



# 2007 Silver Beach Neighborhood Plan

Bellingham WA

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## Introduction

Through this plan the Silver Beach Neighborhood Association hopes to guide the development and future changes that will occur within the Neighborhood during the next decade and beyond. The current neighborhood is the product of good planning and poor decisions, an eye to the future and a disregard for future generations, thoughtful programs and poor stewardship. In short, the neighborhood reflects the same challenges faced by any neighborhood, any city and any state. How much should government intervene in the affairs of its citizens and what is the government's obligation to future generations? It is the purpose of this plan to direct the city leaders in making well-informed decisions and wise policy so that the quality of life within the neighborhood and the city of Bellingham will not only stay the same but also improve. Our hope is that future generations whose parents have not yet been born will recognize the challenges their forbears overcame so they could enjoy a beautiful neighborhood alongside an unpolluted lake teeming with natural wildlife and vibrant forests.

This plan was developed by a group of committed neighborhood citizens who gathered information from a variety of sources, addressed perceived issues and aggressively solicited feedback from the neighborhood at large. (see Appendix 1 for notification and meeting record) The resulting document reflects the opinions of the majority of those neighborhood citizens who responded. Opposing views have also been represented to the City to insure that everyone has been heard and provides our City leaders a sense of scale and proportion.

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## Chapter 1: Framework and Goals

### **Part 1 Vision Statement**

*Silver Beach 2020...*

*The Silver Beach Neighborhood, a residential neighborhood in the Lake Whatcom watershed, is a model for lake preservation and rehabilitation. The neighborhood continues to be safe and secure. Silver Beach Elementary School remains an outstanding school that draws new families to the neighborhood. Each resident's home and property design standards and practices protect Lake Whatcom and preserve and enhance lake views. Lake Whatcom Reservoir is protected from contaminants as a result of the proactive efforts of residents and the treatment of stormwater through filters, human practices, pet and wildlife management and road and trail designs. Green spaces are developed to the fullest potential with watershed preserves, parks, trails, and greenways. Trails, sidewalks, and streets are designed to support walking and bicycling within the neighborhood and connect with other Bellingham neighborhoods. Silver Beach is a beautiful and scenic place.*

### **Part 2 Past and Present**

The Silver Beach Neighborhood, one of 23 neighborhoods recognized by the city for planning purposes, is located at the eastern edge of Bellingham on the northwest end of the Lake Whatcom Reservoir. (see Map 1) Silver Beach was named and platted on May 23, 1890 by Edward F.G. Carlyon with Reginald Jones as his attorney. In 1908 Silver Beach was annexed by the City of Bellingham. From its inception to the 1950's, Silver Beach's identity was intrinsically linked to the saw and shingle mills in and around the neighborhood. The largest sawmill was the Larson mill, established in 1901 at the current site of the Bloedel Donovan Park. The mill was surrounded by the modest frame homes of the mill workers. The neighborhood was connected to Bellingham's center by electric trolley and railway lines. The Northern Pacific Railroad cut through the Silver Beach neighborhood, crossed part of the lake on a 1,500-foot trestle, and then followed what is now North Shore Drive to the south end of the lake.

Sewers were built in the 1960's. By the 1970's the saw and shingle mills were gone and the railway tracks and trestle were gone making the waterfront and surrounding hills prime view property.

From 1980's to 2000 Silver Beach became a scenic lakefront and lake view residential neighborhood with three parks, Bloedel Donovan, sections of Whatcom Falls, and Big Rock Garden. Additional park property and watershed protection properties, which were purchased in the early 2000's, are located adjacent to Big Rock Garden and the Silver Beach School. By 2007, most of the platted residential lots were occupied.

The neighborhood occupies 3% of the Lake Whatcom watershed with eight percent of Lake Whatcom itself lying within Bellingham city limits. The neighborhood is 1125 acres in size, allocated as follows:

	# of Acres	%
Residential (includes 273 acres of roads, sidewalks & driveways)	687	61
Lake Whatcom	344	31
Parks	65	6
City Watershed Protection Land	18	1
School	10	.8
Commercial	1	.1

Silver Beach's population was 3,047 according to the 2000 US census, a density of 3 people per acre. This was 20% of the approximately 15,000 people who live in the Lake Whatcom Watershed. The neighborhood has grown since with continued development.

Silver Beach Elementary School is the only school in the neighborhood and educates approximately 400 students. It has the lowest participation (17%) in the Free and Reduced Lunch Program in the Bellingham School District (May 2005) reflecting the neighborhood's relative wealth. The average program participation for Bellingham is 37%.

Community activism in Silver Beach has a long history beginning with the Silver Beach Mothers' Club and Silver Beach Civic Improvement Association near the turn of the 20<sup>th</sup> century. The residents of Silver Beach, concerned about a reputation as a mill town and host to the sometimes rowdy White City amusement park, petitioned the Bellingham School Board to build a substantial and permanent brick rather than wood frame school in 1911. The Silver Beach neighborhood was recognized in the Residential Land Use Plan of 1960. In 1980 the first neighborhood plan was adopted and a second, actually a minor update of the 1980 plan, was adopted in 2005.

## **Neighborhood Character**

The most distinctive feature of the neighborhood is its proximity to Lake Whatcom. Surrounding the North basin, Silver Beach is the only Bellingham neighborhood to border the lake. The neighborhood extends to the top of Alabama and Barkley hills to the east and begins to climb Squalicum Mountain on the east. It is a relatively hilly neighborhood with a unique mixture of green and developed spaces. Wonderful views of the lake and foothills add to the beauty and value of the neighborhood.

