessary to advise and oversee volunteer labor, and

e. Pursue grant opportunities that fund restoration and enhancement projects.

(See also Guiding Principle B.7 and Implementation Strategy 10)

10. FACTORS AFFECTING NATURAL RESOURCE MANAGEMENT DECISIONS

When making decisions that affect natural resources, it is important to explicitly discuss the various factors involved.

Because Kirkland's natural systems have already undergone alterations to accommodate the human component of our environment, nature/science is only one of many factors that should be weighed in managing Kirkland's natural resources. Human factors, including social, economic, political, lifestyle, and legal context are also important considerations in managing Kirkland's natural resources.

Finding the appropriate balance of the various factors is challenging but crucial, because of the City's need to remain economically sustainable as well as environmentally sustainable, its commitment to absorb future growth, and in the light of individual property owners' desires to maximize use of their property. It is usually helpful to articulate the various factors under consideration when making decisions related to natural resource management.

B. Natural Resources - Management, continued

11. USE CURRENT KNOWLEDGE, TECHNOLOGY, AND INDUSTRY STANDARDS

Natural resource knowledge and practices have markedly changed over that past decades, and they will continue to advance.

Kirkland's policies, practices, programs, and regulations should be periodically updated to reflect current knowledge, technology, and industry standards.

Consideration of "best available science" is required by State and Federal statutes.

Technology and industry standards for managing stormwater, fish and wildlife habitat, air quality, and the urban forest are continually advancing. The City should periodically review and update policies, programs, practices, and regulations to remain current with industry standards and compliant with State and Federal requirements.

12. MONITOR RESULTS AND USE ADAPTIVE MANAGEMENT

Because the science of natural resource management is incomplete and growing, and other relevant factors may also change over time, the results of implementing this management plan should be monitored and management practices periodically adjusted to increase effectiveness. Quality indicators should be developed to periodically measure progress toward natural resource goals.

Much is unknown in the field of natural resources. Progress occurs when known facts are used to try a course of action that should prove effective. The actual effectiveness should be measured over time to assess success. In order to do that, it is necessary to identify measurable quality indicators. Based on the outcome over time, course corrections should be made to better achieve the desired results. The length of trial period required to accurately monitor results depends on the type quality indicator being measured. Typically, the minimum period would range from 5 to 10 years.

13. INFORMATION MANAGEMENT IS ESSENTIAL

Monitoring and managing environmental information is at the core of municipalities' work for a healthy environment and sustainability. Basic environmental information management should provide for data collection, interpretation, analysis, storage, compilation, and communication.

The City's Geographic Information System (GIS) is a valuable tool for the production and analysis of information vital to sound natural resource management. A good beginning has been made in producing the maps shown in this plan's Introduction section. Another important step has been made by beginning a survey of trees in the City rights-of-way and mapping known environmentally sensitive areas. However, it will be important to allocate the staff and funding in order to build on, maintain, analyze, and make use of these data in order to effectively manage Kirkland's natural resources.

C. Land And Vegetation

URBAN FOREST

1. TREE CANOPY COVER

The ecological and economic benefits of a significant tree canopy cover in an urban area are optimized at an overall coverage of 40%.

If the average tree cover were increased to 40% in the urban areas of the Puget Sound Region, the environment would be significantly improved in terms of storm water management and air quality[2]. With an estimated current tree cover of 32%, Kirkland is aiming to increase the tree canopy long term toward 40% -- to the extent feasible when balancing other City goals -- in order to approach measurable economic and ecologic benefits. The challenge will be to increase the City's tree cover wherever feasible to the extent necessary to compensate for those highly urbanized areas in Kirkland where significantly less cover can be sustained. The City has identified the following strategies in which to strive toward that goal:

- Proactive Public Tree Management
- Private Tree Preservation
- Appropriate Transportation Standards for new Street Trees
- Notable Tree Program and other public outreach

Tree management goals should favor preservation over tree replacement. More tree management budget and staff resources should be directed toward education and incentives than toward enforcement. Use of native vegetation on public and private property should be promoted where appropriate, because it can require less maintenance and watering, is essential for fish and wildlife, and contributes to the unique character of our region.

2. PROACTIVELY MANAGE PUBLIC TREES

Trees in City parks, rights-of-way, and on other City-owned properties constitute valuable public assets.

Kirkland's public trees constitute important "green" infrastructure in the community. Their contribution to the overall urban forest and their associated benefits are significant. Proper maintenance of existing healthy trees and adequate planting efforts are critical components to ensure that the trees remain assets, and do not become liabilities.

Gathering useful data on the public trees through an inventory will help the City determine maintenance needs and areas to enhance, thus investing in and increasing the value of Kirkland's public trees.

The most effective way to ensure proper maintenance for the City to commit to a comprehensive public tree management program. All City and ROW trees should be maintained by ISA-certified arborists and tree workers according to a sound plan and following the national (ANSI) standards. At some point, the City may wish to explore the feasibility of adding an Adopt-a-Street program that could train interested citizens to properly maintain designated groupings of street trees for which they wish to assume responsibility.

[2] Regional Ecosystem Analysis: Puget Sound Metropolitan Area - Calculating the Value of Nature, 1998, by American Forests, www.americanforests.org

C. Land and Vegetation, continued

Planting trees is an important component of proactive, public tree management. The City will need to explore funding options, such as a dedicated tree fund, to support the planting of trees as well as proper care of existing trees in public spaces. Kirkland's Public Works Department and Parks and Community Services Department have started to develop a tree nursery as a source of new public trees, but its success will depend upon the availability of funding and staff.

3. PRIVATE TREE PRESERVATION

Ensure more effective retention and preservation efforts for mature trees during development.

The Kirkland Department of Planning and Community Development should explore several ways to approach revision of the current tree regulations to ensure feasible tree retention efforts on private property.

One approach could be based on the fact that Kirkland neighborhoods differ in character, particularly in the extent of their tree cover. To address these differences and where feasible, tree regulations could be tailored to fit the concerns and character of City neighborhoods, drainage basins, or other logical sub-areas. At the same time, it is essential that care is taken to ensure that sub-area variations in tree regulations will result collectively in achieving the City's ecosystem goals.

Effective tools for preservation of healthy, mature wooded stands could include use of Natural Growth Protection Easements, increased dedication of landscape buffers, and standards that help preserve perimeter trees.

In some areas, dense development limits space available for trees to the extent that the City may benefit from a "tree bank" for developers to pay into when tree replacement is not feasible on site. The funds would be dedicated to tree planting in other more appropriate locations in the community, thereby maintaining and enhancing the overall tree canopy. Since the replacement trees may go to City parks or other public spaces, this practice may result in shifting some of the City's tree cover and its maintenance from private to public land.

Restrict removal of mature trees from developed properties unless deemed nuisances or hazards or an appropriate replacement plan is in place.

Recognizing that mature trees exponentially provide great benefit to the community, the City should explore restriction of removal of such trees without good reason. Limiting tree removal to those trees determined to be hazards or nuisances is a sensible approach when combined with flexible options for replacements to ensure "no net loss". Concepts of thinning forest stands for tree health and solar access may also need to be considered when proposing final zoning code amendments dealing with private trees.

Provide education on the benefits of trees on private property and on alternatives to removal.

Through public outreach with brochures and programs (Tree City USA, Arbor Day, Notable Tree Program, Neighborhood tree projects), the City can demonstrate the local and community-wide benefits of trees and foster positive stewardship among the residents and neighborhoods.

C. Land and Vegetation, continued

4. TRANSPORTATION STANDARDS FOR A GREEN AND SAFE STREETSCAPE

Update street tree planting space standards and planting specifications to better accommodate a more diverse palette of tree species.

Ensure street trees are not planted in sub-standard strips, and encourage expanding the standard planting widths in specific areas to accommodate larger tree species. The City should also review and revise planting specifications for required trees, utilizing the latest research on best planting techniques and lessons learned from past installations.

5. TREE CITY U.S.A.

Strive to maintain Tree City USA status.

Achieving the first designation of Tree City USA for Kirkland in 2002 was done with minimal completion of the standards. In order to legitimately hold on to this title on an annual basis, the following must be developed:

Standard 1: Adopt a tree preservation ordinance.
The interim ordinance adopted in 2002 should be replaced by permanent code amendments.

Standard 2: Urban forestry budget of $2 per capita.
This budget should be direct costs toward planting and maintaining community trees.

Standard 3: Designate a Board or group.
The Natural Resource Management Team was designated in 2002. The team must clearly show consistent work toward a community tree program.

Standard 4: Celebrate Arbor Day.
The City must embrace this event on its own and be clearly dedicated toward a community tree effort.

6. NOTABLE TREE PROGRAM

Develop and maintain a program to identify and preserve notable trees in Kirkland.

Such a program could raise awareness of trees in Kirkland that are of exceptional value to the community. Selection of notable trees could be based on tree age, size, rare species, landmark location, or a combination of attributes. The viability of Notable Trees on private property may be enhanced by offering incentives, such as maintenance service to be provided by City crews or sponsored by a local tree care company. When tree regulations are updated, new rules that would specifically protect Notable Trees could be explored as well.

C. Land and Vegetation, continued

7. VIEWS

Exceptions to limitations on tree removal should not be made for the sole purpose of enhancing views.

View enhancement can be achieved by judicious pruning of vegetation to frame views (except in environmentally sensitive areas or their buffers). Too, the removal of trees as permitted by Kirkland's codes (e.g., nuisance and hazard trees) can result in enhanced views. However, removal of trees for the sole purpose of view enhancement should be avoided.

LAND

8. SOIL MANAGEMENT

Soil is a valuable component of the ecosystem and should be managed with care.

Soil performs many vital functions in the ecosystem. It provides nutrients to support vegetation, habitat for subsurface organisms; and it absorbs, cleans, stores, and conveys water, thereby improving water quality and moderating water quantity.

Mismanagement or neglect of soil can result in increased flooding, loss of vegetation, sedimentation of water courses, erosion, and landslides – all of which clearly degrade habitat for humans as well as for other species.

Important steps for sound soil management include managing soils for maximum cleansing and infiltration of stormwater and managing construction site runoff to prevent soil loss. In addition, the City should use and promote compost amendment, and other healthy soil techniques as well as water conservation gardening. Too, the City should consider amendments to codes to address sound soil management practices on developing/redeveloping properties, such as requiring that topsoil be conserved, prohibiting the practice of burying construction debris onsite, and requiring soil restoration following site development.

NATURAL HAZARD AREAS

9. CONSIDER UPDATING POLICIES AND REGULATIONS

Consider evaluating and possibly updating City policies and regulations regarding natural hazard areas in light of the new watershed conservation plan, once it has been completed.

Kirkland is participating in the production of a long term conservation plan for the Lake Washington/ Lake Sammamish/Cedar River watershed. Much new scientific study specific to our watershed has been underway to support this salmonid recovery effort. Since natural hazard areas directly affect salmonid habitat, it is anticipated that the plan and its scientific foundation will provide new information concerning sound management of landslide hazard areas, high erosion areas, seismic areas, and frequently flooded areas. Once the conservation plan has been completed, the City may want to evaluate and perhaps update Kirkland's adopted polices and regulations in light of this new source of scientific and policy information.

C. Land and Vegetation, continued

10. RETAIN VEGETATION WHERE NEEDED TO STABILIZE SLOPES

Vegetation provides a critical function of stabilizing steep slopes.

Significant vegetation as cover on hazard slopes is important, because plants intercept precipitation reducing peak flow, runoff, and erosion which all can impact water quality and slope stabilization. Vegetated ravines also provide habitat linkages for wildlife. Avoiding disturbance of steep slopes and their vegetative cover should be a priority for the City. An increased effort to establish Natural Growth Protection Easements in such areas will be key.

11. FOLLOW PRINCIPLES FOR MANAGEMENT OF NOXIOUS WEEDS AND GREENBELTS

Maintenance of hazard areas should follow the guiding principles regarding noxious and invasive plant species and greenbelt management.

Care must be taken in maintaining hazard areas while controlling invasive plant species, ensuring good native plant cover, providing wildlife habitat, and balancing with human pressures such as manicured areas, views, and dumping.

PEST MANAGEMENT

12. MANAGEMENT OF NOXIOUS AND INVASIVE PLANT SPECIES IN NATIVE LANDSCAPE, ENVIRONMENTALLY SENSITIVE AREAS AND THEIR BUFFERS

The presence of noxious and invasive plant species reduces biodiversity and wildlife function of critical and sensitive areas by displacing native vegetation.

It is required by law to control noxious weeds and reduce the threat of rampant and some toxic plant populations that exist in our urban landscape.

Noxious and invasive non-native plant species pose a major threat to Kirkland's landscape, streams, wetlands, lakes, and their buffers by aggressively crowding out desirable native plants. If left unchecked, the healthy diversity of native plant species is displaced by a non-native monoculture. As a result, the habitat necessary to nourish, protect, and support native fish and wildlife disappears.

King County maintains lists of noxious and "obnoxious" weeds with required or suggested levels of control for hundreds of plant species.

Class A list has non-native weeds which have a limited distribution in Washington. Control and eventual eradication are required by law. Currently there is no species of concern in Kirkland on that list.

Class B list has non-native weeds that are abundant in some areas of the state. Control and slowing of spread of these species are required by law. Some examples of species in Kirkland are scot's broom *(Cytisus scoparius)*, cordgrass *(Spartina anglica and S. alterniflora)*, and purple loosestrife *(Lythrum salicaria)*.

Class C list has non-native species that are common throughout most of the state. Control with containment as the primary goal is required by law. An example is common St. Johnswort *(Hypericum perforatum)*.

Weeds of Concern are species from Class B and C lists that are of lower priority in King County. The Weed Control Board strongly encourages and recommends control and containment of existing populations and discourages new plantings. Some species of concern in Kirkland include reed canarygrass *(Phalaris arundinacea)*, yellow flag iris *(Iris pseudocorus)*, English ivy *(Hedera spp.)*, and Eurasian watermilfoil *(Myriophyllum spicatum)*.

C. Land and Vegetation, continued

Obnoxious Weeds are plants that have escaped from intentional plantings and now are widespread in the County. The Weed Board encourages and recommends control and containment of existing populations and discourages new plantings. Examples include Himalayan blackberry *(Rubus discolor)*, evergreen blackberry *(Rubus laciniatus)*, English holly *(Ilex aquifolium)*, and common reed *(Phragmites australis)*.

The problem persists on both public and private land. In order to protect Kirkland's sensitive areas and buffers, invasive non-native plant species must be proactively managed on public and private property. Extreme care must be taken to ensure that no harm is done to sensitive areas or their buffers during removal of invasive plants.

On City Property

The City is continuously faced with this challenge in many places, including in Juanita Bay Park and along City streets.

The City has developed an Integrated Pest Management (IPM) program. An IPM is an approach to pest control that utilizes regular monitoring to determine if and when treatments are needed and employs physical, mechanical, cultural, biological, and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemicals controls are used as a last resort.

Because of the City's desire to provide a safe environment, the objective of the IPM is to provide a foundation for pesticide usage that allows City staff to perform responsibilities effectively and to pursue alternative methods as appropriate.

- In accordance with the pesticide laws and regulations enforced by the Washington State Department of Agriculture, the IPM promotes plant health care, non-chemical pest control, and when applicable, the safe use, storage, and application of pesticides.

- City staff strives to practice and encourage sound horticultural practices, resulting in a decreased reliance on chemicals to control adverse environmental conditions. To this end, staff reviews park and other city development plans to insure appropriate plant choices, cultural conditions and amenities, and implementation procedures to produce the healthiest plants possible to withstand pest infestation. Maintenance practices reflect a similar concern and emphasis.

- It is the City's policy to tolerate certain levels of non-noxious weeds, insects and plant disease on City owned property, to the extent that public health, aesthetics and use of public land isn't negatively impacted and compromised.

- The City practices and encourages the use of low phosphate fertilizers near all waterways, including lakes, streams, wetlands areas, and utility and storm drainage areas. This is to minimize phosphate loading in surface water, which may ultimately end up in our lakes, streams and estuaries.

- In accordance with the Washington State Licensing Guidelines, the City of Kirkland requires that all staff and contractors who are engaged in the use, application and storage of pesticides, to have a current Washington State Pesticide License. Contractors must notify our department prior to the use of any restricted pesticide application for approval.

- It is the City's policy to minimize the use and application frequency of pesticides whenever possible. Target applications of pesticides are preferred over the broad-based applications.

- When the use of pesticides is necessary, the least toxic pesticides available are used to minimize

C. Land and Vegetation, continued

the effects on the environment.

- All chemicals used on property managed by the City are used in accordance with the manufacturer instructions and recommendations. Material Safety Data Sheets (MSDS) for each chemical on record are kept on file. The MSDS information is available to staff, contractors and the public upon request.

- To promote public understanding and support of the benefits of the Integrated Pest Management Program, it is the intent of City staff to provide educational assistance and information to the public regarding the Departments use of pesticides.

However, invasive weeds remain a persistent problem, despite the City's efforts to date. This is especially troubling in the environmentally sensitive areas and their buffers, where fish and wildlife habitat is being displaced by invasive, non-native plants of little value. Currently, the City is working toward a near-term solution in Juanita Bay Park. It will be important to follow up with a long-term, comprehensive approach for public and private property City-wide.

In addition, the City is currently exploring the Regional Road Maintenance Program as a possible means to improve road maintenance in a manner that could meet the requirements of the Endangered Species Act. The Regional Road Maintenance program has been developed to contribute toward recovery of salmonid habitat by minimizing erosion/sedimentation, containing pollutants, and maximizing habitat improvements. The program includes standards for mechanical, chemical, cultural, and biological control of vegetation that are designed to support the dual vegetation management roles for maximum environmental benefits while meeting various Federal, State, and local regulations and standards.

(See also Guiding Principle D.3 for further discussion of weeds in environmentally sensitive areas and their buffers.)

Private Property

Invasive weeds, Himalayan blackberry *(Rubus discolor, R. procerus)*, Evergreen blackberry *(Rubus laciniatus)*, English holly *(Ilex aquifolium)*, and English ivy *(Hedera helix)* should be removed from "natural areas" with hand labor and light equipment.

Sensitive areas and their buffers on private property are especially plagued by invasive non-native plants, because they are typically fenced off and active land use is prohibited. Left alone, these areas tend to be overrun by invasive non-native plants that progressively degrade the value and functions of the sensitive area and buffer. There are currently no requirements for maintenance beyond a maximum 5-year period following initial planting of approved vegetation. As a result, most sensitive areas and buffers on private property throughout the City are in decline.

The Washington State Department of Fish and Wildlife recommends restricting the use of pesticides and herbicides in many types of habitat. Additionally, the Department of Agriculture and/or the U.S. Environmental Protection Agency have regulations specific to the use of pesticides, fertilizers, and other chemicals that must be adhered to under Federal law, and generally appear on the packaging. City codes should restrict the use of chemicals in critical areas, and Kirkland staff should understand and identify which chemicals are acceptable in specific critical areas prior to approving chemical applications.

C. Land and Vegetation, continued

Aquatic nuisance species

Control of the noxious milfoil in Lake Washington has been a constant concern for METRO and the City of Kirkland. The County has attempted to mechanically remove milfoil in Lake Washington while the City removes milfoil by hand for swimmers' safety at Houghton Beach, Waverly Beach Park with plans to control at the newly acquired Juanita Beach Park. Perceived nuisance species such as algae and water lilies will be addressed if required by state and local law to be controlled and contained. A program of treatment and control may be obtained by the Washington State Department of Ecology and the King County Weed Control Board.

(See also Guiding Principle D.3 for further discussion of weeds in environmentally sensitive areas and their buffers.)

13. MANAGEMENT OF HARMFUL ACTIVITIES OF BIRDS AND ANIMALS

In the case of most birds and animals, management by the City is not feasible or appropriate. However, on City-managed lands, the City should attempt to manage, to the extent practical, those species that pose significant harm to natural resources.

Humans, too, often adversely impact Kirkland's natural resources. The Natural Resource Management Plan outlines strategies to improve group and individual choices and actions to benefit the natural environment and ourselves.

Canada Geese

Canada geese have proliferated in our area to the extent that their droppings significantly impact the water quality of Lake Washington beaches, causing periodic closure of swimming areas, and detract from the beauty and usability of Kirkland's shoreline areas.

As a result, the City of Kirkland along with neighboring Cities in the Puget Sound area and the United States Department of Agriculture/Wildlife Services has taken a collective approach to the geese issues. Control methods over the past ten years have included relocation, egg addling, public education, landscape modifications, topical turf treatments, hazing, and population reduction.

Rodents

Kirkland property owners and residents are responsible for keeping their premises free of rodent infestations, except in wetlands, unimproved parks, greenbelts, or other unimproved property, as long as nothing has been done in those areas to increase rodent infestation. Applicants for demolition or grading permits are required to complete a rat baiting program.

Pets

The presence and by-products of pets have significant impacts on fish, wildlife, and their habitat. For that reason, it is important to manage and/or limit pet access to certain parks and in habitat areas. (See also Guiding Principle D.3)

Beavers

Beavers in parks and natural areas are left alone to live as naturally as possible. Kirkland Parks and Community Service staff gets involved if there is the potential for harm to come to citizens or property. In areas where beavers' removal of trees may be hazardous, Parks staff installs fencing around those trees as a deterrent to beaver activities. Periodically, the Public Works Department will break dams if necessary to control potential flooding of roads and damage to infrastructure.

D. Water

DRAINAGE BASINS

The City's overall goal should be to maintain the integrity of drainage basins in order to preserve the beneficial functions of streams, lakes, wetlands, and aquifers. Beneficial functions include fish and wildlife habitat, flood reduction, aesthetics, food production, recreation, and drinking water. Drainage basins are discussed here in terms of their broad parts: uplands (discussed in land and vegetation management section), areas adjacent to water, and the waters themselves.

1. PROTECT AND RESTORE HYDROLOGIC REGIME

Water system components, such as streams, wetlands, shorelines, lakes, stormwater, and groundwater are all connected in a continuous hydrologic cycle. Changes in one component impact the others. Responsible management of water system components includes understanding their interrelatedness and striving to maintain and, where feasible, restore the continuity and functions of natural drainage systems.

For many years, it was believed that conventional piped drainage systems were the best method for handling all drainage in urban areas. Consequently, as rights-of-ways and properties developed, segments of some of Kirkland's streams were placed in pipes. It has become clear in recent years, that engineered conveyance and detention systems are not as effective as open drainage can be, and they have many drawbacks, including:

- Increased flooding because water is delivered rapidly into streams, wetlands, and lakes, rather than being slowed, absorbed, and retained (to some degree) by the land;
- Decreased water quality, since contaminants in runoff are not filtered through soil before entering streams, wetlands, and Forbes and Totem Lakes and Lake Washington;
- Decreased groundwater recharge by limiting the amount of water seeping into the soil;
- Loss of fish and wildlife habitat as open watercourses disappear, riparian vegetation is removed, and water quality becomes degraded;
- Loss of urban forest area;
- Decreased viability of wetlands and streams, by disconnecting these elements of Kirkland's natural hydrologic systems.

For these reasons, Kirkland has adopted policies and regulations to protect surface water functions by preserving and enhancing natural drainage systems wherever possible. One way to enhance natural drainage systems would be to restore hydrologic connections by "daylighting" stream segments that have been placed in pipes. Potentially, many benefits would result from reversing the adverse impacts of the piped system (listed above).

However, daylighting should be approached carefully, because it also presents challenges, such as:

- Financial costs;
- Reduction of area on the affected parcel(s) that would be available for human activities and development;
- Land use restrictions to prevent or mitigate adverse impacts to the daylighted stream and its buffer.

D. Water, continued

The City should take the following steps to ensure that the benefits of any given daylighting project will outweigh the challenges.

a. Adopt criteria to identify piped segments that would be higher priority candidates for daylighting. According to Adolfson Associates, Inc., science-based criteria would include:
   1. Located in a Primary (i.e. fish-bearing) versus Secondary Basin;
   2. Provides a passage for anadromous fish;
   3. Connects upstream and downstream sections of natural stream channels;
   4. Provides potential habitat for fish, resident or otherwise;
   5. Supports perennial versus seasonal flow; and
   6. Located in the lower watershed (closer to the Lake Washington Shoreline)

   The City may wish to add criteria to address other considerations, such as surface water management or land use. The criteria could be used to proactively designate the candidate segments for daylighting at a future time, such as when the affected property develops/redevelops. Alternatively, the criteria could be applied on a case-by-case basis, as permit applications are received.

b. Amend regulations to include incentives and remove disincentives, as well as to clarify the permit review process and criteria. A central issue is the buffer for the newly daylighted stream segment. To fully realize the benefits of daylighting, a buffer of standard size and vegetation would need to be provided. The City will need to determine how the cost of buffer creation and the loss of developable land area can best be addressed without creating significant disincentives for the affected property owner.

Too much impervious surface negatively impacts a community and its natural systems. Consequently, the City should explore opportunities to minimize impervious surfaces.

Impervious surfaces cover land with pavement, buildings, and other impenetrable barriers to water. Increased impervious surfaces send more rainwater into stormwater drains and can increase the risk of flooding, instead of recharging aquifers. Stormwater runoff can increase erosion, causing siltation and scouring in streambeds and threatening salmonids and other species dependent upon healthy streams. Stormwater runoff also carries pollution like gasoline, motor oil, and metals that collects on impervious surfaces, depositing them in to Kirkland's streams, then into Lake Washington. Also, impervious surfaces increase local air temperatures, because solar energy becomes trapped in pavement, roofs, and other heat-absorbing surfaces.

For all these reasons, impervious surfaces should be minimized. Techniques could include reducing pavement widths (e.g., streets), substituting permeable surfaces for walkways or streets where feasible, amending regulations and offering incentives to encourage "green roofs", amending lot coverage limitations in the zoning code, and by using Low Impact Development practices (see the following Guiding Principle).