The neighborhood is also known for its safety. According to the City's Police web site approximately 2% of all the reportable crimes within the city occur within Silver Beach and less than 1% of all the calls occur here.

Silver Beach has a wide range of styles and sizes of single-family homes, with only three small sites with multi-residential units. Within the various sub-neighborhoods, the variety of housing styles varies from turn of the century, modest rural farm houses to mid-century suburban ranch and split level homes to premium traditional and contemporary homes occupying prime view and waterfront sites.

## **Development Patterns**

Reviewing the Silver Beach Land Use draft, it appears that there are about 86 empty single-family lots available, or about 8% of the total 1034 lots. Teardowns are occurring, affecting height and view corridors. Future multi-residential construction in three of the designated areas may create limited population growth, generally considered harmful to the health of the lake, along with height and view corridor issues.

## **Strengths and Weakness**

The neighborhood's numerous acres of park, lakefront and watershed properties define its natural beauty and provide abundant recreational opportunities for City residents and visitors.

Like several other neighborhoods in the city, Silver Beach lacks a strong sense of community, which maybe due to its sprawling nature and lack of a neighborhood center. It is recognized more for its location near the lake than its strong neighborhood association.

Recent attempts to deal with stormwater pollution have been largely unsuccessful. While the city has attempted to address the problems created by stormwater runoff, water quality on the Lake continues to deteriorate. Many Silver Beach residents are trying to address this issue, through improving home and yard design and maintenance as well as changing daily behaviors that negatively affect the watershed. Unfortunately, many others continue practices that adversely affect the quality of the lake.

## **Part 3 Broad Goal Statements for the Future**


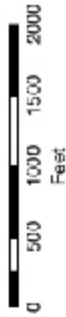
With this plan and citizen action the residents of Silver Beach have an opportunity to protect and in fact improve our neighborhood and its resources. Our primary goals as defined by this plan are:

- Increase citizen stewardship of the Lake Whatcom Reservoir,
- Preserve existing lake views and trees for the residents,
- Establish the environmental model for all Lake Whatcom watershed residents; and
- Maintain the neighborhood's residential character.

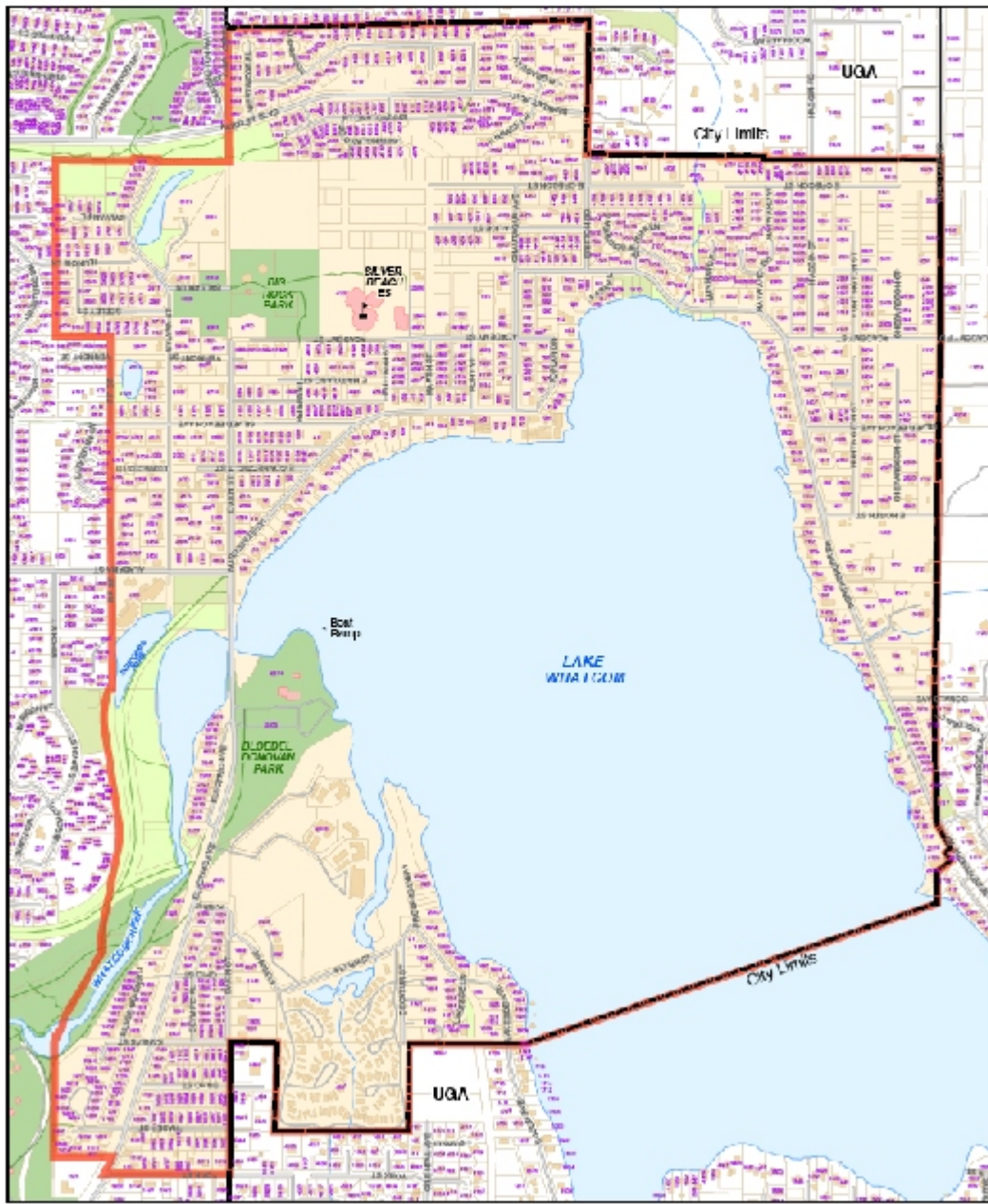
# SILVER BEACH NEIGHBORHOOD BASEMAP

**Legend:**

- City Limits
- Urban Growth Area
- Neighborhood Encl
- Parcel Lines
- Public Buildings
- Streams
- Primary Trail
- Secondary Trail
- Minor Trail
- Community Park
- Open Space/Trail Corridor
- Private Open Space

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Planning Department  
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## Chapter 2: Silver Beach Land Use and Zoning

### **Part 1. Area Descriptions**

The Silver Beach neighborhood currently consists of eighteen 'Areas' that are diverse in their setting and uses. The following describes these Areas, their current uses, their current zoning designation as well as the current comprehensive plan designations that are in place. (see Maps 2, 3 & 4) These areas are further divided into sub-areas that designate additional land use limitations, but those are not discussed here.

#### **Area 1 of the Silver Beach Neighborhood**

Area 1 is bordered by the undeveloped portion of E. Oregon Street on the north, Academy Street on the south, Sylvan and Dakin Streets on the west and Martin Street on the east. This property is adjacent to Silver Beach Elementary School and Big Rock Park and has a number of trails and a large section of watershed preserve land. There are significant wetlands as well and the area supports a considerable variety of wildlife. There are no homes in Area 1 at the present time.

Despite the fact that there are currently no homes in Area 1, the zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Low Density. Low density means 5 or fewer homes per acres and a minimum lot size of 7,201 square feet.

#### **Area 2 of the Silver Beach Neighborhood**

This area is in public ownership and is the site of the Silver Beach Elementary School.

The current zoning and comprehensive plan designation is public.

#### **Area 3 of the Silver Beach Neighborhood**

This area is bordered on the north by the back of lots located on E. Oregon Street, on the south predominantly by Academy Street, on the east by Haggin Street and on the west by Martin Street. Additionally, it includes the lake front property along Northshore Drive from Academy Street south to the city limits. This area is an eclectic mix of lot size and housing types from cottages to large estate properties. Area 3 is extremely important to watershed issues due to its close proximity to the lake. There are currently 256 houses and 34 vacant lots in this area.

The current zoning is residential single while the current comprehensive plan designation is Residential Single, Medium Density. Medium Density means 6-12 homes per acre with lot sizes varying between 3600 square feet and 7200 square feet.

#### **Area 4 of the Silver Beach Neighborhood**

This area is bordered on the north by the back of lots located on E. Oregon Street, on the east by the city limits and on the west by Northshore Drive and Haggin Street. This area contains approximately 107 homes and 55 vacant lots. It appears that some of the larger lots could be further sub-divided. There is a diversity of land cover from forested to residential lawns. Most of the housing was built in the late 1990's and early 2000's, but a few original farmhouses still remain.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Low Density.

### **Area 5 of the Silver Beach Neighborhood**

Area 5 is bordered on the north by a property boundary just south of Barkley Boulevard, Alabama Street on the south, Fir Street on the west and by portions of Dakin, Peters and Pullman Streets on the east. The area is mostly built out with approximately 156 homes and an estimated 10 vacant lots.

The current zoning designation is Residential Single and the Comprehensive Plan designation is Residential Single, Low Density.

### **Area 6 of Silver Beach Neighborhood**

This area is bordered by Academy Street on the north and is adjacent to Lake Whatcom on the south from the corner of Alabama Street and Dakin Street to Poplar Drive on the East. There are 128 houses in this area and approximately 5 vacant lots. Thirty-one of the homes are located along the south side of Northshore Drive with direct shoreline access. Most homes in the area are one story built on a slope and have excellent views of the lake. This area also includes Silver Beach Community Church, which is located on Northshore Drive.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Medium Density.

### **Area 7 of Silver Beach Neighborhood**

This is a small commercial area bordered on the north by residential property, the south by Northshore Drive, the east by Northshore Dr/Chautauqua Street and the west by Flint Street. There are three commercial buildings that house a mini-mart, the Lake Whatcom Center, various retail tenants and a dental clinic.

The current zoning designation is Neighborhood Commercial while the current comprehensive plan designation is Commercial. In that same plan it has been designated as Pocket Center, the smallest Urban Village designation within the city.

### **Area 8 of the Silver Beach Neighborhood**

This area is bordered on the north by Northshore Drive, on the south and east by Lake Whatcom, and on the west by a residential property. Area 8 includes 47 condominiums, all with direct access to the Lake Whatcom shoreline. There are no vacant lots.

The current zoning designation is Residential Multi, and the current comprehensive plan designation is Residential Multi, High Density. High density means more than 12 homes per acre and lots sizes vary from 0 – 3599 square feet.

## **Area 9 of the Silver Beach Neighborhood**

This area is directly west of Lake Whatcom, with Alabama Street the northern border, Fir Street the western border with the southern border dissecting Scudder Pond. The Lakeview Condominiums dominate the area, though there is also public and private open space and trails including a private lakeside dock and picnic area. There appears to be no vacant land for further development.

The current zoning and comprehensive plan designations are Residential Multi.

## **Area 10 of the Silver Beach Neighborhood**

This is open space, parts of which are owned by the City of Bellingham and managed by its Parks & Recreation Department, and others owned and managed by the North Cascades Audubon Society. This area includes Scudder's Pond, Whatcom Creek, the lagoon that is the outlet for Lake Whatcom, the dam that regulates the height of the Lake plus hiking and biking trails. There are no buildings in Area 10.