Improve management of stormwater runoff from existing and new impervious surfaces by employing Low Impact Development (LID) practices where feasible through City projects, incentive programs, and development standards.

Studies have shown that efforts to mitigate stormwater through traditional stormwater management practices (e.g., collection and conveyance) have not proven entirely successful. Development does result in increased runoff off-site, because collection and conveyance systems, stormwater ponds and other traditional stormwater facilities do not replicate natural systems, which greatly slow and – to some degree – absorb water before it reaches streams, wetlands, and other waters.

D. Water, continued

The loss of trees and other vegetation, the compaction of soils by heavy equipment, the creation of vast stretches of connected impervious areas – all these factors combined are extremely difficult to compensate for using traditional practices. As a result, stormwater runoff has:

- Degraded many streams, wetlands, and associated habitat
- Increased flooding
- Caused some water features to increase in size, and
- Made many properties wetter.

Low impact development practices have been developed to better manage stormwater. Rather than traditional collection and conveyance structures, vegetated/pervious areas are used to treat and infiltrate stormwater on the development site. Low impact development practices can include provisions, incentives, and/or standards for landscaped rain gardens, permeable pavement, narrower roads, vegetated rooftops, rain barrels, impervious surface limitations, downspout disconnection programs, "green" buildings, and good soil management. As discussed in the previous subsection, City codes and policies should be updated to address low impact development practices and remove disincentives. One incentive to explore might be offering Surface Water Utility fee credits for low impact development.

Alteration of the hydrologic regime should be based on ecological and cultural goals for the drainage basin.

The quantity and timing of flow in streams is altered by human activities, and directly impacts population and existence of fish and other aquatic species. In the past, the goal of stormwater management was to reduce flooding and to efficiently convey water away from developed areas. Today, management goals may include support or restoration of fish populations, water quality improvement, or preservation of existing physical habitat features.

The City's surface water master plan will examine goals for each drainage basin, and then will develop tools to create or preserve the hydrologic regime to meet those goals. For example, if support of a sustainable coho salmon population is a goal for Juanita Creek, the hydrologic regime to meet that goal may need to include higher summer base flows and reduced peak flows in winter. A mix of regulation of new development, construction of capital projects, acquisition of streamside lands, and perhaps water reuse could be used to achieve that goal.

Examine opportunities to partner with those developing or redeveloping private property in creating stormwater facilities that improve downstream conditions.

By law, developers must mitigate the stormwater impacts of proposed development projects. They are not, however, required to improve downstream hydrology. City participation in private stormwater facilities could be a low-cost mechanism to improve hydrologic conditions in our drainage basins.

D. Water, continued

2. PROTECT AND RESTORE WATER QUALITY

Encourage and require residents and businesses to engage in behaviors that protect and improve water quality.

It is far easier to prevent pollution than it is to clean up polluted water. Everyday activities such as lawn care, cleaning and storage practices, pet care and transportation choices have a direct impact on water quality. Social marketing concepts should be used in developing education programs that encourage positive behaviors. Programs that use neighbor-to-neighbor recruitment and that closely examine the reasons why negative behaviors persist will have a greater likelihood of success than traditional educational efforts. Enforcement tools must still be available, but should be used as a last resort in resolving water quality problems.

Specific recommendations for reductions in chemical use, recycling, and transportation choices are discussed in sections below.

Continue and expand monitoring of biological and water quality parameters to evaluate changes in drainage basin health and to evaluate effectiveness of water quality and habitat improvement programs.

Monthly water quality monitoring is currently occurring in the Forbes Creek drainage basin. In addition, monitoring of the baseline index of biotic integrity (BIBI) is occurring yearly at select locations in the Forbes Creek and Juanita Creek drainage basins. Expansion of the monitoring program may be required of the City as a Federal permit condition (NPDES, Phase II) and can be a useful although blunt tool in focusing water quality improvement efforts. Needs, goals, and costs/ feasibility of water quality and biological monitoring will be explored further in the Kirkland Surface Water Master Plan update, to be completed by the close of 2004.

Identify and address water quality "hot spots".
Trace water quality problems to particular land use activities, and tailor improvement efforts to specific pollutants or polluters.

Kirkland's Surface Water Master Plan update will include identification and prioritization of existing and potential water quality "hot spots." Once the type and source of existing or potential pollutants has been identified, a mix of capital projects, education, regulation, and enforcement can be used to ensure that water quality is protected and/or improved in these areas. The aim of this work is to prevent creation of water quality problems (i.e. to manage resources proactively) as well as to find solutions to existing problems.

Use water quality information to focus and continue emergency sewer program. Investigate source of fecal coliform contamination in local streams and, if applicable, use this information to target areas for the emergency sewer program.

The emergency sewer program thus far has focused on areas with residents having self-reported failing septic systems. Through the surface water master plan, a plan will be developed to trace the source of high fecal coliform counts that have been observed in Kirkland's streams. If the source of contamination is human septage, the emergency sewer program could be focused in areas with the greatest contamination.

D. Water, continued

Involve Volunteers in Monitoring and Protecting Water Quality

Volunteer participation increases awareness of and involvement in drainage basin health, and leverages staff resources.

3. PROTECT AND ENHANCE TRANSITIONS BETWEEN WATER AND UPLAND AREAS

Seek ways to more effectively maintain and enhance greenbelts on public and private property. Identify opportunities for the City to acquire and/or to proactively manage the most valuable resources remaining on private properties.

At the time a property is developed, the City typically requires a Native Growth Protection Easement (NGPE) to be recorded over streams, wetlands, stream and wetland buffers, and sometimes over unstable slopes. The widths for stream and wetland buffers are prescribed in the Kirkland Zoning Code.

The purpose of the easement is to ensure that the land and vegetation essential to the proper function of buffers and features remains undisturbed. The owner is required to install a fence or equivalent barrier along the upland buffer boundary to define and protect the buffer from disturbance. Ideally, the buffer is already vegetated with appropriate native streamside plants.

However, more often the native vegetation has been cleared long before. The City then typically requires that young appropriate plantings be installed in the buffer at the time of development/redevelopment, if that development or redevelopment is likely to impact a stream, wetland, or buffer.

Effective buffers perform many important functions:

- Filter pollutants from runoff, which removes pollutants from our hydrologic systems;
- Absorb runoff, which reduces flooding;
- Provide the food, water, and refuge that fish and wildlife need for survival;
- Shade wetlands and streams, moderating water temperature for fish and wildlife; and
- Buffer fish and wildlife from the impacts of humans (e.g., noise, light, pesticides and herbicides, trampling) and their pets. *(See also Guiding Principle C.12)*

In order to effectively perform these vital functions, buffers need to be of sufficient width, appropriate gradient, and be vegetated with a rich variety of the types of native trees, shrubs, and groundcovers that would have been in that location when it was in its natural state.

Unfortunately, many of the buffers established in Kirkland thus far fall short of the City's intent for many reasons, including:

- There is no provision for long term maintenance of desirable vegetation within the NGPE agreement. Without maintenance, the appropriate native species are typically overrun by non-native invasive species, such as Himalayan blackberries, that produce monocultures with little value, thus substantially reducing buffer functions. As a result, even the NGPEs that were initially well-planned and planted lapse into areas of limited value. This is particularly problematic when a NGPE that was originally established as a public benefit as part of the development permit process (e.g., for a PUD) reverts back to its former condition and the public benefit is lost.

(See also Guiding Principle C.12 for additional discussion of the management of invasive, undesirable vegetation on private and public property.)

D. Water, continued

- The fact that NGPEs are typically behind fences in private back yards severely limits visibility. Often, when investigated, these greenbelts have either been neglected and reverted to inappropriate vegetation, or they have been mowed and converted to active back yard use. Also, the perception that the City is making NGPEs off-limits to the property owner sometimes leads to property owner animosity directed toward the resource and the City.

- The requirements to establish NGPEs were adopted recently enough that most land along steams is nonconforming in terms of width and vegetative cover. Under current law, the City's authority to require rehabilitation of buffers, wetlands, or streams is limited to occasions when new development or redevelopment would clearly impact the buffer, wetland, or stream. The amount of resource rehabilitation that the City requires of a permit applicant must be roughly proportional to the amount of impacts the proposal would cause. As a result, the improvement of buffers in Kirkland as properties develop or redevelop is likely to continue to be a slow, incremental process that will have limited long term value, unless the other problems (see above) are resolved.

In order to ensure effective buffers for the City's sensitive areas, the following changes should be considered:

- Recognizing the problems with regulation and enforcement outlined above, the City should redirect staff and budget resources to place greater emphasis on public education/involvement and acquisition of prime greenbelts.

  Educating property owners and the public at large about the purpose and functions of a greenbelt and the rules about its use is likely to have better results than regulation alone. The goal would be to convey why effective greenbelts are important to have and maintain, to teach appropriate stewardship practices, and to clarify the consequences of violations.

  In addition to educating the affected property owner at the time of development, City staff should include NGPEs in their broader public education program so that residents and business owners are periodically reminded.

- Promoting public involvement by linking landowners and residents with stewardship programs and with sources of technical assistance for restoration and monitoring may also improve results. (See also Guiding Principle E.3)

- In addition, the City should consider amending the standard greenbelt agreement to clearly require that the owner be responsible for maintenance of appropriate vegetation in perpetuity. However, for the reasons outlined above, enforcement of that requirement is likely to remain challenging. (See also Guiding Principle C.12)

- Consider adding more specific regulations to impose higher fines and specify a time limit for replanting when illegal vegetation removal within buffers occurs.

- Revisit the code's provisions for reduction of standard buffer widths, to ensure that resulting buffers – individually and cumulatively throughout the City – function as intended.

- Finally, where feasible, the City should consider purchasing the most important NGPEs -- or rights to them – and proactively manage them using current knowledge and practices.

D Water, continued

Additional Actions for City-managed Property

- Include buffer enhancement in park master planning
- Include criteria in acquisition process that address the importance of functional buffer areas around streams lakes and wetlands
- Coordinate restoration efforts between the Parks and Surface Water CIP programs

Look for opportunities to enhance the ecological functions of the Lake Washington shoreline wherever feasible.

Lake Washington is the second-largest natural lake in Washington State. Defined as a "Shoreline of Statewide Significance", the Lake Washington shoreline and land within 200 feet of it are regulated under the state Shoreline Management Act.

The majority of the shoreline is now in urban residential land use, except for a few commercial and industrial developments. All species of salmonids in our watershed (which includes land drained by Lake Washington, the Cedar River, and Lake Sammamish) migrate through, and rear in Lake Washington. Salmonids use in Lake Washington is currently the subject of extensive research. The decline of salmonid populations in Lake Washington has been linked to the following factors: degradation of riparian shoreline conditions; altered hydrology; invasive exotic plants; poor water quality (phosphorus, alkalinity, pH); and poor sediment quality.

Actions that would aid recovery of the salmonids in Lake Washington include:

- Identify areas where it will be feasible to protect and restore natural lake shorelines and shallow water habitat and to remove bank armoring and docks.
- Identify, protect, and restore tributary mouths entering the lake. Studies show that juvenile chinook salmon hold and feed near the mouths of tributaries, even very small streams and drainages, during rearing and migration.
- Construct demonstration projects on public lands at key locations, such as at the mouth of Juanita Creek in Juanita Beach Park or where street ends meet the shoreline. Remove bulkheads, regrade shorelines, improve substrate, and plant overhanging vegetation in order to enhance rearing and refuge habitat for juvenile Chinook. Monitor to evaluate stability, sedimentation rates, and juvenile/adult use and predation. Consideration of containment issues in site selections is important.
- Identify opportunities to preserve, enhance, or restore lakeshore wetlands.
- Identify opportunities to treat stormwater entering Lake Washington through biofiltration or other water quality techniques. Consider experimental projects.
- Explore alternative dock design/migration packages that use bank softening to replace docks and bank armoring.
- Identify critical areas of juvenile and adult Chinook salmon migration for aquatic weeds management; control invasive aquatic weeds in those parts of the lake.

D. Water, continued

Kirkland's regulations that apply to the Lake Washington shoreline have not been updated since the 1970's. It will be important to inventory shoreline conditions and update City shoreline policies and regulations once the new guidelines produced by Washington Department of Ecology have been adopted.

POTABLE DRINKING WATER SUPPLY

4. ENSURE ADEQUATE POTABLE WATER SUPPLY AND PROMOTE WATER CONSERVATION

Ensure adequate water supply through system upgrades (inter-ties) and by finding a new water source via the Cascade Water Alliance.

Promote water conservation measures.

The City of Kirkland water system is a distribution system which serves ten square miles within the city limits providing water to approximately 12,000 service connections. The City also sells wholesale water to the City of Redmond and the City of Bellevue serving approximately 5000 additional persons. We currently average five million gallons of water usage per day.