The current zoning and comprehensive plan designations are Public.

## **Area 11 of the Silver Beach Neighborhood**

This is a residential area along Electric Avenue that is roughly defined by Fraser Street on the south, Whatcom Falls Park on the west and Mill Wheel community on the east. The area includes 160 single-family homes, a low income housing apartment complex and approximately 4 vacant lots. Homes vary from older small homes on small to large lots, to a few newer large homes on large lots. Many homes border Whatcom Falls Park and Whatcom Creek.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Medium Density.

## **Area 12 of the Silver Beach Neighborhood**

This is a public area known as Bloedel Donovan Park. It is located between Electric Street and Lake Whatcom. It is a mixed-use park that includes facilities for swimming, boats, ball games and more. (See **Parks, Recreation & Open Space** section for more information.)

The current zoning and comprehensive plan designations are Public.

## **Area 13 of the Silver Beach Neighborhood**

This area consists of Old Mill Village, an unnamed apartment complex, and Mill Wheel Community, a mobile home park. There are 288 dwelling units in this area, including 136 in Mill Wheel Community. There is a one-acre lot at the corner of Electric and Flynn that now has a small one-story residence.

The current zoning designation is Planned Residential Multi and the current comprehensive plan is Residential Multi.

## **Area 14 of the Silver Beach Neighborhood**

This area is bounded on the south by the City Limits, on the west by Decatur and Flynn Streets, on the north by Old Mill Village property and on the east by Lake Whatcom. There are 35 homes, eighteen that front Lake Whatcom. There are 10 vacant lots of which four are lakefront properties.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Medium Density.

## **Area 15 of the Silver Beach Neighborhood**

This is a smaller residential area on the east side of Electric, south of Fraser and north of York. There are 19 homes with no vacant lots.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Low Density.

## **Area 16 of the Silver Beach neighborhood**

This is the area of Big Rock Park. (See **Parks, Recreation & Open Space** section for more information.)

The current zoning and comprehensive plan designations are Public.

## **Area 17 of the Silver Beach Neighborhood**

Area 17 is bordered on the north by Northridge Way, on the south by Barkley Boulevard, the east by Britton Road and the west by Westridge Place. There are approximately 102 houses and 1 vacant lot. Most houses are newer, having been built within the last 10-25 years.

The current zoning designation is Residential Single and the current comprehensive plan designation is Residential Single, Low Density.

## **Area 18 of the Silver Beach Neighborhood**

Area 18 is bordered on the north by Barkley Boulevard, on the south by Area 3, on the east by Britton Road and the west by city property. There are approximately 76 houses with no vacant lots. This includes a small group of freestanding condominiums in the eastern portion.

Despite that fact that the existing land use is almost exclusively single-family homes, the current zoning designation is Planned Residential Multi and the current comprehensive plan is Residential Multi, Medium Density.

## Part 3: Analysis and Objectives for Future Land Use

### Analysis

The current zoning in the Silver Beach neighborhood has its strengths and weaknesses. While, for the majority, the current designations recognize and honor the neighborhood's residential character, they have also allowed for development and population increases that have had an adverse effect on the Lake Whatcom reservoir and watershed. These negative impacts must be reversed to provide a safe drinking water supply for the entire Bellingham community.

### Objectives

**Land Use & Zoning Objective (LUZO) -1:** Protect and enhance the Lake Whatcom watershed to protect our drinking water.

## Part 4: Prioritized Implementation Strategy

The Silver Beach neighborhood requires standards of building and site design that enhance their surroundings, do not infringe upon existing private and public views, vistas and view corridors, and do not negatively impact the resale value of existing homes. With that in mind the city should take the following actions:

**Land Use and Zoning Action (LUZA) – 1:** Consider a building moratorium to limit further development in the Lake Whatcom Watershed until water quality improvements in Lake Whatcom are verified.

**LUZA – 2:** Land use designations should be adjusted in areas where appropriate, including:  
Changing the designation of Areas 3, 6, 11 and 14 to Residential Single, Low Density,  
Changing the designation of Area 13 to limit further development  
Changing the designation on Section 18 to reflect current use and decrease density

**LUZA – 3:** Limit house size to 2,500 square feet or 35% of lot size.

**LUZA – 4:** Due to the watershed location, wildlife, wetlands, trails and proximity to Big Rock Park and the Silver Beach School, further development in Area 1 should be prohibited.

**LUZA – 5:** The City should continue and expand their program to purchase sensitive land areas in the Lake Whatcom watershed. In particular it should purchase the wetlands adjacent to Bloedel Donovan Park and located within Area 13.

**LUZA – 6:** The zoning code should be updated to include landscape treatment adjacent to streams. All year around streams should have a buffer zone consistent with the Shoreline Master Plan.

**LUZA – 7:** The neighborhoods of the city shall work together to improve the height restriction section code.

**LUZA – 8:** Existing property owners on the lakeshore should be encouraged to participate in the storm water retrofit program.