Kirkland does not own its own source of drinking water, nor does it own or operate drinking water treatment facilities. Instead, the City currently purchases drinking water from Seattle Public Utilities (SPU) through three master meters. Seattle Public Utilities must balance the need to withdraw drinking water with the need to leave adequate flow in the rivers to support fish populations. Thus, the amount of drinking water available from Seattle Public Utilities is limited and may decrease in the future to meet the needs of threatened salmonid species. Because of this concern about the long-term availability of drinking water from Seattle Public Utilities, the City has joined the Cascade Water Alliance, which may develop alternative sources of drinking water to supply the future needs of the cities in this region that are located on the east side of Lake Washington.

The City has three interties that can feed water from the City of Bellevue or the Northshore Utility District in case of emergencies. This allows the City to feed water from other entities in the case of reduced water flows due to internal hydraulic or physical problems with the infrastructure, problems externally from our water source feed or a natural disaster.

The City monitors the system's operation through a Supervisory Acquisition and Data Control System which monitors water pressures, flows and storage tank water levels to provide twenty four hour information on the operation of the system.

The City's efforts toward controlling this resource include implementation of existing and future water supply contracts, master meter interties, and conservation programs. Currently, Kirkland's conservation program operates in conjunction with Seattle Public Utilities (SPU). This relationship could change once the Cascade Water Alliance is in operation.

E. Fish And Wildlife

The City's overall goals should be to strive to protect sensitive species and their habitats and support their recovery; to protect and restore remnant natural ecosystems; and to maximize habitat value in developed and naturalistic areas, both public and private.

1. REGIONAL FISH AND WILDLIFE RECOVERY AND PROTECTION EFFORTS

Continue active participation in regional conservation efforts.

Wild salmonids are an important economic resource and fundamental environmental indicator, as well as a cultural symbol to those living in the Pacific Northwest. The health of salmonid runs is linked to the economy, tourism, recreation, and food production, as well as to the environment.

Much attention is currently focused on salmon, not just because of its economic, recreational, and cultural value; but also because the decline of salmon is a widely accepted indicator of the decline of our region's environmental quality. As fish that migrate from fresh water streams to the ocean and back again (i.e., anadromous fish), salmon are dependent upon habitat throughout our watershed. Their decline points to the need to improve our management of the ecosystem.

Salmonids are affected by runoff from streets that carries oil-based pollutants. Drainage from lawns carries pesticides, fertilizer, and silt. Construction can divert streams or change hydrology. Our demand for fish and the commercial fishing industry have the potential to further decimate salmonid stocks.

Since 1999, Kirkland has been an active participant in our watershed's effort to recover sustainable, healthy and harvestable runs of salmonids. In addition to salmonid recovery planning at the regional level, the City has been working toward best management practices for maintaining the road right-of-way, updating critical areas regulations, and updating the City's Stormwater Management Plan.

2. WILDLIFE CORRIDORS

Explore opportunities to protect and enhance wildlife corridors.

The City of Kirkland owns several large and significant natural areas which provide a variety of wildlife habitats in this urban setting. These open spaces are home to many birds, mammals, amphibians, and reptiles that rely on various habitat features for their survival. The two most extensive and diverse areas are:

- Yarrow Bay/Cochran Springs/Watershed Park corridor
- Juanita Bay Park/Forbes Valley corridor

Although they are relatively continuous, these two corridors are interrupted by roads and railroads which create barriers to safe wildlife movement. The City should prioritize actions to complete and improve the habitat connections. For instance, it may be possible in some locations to improve crossings with bridges, underpasses, and/or larger culverts as opportunities arise. For salmonids, though, it is important to consider that even the larger culverts may accommodate only the juvenile fish, not the adult spawners. Too, culverts require periodic maintenance, which repeatedly disrupts habitat. So, replacing culverts (on fish-bearing streams) with bridges may be the most effective long-term solution, even though it involves a greater initial investment.

E. Fish and Wildlife, continued

Other fairly large habitat areas in Kirkland include Everest Park, the upper Forbes wetlands in the North Rose Hill Neighborhood, Totem Lake, and the Juanita wetlands on either side of NE 124th Street. Though large blocks of land, these tend to be more isolated "islands" of wildlife habitat. Since many of these areas are connected by streams, enhanced stream buffers could provide some cover for travel between them. However, even without the added benefit of safe and secluded connections, these wetlands and other open space habitats provide smaller, but important wildlife refuges at each location. As discussed in Guiding Principle D.3, for these areas to function well, citizens need to be informed and educated toward sound stewardship practices.

An inventory of Kirkland's wildlife corridors and open space habitats and wildlife species can be found in Kirkland's Streams, Wetlands and Wildlife Study, prepared for the City of Kirkland by The Watershed Company July 1998. This study also points to specific locations in Kirkland where there are threats/opportunities for wildlife corridors. The City should consider this information and pursue opportunities to enhance wildlife corridors.

3. EDUCATE CITIZENS ABOUT PROGRAMS TO PROTECT FISH AND WILDLIFE

Promote and/or develop programs to encourage behaviors that protect and restore fish and wildlife and their habitats.

Pet ownership, fishing, and management of wetlands and landscaping on private property all have the potential to impact fish and wildlife and their habitats. Programs exist for each of these activities that promote behaviors that protect rather than degrade.

Cats, dogs and other pets can, if not properly managed, effect the natural environment by trampling habitat, hunting sensitive species, and depositing waste where it can degrade water quality. Education programs aimed at topics such as the following would assist in minimizing the impact of pets on the natural environment:

- a scoop the poop campaign at City parks and near streams and wetlands
- an effort to keep dogs on leashes near sensitive bird habitat (i.e. Juanita Bay Park)
- education on how to prevent cats from catching/killing large numbers of birds (collar bells)
- information on landscape management practices that retain pollutants and reduce runoff

(Also see Guiding Principle D.3 for discussion of challenges in sensitive areas and buffers.)

Since 2000, the East Lake Washington Audubon Society (ELWAS), along with the City of Kirkland, has sponsored an annual osprey celebration and nature festival at Juanita Bay Park. This annual springtime event provides an opportunity for a number of organizations to staff booths and exhibits which provide public education and outreach to the community on issues related to fish and wildlife protection and environmental stewardship.

Fishing of closed waters can reduce the reproductive success of anadromous fish and can reduce the population and survival of resident fish. Surveys of common fishing areas would help to determine the scope of this problem. Signs and/or volunteers could be then be used at key points to dissuade people from fishing in closed waters.

The City should consider providing incentives for creation of wildlife habitat on private property. Other cities in the region have had great success with programs that promote the creation of backyard wildlife sanctuaries (http://www.nwf.org/backyardwildlifehabitat/). Such a program is low-cost and could help to raise awareness of and create habitat for wildlife in our community. Another program that provides incentive to maintain and protect wetlands and other valuable habitat is the

E. Fish and Wildlife, continued

public benefit rating system. Under this King County program, landowners put sensitive areas in conservation easements and receive a tax reduction in return (http://dnr.metrokc.gov/wlr/LANDS/doc/PBRSResInfo9712.doc).

F. Sustainability And Human Activities

SOLID WASTE

1. REDUCE SOLID WASTE THROUGH CITY PROGRAMS AND SERVICES

Reduce the amount of solid waste generated by Kirkland residents and businesses by providing opportunities to reduce waste and recycle through comprehensive curbside collection services, special collection events, incentivized rates, and education.

As Kirkland's population grows, so does the generation of waste. Waste reduction and recycling continue to be our most important allies for managing solid waste. King County's recycling estimates, along with Washington Department of Ecology survey data, show that the amount of waste diverted each year from the Cedar Hills Regional Landfill to the recycle bin has increased by more than 250% since 1987. Waste reduction and recycling have proven to be environmentally sound and cost effective strategies for managing solid waste – strategies that are backed by strong public support. The question for the future becomes – how do we build on that momentum?

In 2002, Kirkland enhanced the residential curbside recycling collection services and implemented "pay-per-can" rates to encourage residents to reduce their waste. Statistics show that the recycling rate increased from 52% to 54% in 2002 and average number of pounds of garbage going to the landfill per household decreased from 35 to 33 pounds.

Three annual special recycling collection events (two for residents, one for businesses) are held each year to collect items that can be recycled, but not at the "curb". Through these events, items such as tires, appliances, computers, are collected and recycled through local vendors.

Waste prevention educational programs and events are possible due to grants from King County Solid Waste Division and Washington Department of Ecology. Web site design, brochures, compost bin sales, and rain barrel sales have been funded by these agencies which have contributed to diverting solid waste from the local landfill.

Kirkland's Solid Waste Utility is continually looking for ways to reduce waste and, in a broader sense, the human impact to the regional waste stream.

AIR QUALITY, CLIMATE CHANGE, AND ENERGY USE

2. CLEAN AIR LINKED TO HEALTH AND QUALITY OF LIFE

Public health and the quality of life in Kirkland depend on residents having clean air to breathe.

The surrounding air, both outdoors and indoors, has the potential to affect human health, attitudes, productivity, and people's ability to enjoy their lives. It is important to maintain the quality of the outdoor air since all life forms depend on it, and since the quality of indoor air is dependent on that of the outdoors. Air quality is regulated locally by the Puget Sound Clean Air Agency. Their informative internet site can be viewed at http:/www.pscleanair.org/

F. Sustainability And Human Activities, continued

3. AUTOMOBILE USE IS LEADING IMPACT IN OUR REGION ON AIR QUALITY AND CLIMATE CHANGE

Kirkland should continue to adopt and promote smart transportation choices as part of a regional strategy to reduce air pollution and slow climate change.

For many years, there have been scientific reports that emissions and pollutants are disrupting the earth's climate balance through the "greenhouse effect." The greenhouse effect is the natural phenomenon in which gases in the atmosphere trap energy falling on the earth from the sun, just as the glass in a greenhouse allows more heat in than out.

Were it not for the natural greenhouse effect, the earth would be significantly colder than it is; by 59 degrees Fahrenheit. Since the onset of the industrial revolution, however, the burning of fossil fuels – such as coal, gas, oil, and gasoline – has been releasing heat-trapping gases into the atmosphere at ever-increasing rates, thus increasing the capacity of the atmosphere to trap energy and warming the earth even more. It is estimated that, at current emissions levels, average global temperatures will rise 1.8 degrees – 6.3 degrees Fahrenheit during the twenty-first century.

Many climatologists believe that the US is likely to experience the following climate changes as a result of global warming:

- Elevated temperatures in every region;
- Increased precipitation in some regions, mainly in the northern half of the US;
- Decreased precipitation in other regions, mainly in the south;
- An increase in the incidence and intensity of extreme weather events, such as floods, blizzards, tornadoes, and droughts;
- A continuing rise in ocean level;
- A drop in water level in certain lakes

Rising temperatures can exacerbate air pollution problems suffered in urban areas. Because they contain so many structures and so much concrete and pavement, cities suffer from the "urban heat island effect," which elevates air temperatures near ground level. Due to high population densities, urban residents may be at particular risk from infectious diseases whose ranges spread as temperatures or precipitation rise.

Our region's economy is dependent in part on tourism, recreation, agriculture, forestry, and fisheries. As weather patterns change or extreme weather becomes more common, these industries will be at risk of disruption and cutbacks, affecting Kirkland and neighboring urban areas whose economies are linked with them.

Analysis shows that cars, trucks, and sport utility vehicles cause more air pollution and add more greenhouse gases than any other source in our region. These vehicles produce more than 700,000 pounds of smog forming pollutants on a summer day in the Puget Sound region. In addition, excessive greenhouse gas emissions are contributing to the change in our climate. Scientists report that the Pacific Northwest can expect higher temperatures, wetter winters, drier summers, reduced river flows, increased coastal flooding and erosion, and decreased forest health and productivity. Reduced mountain snowpack will dramatically change water availability in our region.

One of Kirkland's responses to this issue is the Employee Transportation Management Program (ETMP), more commonly known as the "Super Commuter" Program, which began in 1990. The Super Commuter program has been a considerable success. In 1996, approximately 20% of city employees were enrolled in the program. Currently, over 40% of all employees are enrolled in the program, and participants are helping to eliminate over 22,000 commute trips per year.

F. Sustainability And Human Activities, continued

The purpose of the Super Commuter program is to help the City meet its goals as required under the Commute Trip Reduction (CTR) law. The purpose of the CTR law is to improve air quality, reduce traffic congestion, and decrease fuel consumption. Other benefits may accrue to the City or its employees, such as improved health or reduced pressure on parking facilities, but these are secondary to the main purpose of the program. Our goal under the CTR law is to reach a level where, on any given day, 45% of employees are arriving by a non-SOV commute. We are currently at 32% non-SOV commute and are making progress towards our goal.

City of Kirkland employees who regularly commute by carpool, bus, vanpool, walking, or biking, are eligible for Super Commuter benefits. By commuting by one of these alternative modes at least three days a week (or 60% of your work trips), an employee can receive monetary benefits. To make Super Commuting easier, the City of Kirkland provides employees with a FlexPass that is good for Sound Transit and Metro bus rides and covers up to $65 a month in vanpool costs.

City staff coordinates with King County METRO to put similar employee management transportation programs into place for Kirkland's larger commercial developments.