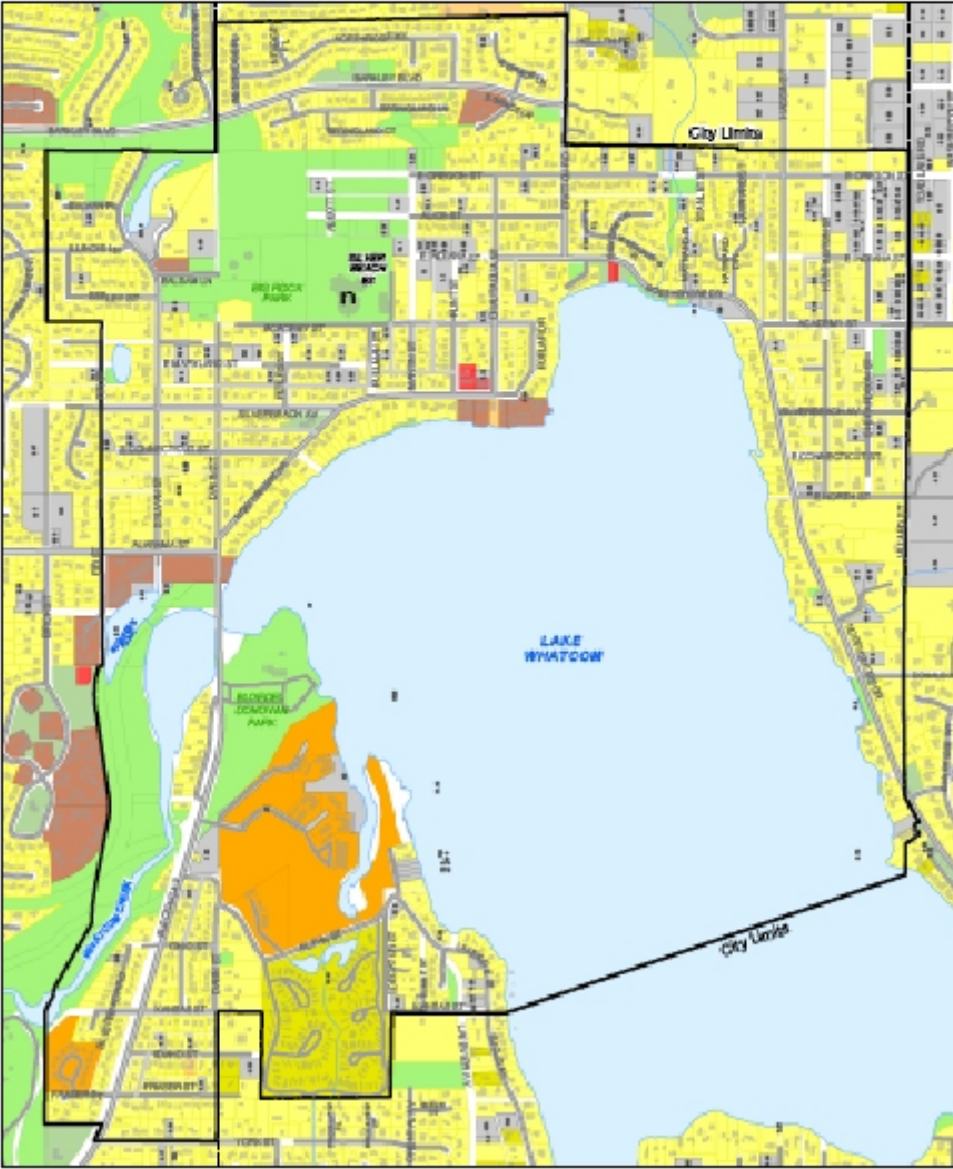
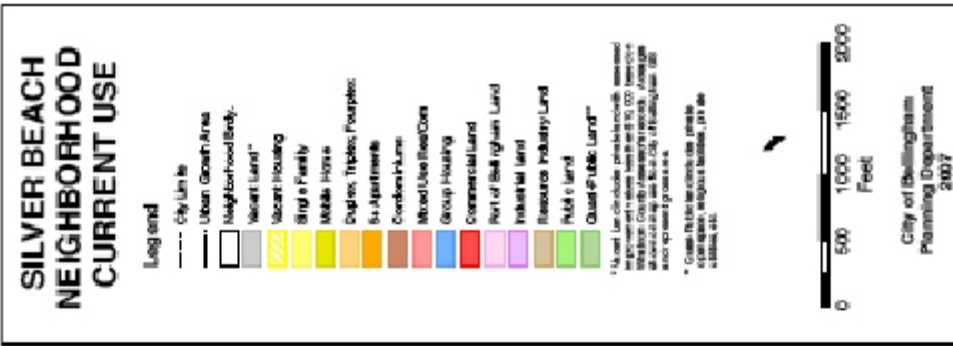
**LUZA – 9:** All requests for building permits should include a landscaping plan that includes retaining as much natural vegetation as possible. New plantings should be designed to protect existing views where possible-

**LUZA – 10:** Update the zoning code to include regulations regarding size of docks and other marine facilities. The size and number of these facilities should be reduced so as not to degrade the quality of the Lake.

**LUZA – 11:** Encourage the continued use and expansion of the commercial facilities in Area 7 to provide a neighborhood retail center and community gathering area that is pedestrian friendly and helps eliminate car travel. The neighborhood would like to see expanded services such as a café, garden area, deli, etc.