The City has also adopted a non-motorized transportation plan to guide improvements to the Kirkland's pedestrian and bicycle system. The plan focuses comprehensively on nonmotorized travel within the City as well as ensuring key linkages with neighboring communities. It provides coordinated long-range planning between the three City departments largely responsible for the various elements of nonmotorized transportation, namely land-use planning, sidewalk and bike lane planning and development, as well as park and recreational trail planning and development.

Another strategy that has been in place for over 20 years is the use of vehicles in the City fleet that are powered at least in part by compressed natural gas (CNG). The City constructed its original CNG refueling site adjacent to City Hall in 1982, and moved it to the Maintenance Center in 1997. As of 2003, the City operates eight bi-fuel (CNG/unleaded gasoline) vehicles, and one hybrid (electric/unleaded gasoline) vehicle in 4 different City departments. At the time of purchase of a new vehicle, or the replacement of an existing fleet vehicle the function of the vehicle and its funding are taken into consideration. A CNG or hybrid will be purchased if these two factors are met and there is a vehicle which meets these requirements available in the marketplace.

4. ADDITIONAL RESPONSE ACTIONS

Kirkland should pursue additional actions to respond to air quality, climate change, and energy issues.

In addition to addressing vehicles' adverse impacts to air quality and climate, there are other actions that can be of significant value to address air quality, climate change, and energy use. These include tree planting, retention, and replacement; since trees provide oxygen and moderate temperature to reduce urban "heat island" effects; and actions to promote low energy use and "green" construction. For example, the City can model energy stewardship by purchasing energy efficient and renewable technology products and services whenever feasible. Also, the City could design a program to provide incentives for low energy use and for "green" construction. In addition, the City could provide links for Kirkland residents and businesses to energy information about:

- Insulation, windows, & other building materials
- Efficient lighting
- Efficient appliances and alternatives to appliances
- Efficient building design
- Local suppliers & businesses, and
- Financing and rebates.

F. Sustainability And Human Activities, continued

HAZARDOUS MATERIALS

5. REDUCE USE TO MINIMIZE RISKS

Minimize risks to human health and the environment by striving to reduce hazardous materials and hazardous waste.

City practices are governed by various State requirements and regulations pertaining to the handling of hazardous materials and waste. General Provision 5.8 of the City's public works bid document requires that contractors hired by the City comply with them as well.

Specifically, GP 5.8 requires compliance with RCW Chapter 49.17 (Washington Industrial Safety and Health Act), Washington Administrative Code Chapter 296-62 (Occupational Health Standards for Carcinogens and RCW Chapter 49.26 (Health and Safety – Asbestos relating to chemicals, hazardous materials, and waste).

The City should also explore opportunities to create financial incentives for businesses and City departments to reduce their use and storage of hazardous materials and their generation of hazardous waste.

6. EDUCATE AND INFORM

Educate and inform the entire community, public and private sectors, about hazardous materials.

Residents and businesses should have the opportunity to understand the dangers associated with hazardous materials and available alternatives for use in their workplaces and homes.

They should also be informed of options available to manage and dispose of hazardous waste, such as:

- Collection of oil, paint, and batteries.
- Satellite collection points.
- Mobile collection service.
- Additional "one day" collection events

Kirkland should identify a central phone number which residents could call to report illegal disposal of hazardous wastes in Kirkland. Stencil this number on sewer catchbasins using alternative community service labor. Educate city enforcement staff (such as police and fire personnel) about the number to develop a consistent and effective response to complaints.

Refer people to alternatives to the use of hazardous materials in homes and businesses. Link to organizations that already provide education. Target neighborhood associations, student-body councils, merchant associations, and emergency response team participants.

G. Funding Sources

Explore a wide range of public and private funding options for natural resource management, including grant funding, tax incentives, bonds, foundations, re-distribution of City funds, and additional fees.

A variety of funding sources should be explored to finance natural resource management. It is important to recognize that many of these sources would require the dedication of additional staff hours to pursue them. The majority of participants in City surveys have supported increased funding for natural resource management and believed that the City should explore a variety of funding sources.

The City's Capital Improvement Program (CIP) is the six-year funding plan for major capital improvements over $50,000. For natural resources these could include such projects as acquisition of open space or wildlife habitat areas; the restoration of a wetland or the installation of a stream culvert to improve fish passage. In developing the CIP it is important to coordinate projects and, where possible, combine funding sources. The CIP should specifically identify and perhaps group those projects that are supportive of the Natural Resource Management Plan. Multiple funding sources include grants, partnering with adjacent jurisdictions, city general funds, impact fees, surface water utility fees, donations and private partnerships, and State and Federal programs. The City should explore the legal authority and potential for using the surface water utility for trees or a natural resource surcharge on the Surface Water Utility fee.

Too, the City should build on the valuable volunteer efforts that have contributed toward natural resource management in Kirkland for many years. Schools, organizations, individuals, and neighborhoods can be powerful agents of positive change as they work to remove debris and to plant and maintain vegetation in environmentally sensitive areas, count salmon, monitor water quality, and plant new trees in neighborhoods. In addition, the City should continue to coordinate with environmental organizations to explore opportunities for programs or projects that would enhance Kirkland's natural resource systems directly or through public education. Currently, City staff and funding to support volunteer efforts is limited. The City should consider investing more in this area, because it is likely to yield increased community involvement, good will, and pride; along with natural resource enhancement.

IV. IMPLEMENTATION STRATEGIES

Important Note:

Implementation of the Natural Resource Management Plan is expected to occur in many, future follow-up steps. This plan is not intended to lock-in specific actions for implementation. Instead, it is intended to provide – all in one place – the framework to guide all actions related to natural resource management that might be considered in the future. As each new action is raised for consideration, it will be examined in depth -- to ensure that it is consistent with this plan and to analyze costs/benefits and alternatives. This approach is more prudent than specifying that level of detail at this time in this plan, because (1) It is not feasible to fund the entire implementation of a plan of this scope at one time, and (2) The dynamic nature of our natural features and changes within our community dictate the need to perform analyses at the time of action, rather than far in advance.

NATURAL RESOURCES - MANAGEMENT

STRATEGY	REASON	PROCESS	TIMING
1. Interjurisdictional coordination			
Continue to coordinate natural resource management across boundaries using interjurisdictional collaboration. (See Guiding Principles B.3,B.8,C.12-13, D.1-D.4, E.1-E.3, F.1-F.6, and G)	Because natural systems cross jurisdictional boundaries, interagency coordination is essential to managing them successfully.	Continued Council support of administrative activities through allocations of budget and staff.	Ongoing
2. Public Involvement & Education			
Design and maintain a program to inform & involve stakeholders in natural resource practices, programs, and amendments. Include mailings, articles, cable TV, internet, neighborhoods & schools. Work to foster links between school teachers and experts in the fields. *(See Section C.3 of the Introduction and see Guiding Principles A.1- A.3, B.1–B.13, C.1--C.13, D.1-D.4, E.1-E.3, F.1-F.6, and G)*	Due to the high cumulative impact of the actions/choices of individuals, institutions & businesses, public outreach is key to improving the viability of City natural resources, reducing code violations by explaining the rules and the reasons behind them, increasing fairness of enforcement, and utilizing volunteers.	Kirkland's Natural Resource Management Team could design and implement the program, but funding and staff time would be needed.	First Quarter of 2004
3. Find and Implement Incentives			
Search for incentives that would be feasible to implement in order to encourage sound natural resource stewardship. Evaluate current regulations for unintentional disincentives and work to rectify those. (See Section C.4 of the Introduction and see Guiding Principles A.3, B.6, B.9, C.1, C.5-C.6-C.13, D.1-D.4, E.1-E.3, F.1-F.6, and G)	Incentives to reward good stewardship of natural resources can be effective resource management tools when combined with public involvement and education. Often regulations can unintentionally thwart preferred outcomes, such as requiring a lengthy or expensive process to evaluate a proposal for habitat restoration.	This task would need to be funded and staff time allocated. Stakeholder participation would be an important part of the process.	To be determined

NATURAL RESOURCES - MANAGEMENT, continued

4. Acquire Best Resources			
Identify the most valuable and/or the most imminently threatened natural resource features in Kirkland and target them for eventual acquisition by the City, then allocate the staff and financial resources to manage resources according to best known practices. *(See Section C.2 of the Introduction and Guiding Principles A.1-3, B.1–B.13, C.1-C.3, D.1-D.3, E.1, E.2, F.4, and G))*	Acquisition is most effective way to ensure that these vital assets are managed as the City would wish. Since it would not be feasible to acquire all, it is important that the most valuable and/or the most imminently threatened be identified and targeted for consideration for future acquisition by the City.	1. A qualified professional should identify Kirkland's most valuable natural resource assets using criteria approved by the City Council. 2. GIS analysis could identify key parcels related to target areas. 3. This information could be considered by the Park Board & Council as parcels become available.	Staff and funds would need to be allocated for professional services and for periodic updates of the GIS data. The resulting information would be for the City Council's consideration when targeted parcels become available for purchase.
5. Upgrade City Practices			
City practices and programs should be updated to use current knowledge and technology. **Also, the City should move toward proactive maintenance of the City-managed natural resources.** (See Guiding Principles A.1-3, B.1-13,C.1-C.13, D.1-D.4, E.1-E.3, F.1-F.6 and G`)	Currently, limited budget and staff resources are dedicated to maintain City-owned natural areas and City-managed trees in parks and downtown. Consequently, management of Kirkland's natural resources tends to be on a reactive, rather than proactive basis. Proactive management would increase the value of Kirkland's natural assets and would likely be more cost effective than rectifying problems after the fact.	Approval of additional staff and financial resources to support upgrades to the City's practices.	To be determined
6. Update Policies and Regulations			
• Amend Kirkland's Comprehensive Plan, Zoning Code and other adopted plans and regulations to be consistent with this plan. • Ensure that enforcement staff and budget are sufficient to support the regulations. *(See Introduction, Section C.1, and Guiding Principles A.1-3, B.1-B.13, C.1-C.13, D.1-D.3, E.1-3 and G)*	• To strengthen enforcement • To codify interim rules for tree removal and retention, and improve rules for tree replacement • For greater clarity & more flexibility • Tailor to concerns and character of basins or neighborhoods • Need improved organization of rules • Update for current technology and knowledge • To reflect City-wide ecosystem goals • To resolve competing City responsibilities in the ROW • To address low-impact development practices	City Council decision on amendments developed through public process and recommended by City commissions and/or boards and Houghton Community Council. Some funds have already been allocated.	Third and fourth qtrs 2003 & First qtr. 2004

NATURAL RESOURCES - MANAGEMENT, continued

STRATEGY	REASON	PROCESS	TIMING
7. Adaptive Management			
Periodically monitor and assess results of City practices, programs, and regulations; and adapt them as appropriate to better achieve the City's natural resource goals. *(See Guiding Principles B.5-B.13, C.1-13, D.1-3, E.1-3, F.1-6 and G)*	Because the science of natural resource management is incomplete and growing, and other relevant factors may also change over time, results of City actions should be monitored and adjusted to increase effectiveness.	Identify quality indicators, monitor, analyze results, and amend practices, programs, and regulations to increase effectiveness.	To be determined
8. Manage Data			
Build, interpret, analyze, store, update, and communicate data concerning Kirkland's natural resources. *(See Guiding Principles A.1-3, B.1-13, C.1-4, C.6-13, D.1-4, E.1-3, F.1-6 and G)*	Monitoring & managing environmental information is key to effective management of natural resources. GIS is the primary tool. Decisions by City Officials and the efficiency of City staff's daily work would benefit greatly by accurate, current data.	City Council approval of staff and budget to manage the data.	Ongoing
9. Interdisciplinary			
Consider dedication of funds and staff to do work now done by Nat. Resource Mgmt Team. *(Guiding Principles A.1-3, B.1-13, C.1-13, D.1-4, E.1-3, F.1-6 and G, Implementation Strategy 11)*	To support an ongoing interdisciplinary approach to coordinate between City departments with differing responsibilities and to expedite implementation of the Natural Resource Management Plan.	City Council approval of dedicated funds and staff time.	Review in 2005
10. Pursue Restoration			
Pursue opportunities for restoring functions of natural systems where significant environmental benefits will be realized. Determine criteria and method for prioritizing target areas. Consider restoration or enhancement by way of: • Model projects on City property • Increased use of existing code authority to require restoration on private property at the time of development. *(See Guiding Principles A.1-3, B.1-13, C.1-13, D.1-4, E.1-3,F.2, F.4 and G)*	Environmental degradation results in loss of important functions normally performed by healthy natural water systems, which in turn adversely affects water quality, water quantity, and the habitat of humans, fish, and wildlife.	City Council approval of funds and staff resources to identify and pursue such opportunities through projects. Staff could then pursue grants and work with volunteers to help with the cost of restoration.	Ongoing