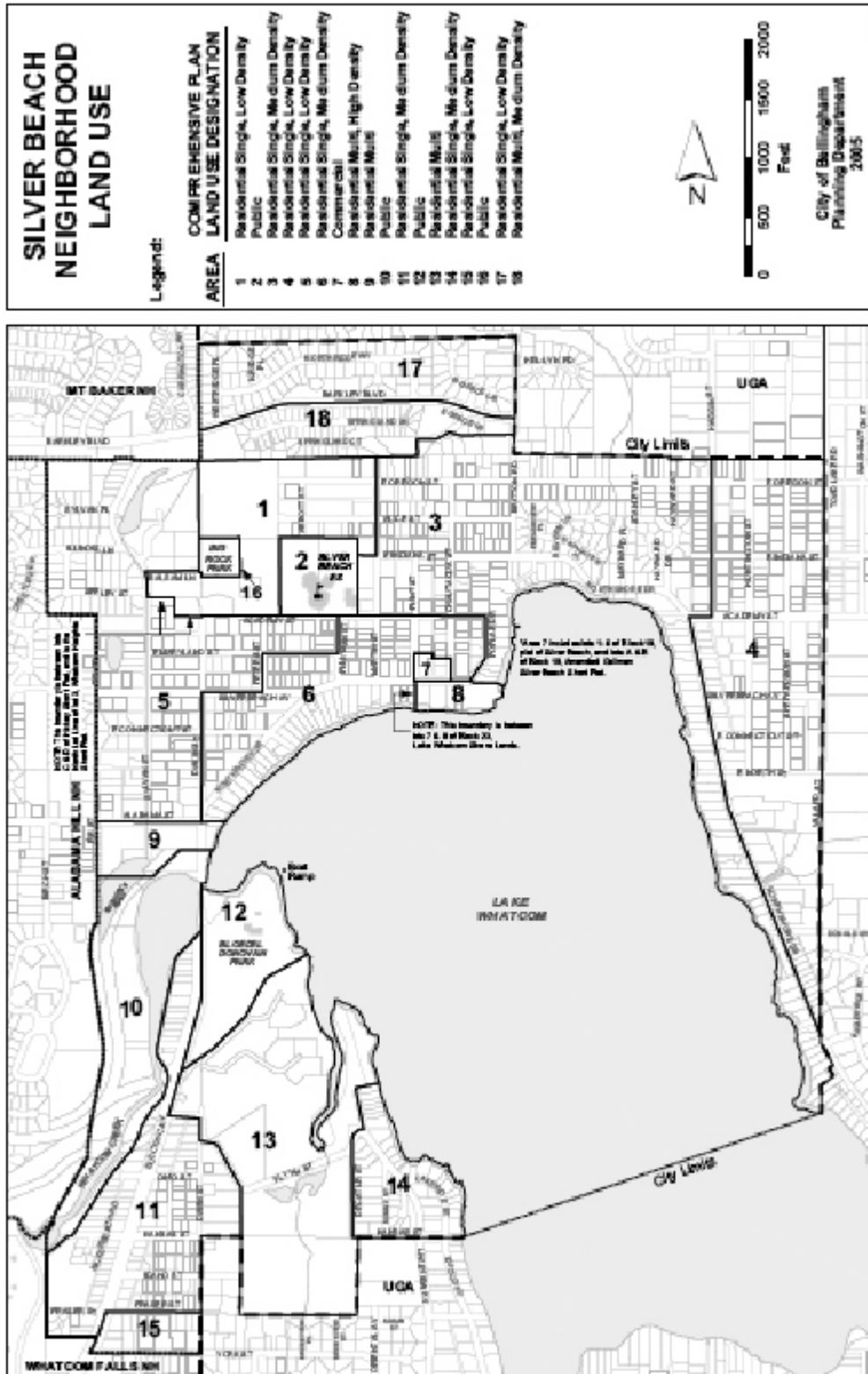
**LUZA – 12:** Create a Design Review process that will insure that the above standards are followed.

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Map 3: Silver Beach Neighborhood Current Zoning (COB DPW)



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## Chapter 3: Transportation

### **Part 1: Existing Streets, Pedestrians and Bicycle Routes**

The transportation network of the Silver Beach neighborhood consists of pathways of varying scale that have the primary purpose of moving people to and from their homes, greater Bellingham and the surrounding countryside. People move along these paths on foot, bikes, skateboards, scooters, and motorized vehicles. The purpose of this section is to summarize the existing network and direct future maintenance and development of this network. The city's current Transportation and Circulation map (Map 5) can be found at the end of this section.

#### **Streets**

The streets within the neighborhood vary in scale from secondary arterials, our largest, to alleys of one lane.

#### ***Secondary Arterial Streets***

Our '**Secondary Arterial Streets**' are: Electric, Alabama, Britton, Northshore, and Barkley.

**Electric Avenue** starts at Lakeway and ends at the intersection of Alabama Street and Northshore Drive. According to the city's 2005 traffic volumes study 10,200 vehicles travel on Electric over a 24-hour period, the heaviest in the Silver Beach neighborhood. The speed limit is 35 mph. There is also a high volume of bike and pedestrian traffic, both primarily located in the bike lanes, as sidewalks are rare.

**Alabama Street** ends where Electric Avenue becomes Northshore. Alabama Street is only in Silver Beach Neighborhood for two blocks but carries 9,900 vehicles daily according to the city's 2005 study.

**Britton Road** provides a link between Mt. Baker Highway and the neighborhood, crossing Barkley Boulevard and ending at Northshore Drive. The portion in the Silver Beach neighborhood is up to standards with bike lanes, sidewalks and a turning lane on to Barkley Avenue. Truck traffic from Britton to Northshore has been limited to local traffic.

**Northshore Drive** is the link between the residents of the neighborhood, those living in the county northeast of Lake Whatcom, and Bellingham proper. It also serves as the main link connecting all of the other neighborhood secondary arterials except Barkley. It is heavily traveled and traffic is on the increase as development occurs on Squalicum Mountain. The only commercially zoned property in the neighborhood is located on this street. Due to lack of adequate bike paths and sidewalks, vehicles, bikes, and pedestrians often compete for the same space. Truck traffic from Britton to Northshore has been limited to local traffic. It is scheduled to be resurfaced and bike lanes and sidewalks are to be added from Alabama to the Britton intersection in 2008.

**Barkley Boulevard** is a main link for our neighborhood to Barkley Village, I-5 and the northern neighborhoods of Bellingham. In addition to high vehicle use, walkers and bikers heavily use Barkley. It does have adequate bike lanes and sidewalks on one side. There is only one crosswalk between Britton Road and Barkley Village and that is located at Chandler Parkway.