FUNDING

STRATEGY	REASON	PROCESS	TIMING
11. Funding			
Explore and pursue a wide variety of sources of funding and in-kind services, including: grants, partnerships with other jurisdictions, city general funds, CIP projects, impact fees, surface water utility fees, donations and private partnerships, volunteer efforts, and State and Federal programs. Provide the funding and staff resources necessary to explore and pursue these sources. *(Guiding Principles A.1-3, B.1-13, C.1-13, D.1-4, E.1-3, F.1-6 and G)*	As shown in this plan, many actions could be taken to improve natural resource management in Kirkland. With the exceptions of the tree code updates and the Surface Water Master Plan, every implementation strategy in this plan would require additional funding and staff time. Since natural resource management is important to Kirkland, it is necessary to find ways to fund it.	City Council approval of funds and staff resources to identify and pursue funding and volunteer opportunities.	Ongoing

URBAN FOREST

STRATEGY	REASON	PROCESS	TIMING
12. Public Tree Management Programs			
a. Currently the City maintains a limited number of ROW vegetation areas & would like to begin a pilot program to explore accepting more responsibility for proper maintenance of ROW vegetation. b. Neighborhood stewardship projects will be created as part of the grant for public tree inventory. c. Dedicate funds to support a pro-active program for planting and maintaining new trees as well as for the maintenance of existing ones in public spaces, such as in parks and other City properties, public rights-of-ways, and on school grounds. *(See Guiding Principles A.1-3, B.1-13, C.1, C.2, C.4-13, D.3, E.1-3, F.2, F.4 and G)*	a. The Public Works Dept. can determine maintenance costs for maintaining street trees through a pilot program in a selected street corridor. b. When coordinating public tree projects with neighborhoods, the City is promoting stewardship within the community. c. The proactive program will invest in Kirkland's urban forest to increase the economic and ecological benefits of that asset.	a. Determine corridor & maintenancy needs. • Perform work, track costs. • Estimate cost to expand program b. Promote projects w/ neighborhoods. Implement first projects. c. City Council approval of funding and approach.	4th qtr. 2003 2004 4th qtr. 2004 4th qtr. 2003 2004 To be determined
13. Street Tree Standards			
Review and revise planting specifications for street trees to accommodate a more diverse palette of species and to address current best planting techniques. *(See Guiding Principles A.3, B.5, B.7-8, B.11-13, C.1-2, C.4-8 and G)*	The official list should be updated to delete species that are not suitable or viable as street trees.	The City's Urban Forester will update the list for review and approval by the directors of the Parks, Public Works, and Planning Departments.	Third quarter 2003

URBAN FOREST, continued

STRATEGY	REASON	PROCESS	TIMING
14. Remain a Tree City U.S.A.			
In order to hold onto the Tree City USA title on an annual basis, the City must: • Replace the interim tree ordinance with code amendments. • Budget $ per capita annually for direct costs toward maintaining City trees. • As the designated tree group, the Natural Resource Management Team must show consistent work toward a community tree program. • Host an Arbor Day celebration and be clearly dedicated toward a community tree effort. *(See Guiding Principles A.1-3, B.1-2, B.5, B.7, B.9-13, C.1-13, D.3, E.1-2, F.2, F.4 and G)*	To raise community awareness and pride in the trees that are valuable assets to Kirkland, and to develop and maintain a comprehensive approach to effectively managing those assets.	• City Council adoption of zoning code amendments recommended by the Planning Commission and Houghton Community Council with public input • City Council dedication of $2/ capital toward maintenance of City trees • Allocation of funds and staff time for development of an ongoing tree program and annual Arbor Day celebration.	Amendments in fourth quarter of 2003 Budget adopted in fourth quarter of each year Arbor Day celebration each Spring
15. Preserve Notable Trees			
Develop and maintain a program to identify and preserve trees of exceptional value to the community. *(See Guiding Principle A.1-3, B.1, B.2, B.5-13, C.1-8, C.12-13, F.2, F.4 and G)*	Exceptional trees may be lost unnecessarily without awareness and maintenance.	• Determine program frequency and criteria for designation. • Design promotion • Announce program and assist in nominations. • Public hearing by Hearing Examiner • Recognition	2004 2004 2004 2004 Arbor Day

SOLID WASTE

STRATEGY	REASON	PROCESS	TIMING
16. New Recycling Approach			
Develop new solid waste contract with provision for 100% commingled recycling collection *(See Guiding Principle B.1-2, B.5-7, B.10-13, F.1 and G)*	To make recycling easier and thus increase participation, allow all recyclable materials to be collected in one container. Surprisingly, the cost can be less than that of pre-sorted recycling, since the number of bins to handle decreases and the typical increase in participation results in more recyclables for the contractor to market.	Administrative	Second half 2003
17. Collect Food Waste			
Develop new solid waste contract with provision for curbside food waste collection. Residents could then put food waste with yard waste in the City-provided carts with rodent-deterring lids. *(See Guiding Principle B.1-2, B.5-7, B.10-13, F.1 and G)*	30-40% of solid waste is food waste. By collecting food waste with other organic materials (e.g.,yard waste), a significant portion of the waste stream can be diverted from the landfill.	Administrative	Second half 2003
18. Special Collection Events			
Hold 2 annual (spring & fall) residential recycling collection events and 1 business recycling collection event to drop off items that can be recycled (i.e., computers, cell phones & tires) but are not collected as part of weekly curbside collection. *(See Guiding Principle B.1-2, B.5-7, B.10-13, F.1 and G)*	Residents have come to rely upon these events and save up their material to drop off each year. Pounds of recyclable waste collected continue to increase with each event.	Administrative Dependent upon grant funding from King County and Washington State	Spring event held each March/April Fall event held each September/ October
19. Sell Compost Bins and/or Rain Barrels			
Hold compost bin or rain barrel sales to encourage conservation behavior. *(See Guiding Principle B.1-2, B.5-7, B.10-13, F.1 and G)*	The goal of this type of event is twofold: (1) purchase conservation products made from recycled materials to support the recycling industry, and (2) give residents a means to conserve resources.	Administrative Dependent upon grant funding from King County and Washington State	Early Spring event.

AIR QUALITY, CLIMATE CHANGE, AND ENERGY

STRATEGY	REASON	PROCESS	TIMING
20. Enhance TDM Activities			
Work in partnership with METRO to maintain and enhance the City's Transportation Demand Management (TDM) activities, including complying with the State's Commute Trip Reduction law. *(See Guiding Principles A.1-2, B.1-3, B.5-7, B.10-13,F.2-3 and G)*	Efforts should be expanded to target residents of Kirkland, particularly those who live in proximity to transit service. Need to promote telework and compressed workweek programs, which actually eliminate commute trips.	City Council approval needed for enhancements.	To be determined
21. During the Workday			
Encourage employees to use the bus, carpool or teleconference instead of driving to business meetings. *(See Guiding Principles A.1-2, B.1-3, B.5-7, B.10-13,F.2-3 and G)*	Need to reduce single occupant vehicle trips. Need to focus on non-commute trips, which outnumber commute trips 4-1.	Administrative	To be determined
22. City Purchasing			
Continue to explore opportunities for the City to purchase energy efficient and renewable technology products and services. *(See Guiding Principle B.1-2, B.5-7, B.10-13, C.2, C.4, F.1-4 and G)*	To conserve energy and to model energy conservation practices.	Administrative	Ongoing
23. Alternative Fuel for Fleet			
Continue to strive to increase the average fuel economy of the City's fleet, including continuing to transition to "alternative fuel" vehicles (electric, hybrid, biodiesel, etc.) wherever feasible. *(See Guiding Principles A.1-2, B.1-3, B.5-7, B.10-13,F.2-3 and G)*	Reduce air pollution and emission of greenhouse gases. Kirkland's leadership in this area would serve as a model for the community.	City Council approval of funding.	Ongoing

AIR QUALITY, CLIMATE CHANGE, AND ENERGY, continued

STRATEGY	REASON	PROCESS	TIMING
24. Use Better Diesel in Fleet			
Work toward cutting toxic emissions from diesel fleet by following the example of King County Metro, the City of Seattle, Boeing and others to adopt the use of ultra-low sulfur diesel fuels, as they become more available and affordable. *(See Guiding Principles A.1-2, B.1-3, B.5-7, B.10-13,F.2-3 and G)*	All Public Works construction vehicles, all Fire pumpers, and all aid cars use diesel fuel. According to EPA data, the level of ambient air toxics in the Seattle/King County region is among the highest in the country; The level of toxics are projected to result in 1400 additional cancer risks above the goal set in the Clean Air Act – 80 percent of those toxics are due to diesel emissions.	City Council approval of funding.	To be determined

Appendix A

THE LEGAL CONTEXT FOR NATURAL RESOURCE MANAGEMENT IN KIRKLAND

FEDERAL LAWS

Statute & Description	Agencies & Responsibilities
CLEAN WATER ACT (CWA) The primary Federal law that protects the nation's waters, including coastal areas. Among its purposes is "the protection and propagation of fish … and wildlife." The 2 fundamental goals of the CWA are to: • Eliminate the discharge of pollutants into the nation's waters • Achieve water quality levels that are fishable and swimmable.	**Environmental Protection Agency** (with some authorities delegated to WA State Dept. of Ecology) is charged with implementing most of the CWA, including: • Section 303 (water quality standards and TMDLs) • Section 402 (NPDES permitting) **US Army Corps of Engineers** is charged with implementing: • Section 404 (dredge and fill permitting).
ENDANGERED SPECIES ACT (ESA) Provides significant protection for species in the US that are listed as needing protection. When a species is listed under the ESA, habitat containing physical or geological features essential to the species conservation is designated. Federal agencies are prohibited from authorizing, funding, or carrying out any action that will result in the destruction or adverse modification of that habitat. In our watershed, wild Chinook salmon and bull trout are both listed as "threatened" under the ESA.	**NOAA Fisheries** (formerly known as National Marine Fisheries Service) is responsible for listing and protecting marine species, including anadromous fish. **US Fish and Wildlife Service** is responsible for listing and protecting freshwater and terrestrial species.
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) Designed to "encourage productive and enjoyable harmony between man and his environment; promote efforts to prevent or eliminate damage to the environment and biosphere; and enrich the understanding of the ecological systems and natural resources important to the nation."	**All Federal agencies** The **White House Council on Environmental Quality** was established as a result of this legislation; it is responsible for reviewing and appraising all Federal agencies' programs and activities and for determining whether the objectives of the policy are being achieved. It is also responsible for documenting and defining changes in the natural environment.
ANADROMOUS FISH CONSERVATION ACT Authorizes the Secretary of the Interior to enter into cooperative agreements with the states and other non-Federal interests for the conservation, development, and enhancement of the nation's anadromous fishery resources that are subject to depletion from water resource developments and other causes.	**NOAA Fisheries** (formerly known as National Marine Fisheries Service) **US Fish and Wildlife Service**

FEDERAL LAWS, continued

Statute & Description	Agencies & Responsibilities
CLEAN AIR ACT (CAA) The primary Federal law designed to make sure that all Americans have air that is safe to breathe. Public health protection is the primary goal, though the law also seeks to protect our environment from damage caused by air pollution.	**Environmental Protection Agency (EPA)** sets national health-based air quality standards to protect against common pollutants including ozone (smog), carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, and particulate soot. In addition, the EPA sets national standards for major new sources of pollution including automobiles, trucks and electric power plants. The agency also is charged with developing controls for major sources of such toxic pollutants as benzene. At the **state level**, cleanup plans must be devised to meet the heath standards by a specific date. (Areas with the worst smog have a longer time to meet the standards.)
MIGRATORY BIRD TREATY ACT Passed in 1918, the MBTA is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests.	Section **704 of the MBTA states that** the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take.

STATE LAWS

Statute & Description	Agencies & Responsibilities
GROWTH MANAGEMENT ACT (G.M.A.) The Washington State Legislature found that uncoordinated and unplanned growth threatened the environment and sustainable economic development. It therefore established a process for citizens, local government, and the private sector to cooperate in and coordinate comprehensive land use planning and zoning. The GMA establishes goals and requirements that provide direction on a wide range of issues, including environmental protection and shoreline management.	**City and county governments:** • Directed to implement and develop mechanisms to meet the GMA's goals • Must designate and protect critical areas, using "best available science" and giving consideration to the enhancement of anadromous fisheries. Critical areas include areas and ecosystems related to wetlands, aquifer recharge areas, and fish and wildlife habitat conservation areas. • Must be consistent with King County's adopted Countywide Planning Policies
SHORELINE MANAGEMENT ACT (S.M.A.) Designed to manage and protect shorelines of statewide significance by regulating development in the shoreline area. A major goal of the act is "to prevent the inherent harm of an uncoordinated and piecemeal development of the state's shorelines." The SMA also states that shorelines should be managed to foster all reasonable and appropriate uses and ensure uses are designed and conducted in a manner that minimizes damage to the ecology and environment. Amendments made to the SMA in 1995 integrated SMA requirements with those of the GMA.	**Washington Dept. of Ecology (DOE)** serves in a support and review capacity to assist and ensure that local governments implement the Act via Shoreline Master Programs (SMPs). **DOE** must approve SMPs. **Cities and Counties** must develop SMPs and administer shoreline permits. SMP goals must be part of the City's GMA Comprehensive Plan, and SMP regulations must be part of the City's code. SMPs are to be updated following the pending adoption of new **DOE** guidelines.
STATE ENVIRONMENTAL POLICY ACT (S.E.P.A.) Establishes a policy for state agencies to use all practicable means and measures to create and maintain conditions under which people and nature can exist in productive harmony. Requires that state agencies analyze the environmental impacts of proposed projects. This analysis is intended to coordinate with permit reviews, including those required for activities in nearshore and streamside habitats. Amendments made to SEPA regulations November 1997 integrated SEPA requirements with those of the GMA.	**All state, county, and city agencies:** • An environmental impact statement (EIS) is required for all non-exempt developments. Elements of the EIS include water, plants, and animals, unique species, shoreline uses, and habitat. • The **Washington Dept. of Ecology and local governments** have programs for monitoring, compliance, and enforcement.
TRIBAL AGREEMENTS AND RELATED CASE LAW Salmon and steelhead fisheries are managed cooperatively by the State of Washington and Indian tribes whose rights were established in treaties signed with the Federal government in the 1850's. A 1974 federal court case (known as the Boldt decision) re-affirmed the tribes' rights to harvest salmon and steelhead and established tribes as co-managers of Washington fisheries.	**State of Washington** (primarily **Washington Dept. of Fish and Wildlife**) and **Federally recognized Indian tribes in Washington state**: • The state and the tribes are charged with overseeing management of harvest and hatcheries for the state's fisheries. As such, they have been working with federal agencies to develop appropriate scientific tools to quantify harvestable salmon populations. • The tribe concerned with natural resources in Kirkland is the Muckleshoot Indian Tribe.

STATE LAWS, continued

Statute & Description	Agencies & Responsibilities
WATERSHED PLANNING ACT (RCW 90.82, also referred to as 2514) Enables counties, cities, and water utilities, in cooperation with Indian tribes with reservation lands in the management area, to form WRIA (water resource inventory area) planning units and to receive state assistance for watershed planning. Watershed planning performed under the authority of RCW 90.82 must address water quality, which includes an estimate of water resources present, existing and claimed water rights, and underground resources. This statute restricts watershed planning from conflicting with existing state statutes, federal laws, or tribal treaty rights, or from impairing existing water rights.	**State and local governments** Kirkland participates in the watershed conservation planning efforts for WRIA 8, the watershed that drains into Lake Washington, Lake Sammamish, and the Cedar River.
WATER RESOURCES ACT (RCW 90.54) Outlines water resource policies and provides guidance to local governments in comprehensive water resource planning. The statute emphasizes cooperation and coordination among local governments, the state, and federally recognized Indian tribes. Local governments are directed to explore all possible measures for the protection of groundwater aquifers that are the sole source of drinking water within a jurisdiction. Policy guidelines in the statute are largely advisory.	**State and local governments**
WASHINGTON STATE SALMON RECOVERY ACT (RCW 77.85, also referred to as 2496 or 5595) Passed by the State Legislature in advance of the ESA listing of Chinook salmon. Multistakeholder steering committees and the Salmon Recovery Funding Board were created as a result of this legislation.	**Governor's Salmon Recovery Office, Steering Committees, Business and environmental interests, water/sewer districts, state agencies:** The WRIA 8 Steering Committee is charged with recommending habitat project lists to the Salmon Recovery Funding Board (SRFB). Steering committees are responsible for submitting prioritized lists of habitat protection and restoration projects to the SRFB based on limiting factors analysis.
WATER QUALITY PROTECTION ACT **Established the Puget Sound Water Quality Action Team and a nine-member Puget Sound Council to take the lead on water quality protection efforts for Puget Sound.** The Act directs state and local agencies to coordinate with each other in order to produce a biennial work plan that clearly delineates state and local actions necessary to protect and restore the biological health and diversity of Puget Sound.	**Puget Sound Water Quality Action Team** • Brings together federal, state, local, and tribal representatives to lead and coordinate efforts to protect Puget Sound. • Responsible for developing a biennial Puget Sound Water Quality Work Plan that identifies actions necessary to correct regional water quality problems.

STATE LAWS, continued

Statute & Description	Agencies & Responsibilities
WASHINGTON STATE HYDRAULIC CODE (WAC 232-14-010) Jointly administered by the department of fisheries and department of game, by law separate agencies. This code requires that prior to construction or other work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state, that written approval be obtained from the director of the department of fisheries or department of game.	Rules establishing procedures for obtaining a hydraulic project approval and explaining criteria, policies and procedures typically utilized by the Department of Fisheries and Department of Game in administering the Hydraulic Code have been jointly promulgated by the two agencies.

OTHER

Statute & Description	Agencies & Responsibilities
W.R.I.A. 8 INTERLOCAL AGREEMENT In 2000, cities and counties throughout the Lake Washington/ Lake Sammamish/Cedar River watershed agreed to cost-share services to conduct WRIA-based salmonid conservation planning. This shared interjurisdictional effort is focused on responding to Endangered Species Act needs.	**King and Snohomish counties and 25 cities within them (including Kirkland):** Parties to the agreement are committed to jointly funding salmonid conservation planning efforts. Participation is voluntary.

Appendix B

SOURCES FOR GUIDING PRINCIPLES AND MAPS

GUIDING PRINCIPLES

Each of the Guiding Principles in Chapter III of this plan was based on City policies/vision/goals, on legal requirements, and/or on widely-accepted current scientific knowledge or technology. Some of the specific sources for the Guiding Principles are listed below.

A. Natural Resources – General

A1. The Value of Natural Resources

- Kirkland's *Vision Statement*, early 1990's
- *Framework Goals* in the Kirkland Comprehensive Plan, adopted 1995
- *Natural Environment Element*, Kirkland Comprehensive Plan
- *Survey of Attitudes*. Kirkland. 2000. Carolyn Browne Associates
- Community Conversations. Kirkland. 2002
- RCW 36.70A (Growth Management Act)
- RCW 90.58 (Shoreline Management Act)
- Federal Clean Water Act
- Federal Endangered Species Act
- The Watershed Company. 1998. *Kirkland's Streams, Wetlands, and Wildlife Study*. The Watershed Company, Kirkland, WA.
- *City of Kirkland Tree Management Review.* 2001. Gilles Consulting, Kirkland, WA
- American Forests. 1998. Regional Ecosystem Analysis: Puget Sound Metropolitan Area– *Calculating the Value of Nature.* www.americanforests.org
- Wolf, Ph.D, K. 1998. *Urban Forests Values: Economic Benefits of Trees in Cities.* Human Dimensions of the Urban Forest, Fact Sheet 3. University of Washington, Seattle, WA.
- Council of Tree and Landscape Appraisers. 2000. *The Guide for Plant Appraisal*. Ninth Edition. International Society of Arboriculture Press.

A.2 Interdependence of Natural Systems

- Natural Environment Element, Kirkland Comprehensive Plan
- RCW 36.70A.030 (5); .060. 170 (Growth Management Act critical areas)
- RCW 90.58 (Shoreline Management Act)
- Federal Clean Water Act
- Federal Endangered Species Act
- Washington State Dept. of Natural Resources. 1998. *Our Changing Nature: Natural Resource Trends in Washington State.*

A.3 Biodiversity

- The City and County of San Francisco. 1997. The Sustainability Plan.
- Washington Native Plant Society and Seattle Public Library. 2002. *Native Plants of the Pacific Northwest.*
- King County. 1994. *Northwest Native Plants: Identification and Propagation for Revegetation and Restoration Projects*. King County Surface Water Management, Water andLand Resources Division.

B. Natural Resources -- Management

B.1 Benefits of Natural Resource Management

- Natural Environment Element, Kirkland Comprehensive Plan
- Washington State Dept. of Natural Resources. 1998. Our Changing Nature: Natural Resource Trends in Washington State
- The Watershed Company. 1998. *Kirkland's Streams, Wetlands, and Wildlife Study*. The Watershed Company, Kirkland, WA.
- Adolfson Associates, Inc. 1998. *Kirkland's Sensitive Areas Recommendations Report*. Adolfson Associates, Seattle, WA
- Gilles, Brian. 2001. *City of Kirkland Tree Management Review*. Gilles Consulting, Kirkland, WA
- Lake Washington/Cedar/Sammamish Watershed. 2002. *Near Term Action Agenda*.
- American Forests. 1998. *Regional Ecosystem Analysis: Puget Sound Metropolitan Area – Calculating the Value of Nature*. www.americanforests.org

B.2 Sustainability

- The City and County of San Francisco. 1997. *The Sustainability Plan.*
- The Governor's Sustainable Washington Advisory Panel. 2003. *A New Path Forward: Action Plan for a Sustainable Washington, Achieving Long-term Economic, Social, and Environmental Vitality*.

B.3 Manage Natural Systems Across Boundaries

- Natural Environment Element, Kirkland Comprehensive Plan
- Washington State Dept. of Natural Resources. 1998. O*ur Changing Nature: Natural Resource Trends in Washington State*
- The Watershed Company. 1998. *Kirkland's Streams, Wetlands, and Wildlife Study*. The Watershed Company, Kirkland, WA.
- Lake Washington/Cedar/Sammamish Watershed. 2002. *Near Term Action Agenda*.
- RCW 36.70A.100 (Growth Management Act - coordinate plans with others with common borders and related regional issues)

B.4 Integrate Local, State, and Federal Regulations for Lakes, Shorelines, Streams, Wetlands, and Aquifer Recharge Areas

- Natural Environment Element, Kirkland Comprehensive Plan
- RCW 36.70A.480 (Growth Management Act – integrate SMA and GMA plans and regulations in shoreline areas)
- RCW 90.58 (Shoreline Management Act)
- Federal Clean Water Act
- Federal Endangered Species Act. Lake Washington/Cedar/Sammamish Watershed. 2002. *Near Term Action Agenda*.

B.5 Use A Multidisciplinary Approach

- Natural Environment Element, Kirkland Comprehensive Plan
- Adolfson Associates, Inc. 2002. *Kirkland Natural Resource Management Plan: Phase One.* Adolfson Associates, Inc., Seattle, WA
- Washington State Salmon Recovery Act, RCW 77.85
- Puget Sound Action Team. 2002. *Puget Sound Water Quality Work Plan*

B.6 Use a Variety of Management Tools

- Natural Environment Element, Kirkland Comprehensive Plan
- Lake Washington/Cedar/Sammamish Watershed. 2002. *Near Term Action Agenda.*
- Adolfson Associates, Inc. 2002. *Kirkland Natural Resource Management Plan: Phase One.* Adolfson Associates, Inc., Seattle, WA

B.7 Concentrate Efforts in Areas That Will Yield Greatest Benefits

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B.8 Managing Resources by Drainage Basin

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B.9 Enhancement and Restoration

- Natural Environment Element, Kirkland Comprehensive Plan
- RCW 36.70A.020(9) and (10) (Growth Management Act – retain open space and conserve fish and wildlife habitat; protect and enhance air and water quality)
- RCW 90.58.020 (Shoreline Management Act goals and policies)
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- The Watershed Company. 1998. *Kirkland's Streams, Wetlands, and Wildlife Study.* The Watershed Company, Kirkland, WA.
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- Gilles, Brian. 2001. *City of Kirkland Tree Management Review*. Gilles Consulting, Kirkland, WA
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- Gilles, Brian. 2001. *City of Kirkland Tree Management Review*. Gilles Consulting, Kirkland, WA

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- RCW 90.58 .100 (Shoreline Management Act – Multidisciplinary methods)
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B.12 Monitor Results and Use Adaptive Management

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C. Land And Vegetation

Vegetation

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- Kirkland City Council. 2002. Direction with regard to tree retention on private property.
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- National Arbor Day Foundation, Tree City USA Program, Nebraska City, NE.
- Gilles, Brian. 2001. *City of Kirkland Tree Management Review*. Gilles Consulting, Kirkland, WA

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- Kirkland City Council. 2002. Direction with regard to tree retention on private property.
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C.7 Views

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Land

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Natural Hazard Areas

C.9 Consider Updating Policies and Regulations

- Lake Washington/Cedar/Sammamish Watershed. 2002. *Near Term Action Agenda.*

C.10 Retain Vegetation Where Needed to Stabilize Slopes

- WA State Dept. of Ecology. 1993. *Slope Stabilization and Erosion Control Using Vegetation*. Publication 93-30.
- WA State Dept. of Ecology. 1993. *Vegetation Management: A Guide for Puget Sound Bluff Property Owners*. Publication 93-31

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- King County Noxious Weed Board. 2002. *King County Noxious Weed Board 2002 List.* King County Noxious Weed Control Program, Natural Resources and Parks, Water and Land Resources Division.
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Pest Management

C.12 Management of Noxious and Invasive Plant Species in Native Landscape, Environmentally Sensitive Areas and Their Buffers

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- Kirkland Municipal Code, Section 9.04, Rodent Control
- Kirkland City Council direction and staff's experience

D. Water

Drainage Basins

D1. Protect and Restore Hydrologic Regime

- *Puget Sound Water Quality Master Plan*. 2002.
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- Schueler, Thomas R. and Heather K. Holland, editors. 2000. *The Practice of Watershed Protection*. Center for Watershed Protection.