## **Neighborhood Collectors**

There are five streets that are designated 'Other Streets' by the city, but by virtue of the amount of use they experience they often serve as '**Collectors**'. They are Silver Beach Avenue, Sylvan, Academy, Flynn and Lakeside. They also serve as heavily used pedestrian and bicycle routes.

**Silver Beach Avenue** is typical of the streets in its surrounding area. It is a fairly narrow paved street with open storm water ditches on each side and no sidewalk. It has become a part of WTA's bus routes 340 & 341, connecting Northshore Drive to Alabama Street. It also has become a short cut for some drivers following the same route.

**Sylvan Street** from Silver Beach Avenue to Alabama is now part of the same WTA bus route increasing the traffic on the street while increasing the accessibility to bus ridership.

**Academy Street** is a narrow street with few improvements. On the west side of the lake it provides access from Northshore Drive to the Silver Beach Elementary School. Traffic is heaviest during peak school delivery and pick up times. Academy Street on the east side of the lake from Northshore to Toad Lake Road is heavily traveled due to development on Squalicum Mountain.

**Flynn and Lakeside Streets** act as one street. They are narrow and windy and have several blind corners. Due to recent development there is increased vehicle, pedestrian and bike traffic on these streets, adding to conflicts between these modes of transportation.

## **Other Streets**

The remaining streets in our neighborhood are solely for access to our homes and are designated as '**Other Streets**' by the city. These streets fall into three groups.

First, the streets in the newer developments have paved streets, sidewalks on at least one side and under street stormwater drainage running into a treatment system. These developments are characterized by limited access and no through streets. Examples: Springland Lane, North and South Grace, and Northridge.

Second are the streets in newer developments that are paved, have at least one sidewalk, and storm drainage, but have the potential or are in the process of becoming through streets. This includes Haggin, Huntington, Shepardson and similar streets.

Third are the streets in the older areas that developed over a long period by individual owners. These areas developed in an organic, piecemeal manner. They are characterized by varying widths of paved or unpaved surfaces, open storm water drainage, and intermittent or no sidewalks. These streets mingle all modes of transportation on the same pathway.

## **Other Pathways**

There are many **other pathways** and connections within Silver Beach Neighborhood and between the neighborhood and Bellingham. Some of the paths are official, e.g. the dedicated alleys and the path from Big Rock Garden to Silver Beach Elementary School, while others are informal and created as needed by the residents to get from one place to the other

**Alleys:** Dedicated alleys are primarily located in the sections of the neighborhood that have been developed the longest. They are most commonly used for automobile access to the garages or backs of homes.

**Bikeways:** There are a variety of bikeways within the neighborhood. They range from established bike lanes on the larger streets such as Barkley, Electric and Alabama, to informal, but well used routes along the 'Other Streets' in the neighborhood. Additionally the trails through the green zones of the neighborhood serve as mountain bike pathways.

**Trails:** Silver Beach neighborhood has a fine tapestry of trails that convey people through and around the neighborhood. They also provide road access to the rest of Bellingham. The most apparent and established are the trails that lead into Scudder Pond and Whatcom Falls Park, the trail from Silver Beach Elementary School to Big Rock Garden, and the less developed Klipsun trail on the north side of the watershed management area. There are many other ad hoc trails throughout this area.

**Crosswalks:** Perhaps due to the original informal development of the Silver Beach Neighborhood, crosswalks are few and far between. The only crosswalks that exist are at the corners of Alabama St. and Northshore, Britton and Northshore, and Britton and Barkley Blvd.

**WTA:** Whatcom Transit Authority (WTA) provides bus service in the neighborhood via Routes 340 and 341, which connect the neighborhood with downtown and the rest of the WTA system. These routes run hourly on the same loop from the downtown Bellingham station through Silver Beach Neighborhood but in opposite directions. There are approximately 8 bus stops in either direction. The routes currently run along Britton Road, Northshore Dr., Silver Beach Ave. and Sylvan St. Routes 11 & 12 currently offer 30-minute and 1-hour service but are one block outside of the neighborhood on Electric Ave.

## **Part 2: Analysis and Objectives for Transportation**

### **Analysis**

While the existing transportation pathways within the neighborhood serve its residents fairly well, the large increase in development in and around Bellingham and the pressing need to improve the water quality of the Lake Whatcom Reservoir present challenges that need to be addressed.

Most of the current road and walkway designs are not environmentally friendly and actually contribute to the increasing pollutant load in Lake Whatcom. Future road development and redevelopment provide unique opportunities to significantly reduce adverse water quality impacts. Many of the smaller, less traveled older roads are in need of updates, either to handle the additional traffic or to address the problems that are caused by storm water runoff.

Trees play an important role in both the visual and environmental quality of Silver Beach. Several street trees have died, including many along Barkley Blvd, decreasing their effectiveness in treating stormwater runoff and cooling as well as the visual quality of the roadways.

The increased traffic loads and combination of users have created areas of conflict. The surfaces and designs of some of the roads, especially the most heavily used roads, e.g. Northshore and Electric, are not adequate to handle these loads and mix of users. Improvement is needed quickly to remedy these conflicts.

Access to and from the commercial parking areas to the most heavily used streets is cumbersome and often dangerous

The residential character of the neighborhood is one of its strengths and the relatively narrow streets and limited access to them has helped to maintain that character. The small number of through streets has also helped to maintain that character. Recent extensions of previous dead-end

residential streets have created through streets that have become raceways for automobiles. This has happened to Haggin and could happen to others such as Huntington and Shepardson.

The formal trails throughout the neighborhood are a valuable asset and add to its livability. The informal trails, especially through the Watershed Management Areas, in some instances, actually add to the watershed problems.