D.2. Protect and Restore Water Quality

- *Natural Environment Element*, Kirkland Comprehensive Plan
- Puget Sound Water Quality Master Plan. 2002.
- Regional Road Maintenance Technical Working Group. 2002. *Regional Road Maintenance Endangered Species Act Program Guidelines, Final Draft*.
- King County Dept. of Natural Resources. 1998. *King County, Washington Surface Water Design Manual.*
- Federal Endangered Species Act
- McKenzie-Mohr, Doug, and William Smith. 1999. *Fostering Sustainable Behavior; an introduction to community-based social marketing*. New Society Publishers.

D.3. Protect and Enhance Transitions Between Water and Upland Areas

- *Natural Environment Element*, Kirkland Comprehensive Plan
- Kirkland Zoning Code, Chapter 90, Drainage Basins
- Growth Management Act (RCW 36.70A.060)
- Shoreline Management Act (RCW 90.58)
- Federal Endangered Species Act
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- Puget Sound Water Quality Master Plan. 2002.
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Potable Water Supply

D4. Ensure Adequate Potable Water Supply and Promote Water Conservation

- Interview with Kirkland Water Division Manager, Larry Benson, Public Works Dept.
- City and County of San Francisco. 1997. *The Sustainability Plan*.

E. Fish and Wildlife

E1. Participate in Regional Fish and Wildlife Recovery and Protection Efforts

- *Natural Environment Element*, Kirkland Comprehensive Plan
- Washington State Salmon Recovery Act
- Washington State Water Resources Act
- Washington State Watershed Planning Act

E2. Explore Opportunities to Protect Wildlife Corridors

- Kirkland Comprehensive Plan
- The Watershed Company. 1998. Kirkland's Streams, Wetlands, and Wildlife Study. The Watershed Company, Kirkland, WA.

E3. Educate Citizens about Programs to Protect Fish and Wildlife

- The Watershed Company. 1998. *Kirkland's Streams, Wetlands, and Wildlife Study.* The Watershed Company, Kirkland, WA.
- WRIA 8 Conservation Planning

F. Sustainability and Human Activities

Solid Waste

F1. Reduce Solid Waste Through City Programs and Services

- King County Final 2001 Comprehensive Solid Waste Management Plan
- Waste Not Washington Act (RCW 70.93 and RCW 70.95)

Air Quality, Climate Change, And Energy Use

F2. Clean Air Linked to Health and Quality of Life

- *Natural Environment Element,* Kirkland Comprehensive Plan
- City and County of San Francisco. 1997. *The Sustainability Plan.*
- ICLEI. 2000. *Best Practices for Climate Protection: a local government guide.*

F.3 Automobile Use is Leading Impact in Our Region on Air Quality and Climate Change

- ICLEI. 2000. *Best Practices for Climate Protection: a local government guide.*
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F.4 Additional Response Actions

- ICLEI. 2000. *Best Practices for Climate Protection: a local government guide.*
- ICLEI. 2001. *Cities At Risk: assessing the vulnerability of United States cities to climate change.*
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Hazardous Materials

F.5 Reduce Use to Minimize Risks

- Washington Industrial Safety and Health Act (RCW 49.17)
- Washington Health and Safety – chemicals, hazardous materials and waste (RCW 49.26)
- Occupational Health Standards for Carcinogens (WAC 296-62)
- City and County of San Francisco. 1997. *The Sustainability Plan.*

F.6 Educate and Inform

- City and County of San Francisco. 1997. *The Sustainability Plan.*

G. Funding Sources

Explore a wide range of public and private funding options for natural resource management

- Kirkland Natural Resource Management Plan: Phase I

SOURCES FOR MAPS

Each map was created in 2003 by Kirkland's Geographic Information System (GIS) staff, Information Technology Department. Map sources included the following:

Tree Canopy Map

- Imagery obtained from a commercial satellite sensor at an altitude of 425 miles in August 2001. A continuous gridded, multispectral image of Kirkland at a ground resolution of 4 meters (13 feet) was used. Image processing software allowed extraction of all cells representing particular land cover classes, such as forest, impervious surfaces, and lawns.

Impervious Surfaces Map

- Original vector data stereocompiled from 1999 B/W panchromatic aerial photography at a nominal scale of 1:7200 (1" – 600'). Date sets revised, also with photogrammetric techniques, from 2002 color aerial photography at a nominal scale of 1:5100 (1" – 425'). Pavement, building, and miscellaneous impervious polygons were edited within GIS software (ArcInfo).

Landslide and Seismic Hazard Areas Map

- Based on data prepared for the City of Kirkland by the Resource Planning Section, Environmental Division, King County, Washington, December 1991.

Topography Map

- Original digital elevation model (DEM) stereocompiled as mass points and breaklines from 2002 color aerial photography at a nominal scale of 1:5100 (1" – 425'). Triangulated irregular network (TIN) and various contour data sets were originally created with photogrammetric mapping software (Intergraph) and translated to GIS software (ArcInfo). Final editing and contour labeling was done in ArcInfo.

Sensitive Areas Map

Disclaimer: The boundaries and alignments of hydrographic features shown are approximate, based on aerial photos and field observations. These lines have not been surveyed. Also, there may be additional hydrologic features that are not shown on this map.

- 2002 City of Kirkland aerial mapping project. 2002.
- The Watershed Company. 1998. Kirkland's Streams, Wetlands, and Wildlife Study. The Watershed Company, Kirkland, WA.
- Various site-specific stream and wetland studies compiled in the City's Department of Planning and Community Development as Kirkland properties have been developed and redeveloped.
- Watershed Resource Inventory Area (WRIA) 8 Technical Committee. 2003. Known Freshwater Distribution of Salmon and Trout: WRIA 8, Lake Washington/Cedar/ Sammamish Watershed available at http://dnr.metrokc.gov/wrias/8/fish-map

Appendix C

GLOSSARY

ANSI standards ..... Nationally-accepted standards from American National Standards Institute, here specifically for tree care practices, such as pruning and cabling/bracing.

Biofiltration..... The simultaneous process of filtration, infiltration, adsorption, and biological uptake of pollutants in stormwater that takes place when runoff flows over and through vegetated areas.

Buffer..... The zone contiguous with a sensitive area that is required for the continued maintenance, function, and structural stability of the sensitive area.

Capital Improvement Project (CIP) ..... A construction project intended to create new or expand existing roadway, drainage, and/or utility infrastructure. Maintenance or repair of currently serviceable structures is not a Capital Improvement Project.

Channel ..... A feature that conveys surface water and is open to the air.

Conveyance System..... The drainage facilities, both natural and man-made, which collect, contain, and provide for the flow of surface and stormwater from the highest points on the land down to a receiving water. The natural elements of the conveyance system include swales and small drainage courses, streams, rivers, lakes , and wetlands. The human-made elements of the conveyance system include gutters, ditches, pipes, channels, and most retention/detention facilities.

Critical Area ..... Critical areas include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas.

Drainage Basin ..... A specific area of land drained by a particular watercourse and its tributaries.

Ecosystem..... A community of living organisms interacting with each other and their physical environment (a stream ecosystem, for instance).

Drainage Basin ..... A specific area of land drained by a particular Kirkland watercourse and its tributaries.

Erosion..... The wearing away of the land surface by running water, wind, ice, or geological agents, including such processes as gravitational creep. Also, detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Habitat ..... The location where a particular species (or identified subspecies) of plant or animal lives and its surroundings, both living and non-living. Habitat includes the presence of a group of particular environmental conditions surrounding an organism including air, water, soil, mineral elements, moisture, temperature, and topography.

Hydrology..... The science of the behavior of water in the atmosphere, on the surface of the earth, and underground.

Impervious Surface..... A hard surface area which either prevents or retards the entry of water into the soil.

Infiltration..... The downward movement of water from the surface to the subsoil.

Infiltration Facility (or system)..... A drainage facility (including ponds) designed to use the hydrologic process of surface and stormwater runoff soaking into the ground, commonly referred to as a percolation, to dispose of surface and stormwater runoff.

Infrastructure ..... The basic facilities (roads, bridges, drainage, utilities, easements and the ROW surface), equipment, and installations needed for the functioning of a system (transportation, utilities, etc.).

ISA-Certified Arborist: .. Sole certification program for arborists by the International Society of Arboriculture.

Low Impact Development (L.I.D.) ..... Techniques to allow rainfall to infiltrate into the ground as near the source as possible. This reduces runoff and flooding, improves water quality, and recharges groundwater. Low impact development practices can include provisions, incentives, and/or standards for landscaped rain gardens, permeable pavement, narrower roads, vegetated rooftops, rain barrels, impervious surface limitations, "green" buildings, and good soil management.

Mitigation ..... To moderate, reduce, or alleviate the impacts of a proposed activity, including: a) avoiding the impact altogether by not taking a certain action or part of an action; b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, to avoid or reduce impacts; c) rectifying the impact by repairing, rehabilitating or restoring the affected environment; d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and e) compensation for the impact by replacing, enhancing, or providing substitute resources or environments.

Monitor ..... To systematically and repeatedly observe something in order to track its current condition.

Monitoring ..... The collection of data by various methods for the purposes of understanding maintenance activities, BMPs, and features, or assessing the performance of mitigation measures.

National Pollutant Discharge Elimination System ..... The part of the federal Clean Water Act, which requires point source discharges to obtain permits. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

Nutrients..... Essential chemicals needed by plants or animals for growth.

Ordinary high water mark ..... On all lakes, streams, and tidal water is that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department [Washington State Department of Ecology]: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water.

Receiving waters ..... Bodies of water or surface water systems receiving water from upstream manmade (or natural) streams.

Recovery ..... The process by which the decline of an endangered or threatened species is arrested or reversed, and threats neutralized so that its survival in the wild can be ensured. The goal of the ESA is for the recovery of listed species to levels where protection under the ESA is no longer necessary.

Right-of-Way ..... Land dedicated primarily to the movement of vehicles and pedestrians and providing for primary access to adjacent parcels. Secondarily, the land provides space for utility lines and appurtenances and other publicly owned devices.

Riparian ..... Pertaining to the banks of streams, wetlands, lakes or tidewater.

Roadway ..... The traveled surface portion of the right-of-way structure.

Salmonid ..... A member of the fish family salmonidae, which includes Chinook, coho, chum, sockeye, and pink salmon; rainbow, steelhead, and cutthroat trout; brown trout; brook and dolly varden char, kokenee, and white fish.

Sediment ..... Fragmented material that originates from weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation ..... The depositing or formation of sediment.

Sensitive Areas ..... Wetlands, streams, lakes, and frequently flooded areas.

Sheetflow ..... Runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Siltation ..... The process by which a river, lake, or other water body becomes clogged with sediment. Silt can clog gravel beds and prevent salmon spawning.

Species ..... Any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature.

Stormwater ..... The portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, channels or pipes into a defined surface water channel, or a constructed infiltration facility.

Stormwater Drainage System ..... Constructed and natural features which function together as a system to collect, convey, channel, hold, inhibit, retain, detain, treat or filter stormwater.

Streams ..... Areas where surface waters produce a defined channel or bed that demonstrates clear evidence of the passage of water, including but not limited to bedrock channels, gravel beds, sand and silt beds, and defined-channel swales. The channel or bed need not contain water year-round. Streams do not include irrigation ditches, canals, storm or surface water run-off devices, or other entirely artificial watercourses, unless they are used by salmonids or convey a naturally occurring stream that has been diverted into the artificial channel.

Swale..... A shallow drainage conveyance with relatively gentle side slopes, generally with flow depths less than one foot.

Trees..... Significant Trees, Notable Trees, Nuisance Trees, and Hazard Trees are defined terms in Kirkland's Zoning Code. These tree types are each specifically regulated.

Urban Forest ..... The assemblage of trees and associated vegetation, both on public and private property, in an urban setting/environment which is being managed for the benefit of the community.

Wetlands ..... Those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soils conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including but not limited to irrigation and drainage ditches, grass-lined swales, canals, retention and/detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. However, wetlands do include those artificial wetlands intentionally created from non-wetland sites as mitigation for the conversion of wetlands.

Appendix D

ACRONYMS

ANSI American National Standards Institute

BMP Best Management Practice

CIP Capital Improvement Program

CWA Clean Water Act

EPA Environmental Protection Agency

ESA Endangered Species Act

GMA Growth Management Act

HPA Hydraulic Project Approval

NGPE Native Growth Protection Easement

NPDES National Pollutant Discharge Elimination System

RCW Revised Code of Washington

ROW Right-of-way – see glossary

SEPA State Environmental Policy Act

SMA Shoreline Management Act

SMP Shoreline Master Program

USFWS United States Fish and Wildlife Service

WAC Washington Administrative Code

WRIA Water Resource Inventory Area

WSDOT Washington State Department of Transportation

WSDFW Washington State Department of Fish and Wildlife

WSDOE Washington State Department of Ecology