Public transportation in the neighborhood exists, but its limited nature does not encourage ridership. The current routes do not allow for direct and easy access to the Barkley Village area, the neighborhood's primary commercial district. The section of the neighborhood south of Alabama St. is not served by any route, thereby limiting those residents' access to downtown and the rest of the WTA system. Interestingly, this is the area of the neighborhood that contains greatest number of multi-family housing units.

## **Objectives**

**Transportation Objective (TO) - 1:** Maintain the residential character and scale of our streets.

**TO - 2:** Promote and improve safety between the varying means of transportation.

**TO - 3:** Rebuild the streets in our neighborhood to treat stormwater runoff before it enters the lake.

**TO - 4:** Recognize the value of street trees for aesthetic and stormwater runoff treatment purposes by developing a palette of planting materials to be used as such in the Silver Beach Neighborhood.

**TO - 5:** Accommodate the multimodal transportation needs of our multigenerational residents.

**TO - 6:** Where watershed friendly, further develop pedestrian paths that link the various areas within our neighborhood.

**TO - 7:** Develop 'safe routes' to Silver Beach Elementary School.

**TO - 8:** Improve access to public transportation for all residents of the neighborhood.

## **Part 3: Prioritized Implementation Strategy**

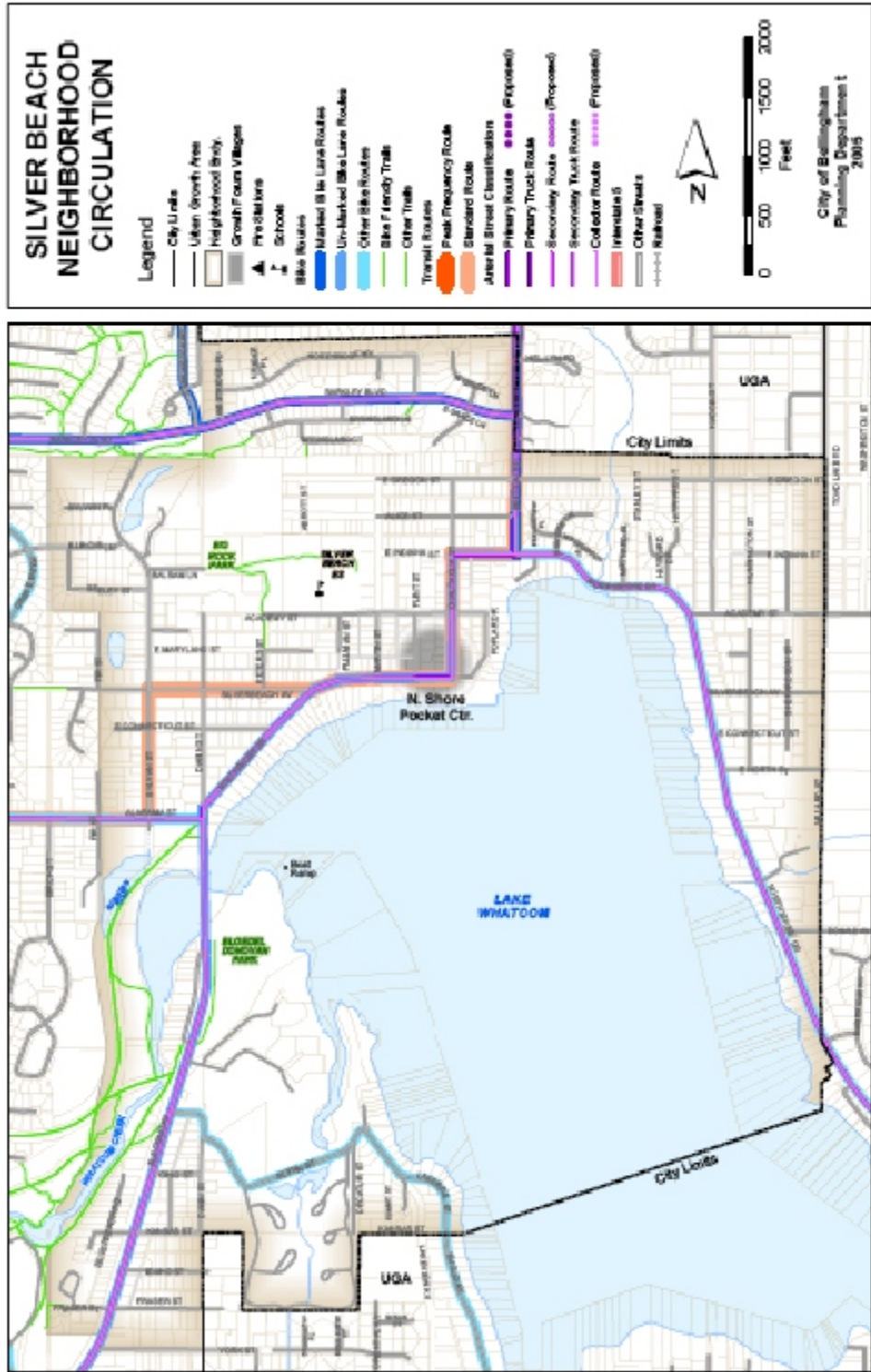
In order for the City to accomplish the objectives in this plan they must implement new tools and increase the use of successful existing strategies.

**Transportation Action (TA) -1:** The City will adopt 'Green Street' (see Appendix 3) criteria and techniques when redoing and maintaining the streets in the Silver Beach Neighborhood. This approach addresses the issues unique to our neighborhood - assuring that the scale of our streets remain residential and that runoff will be treated using basic natural methods within the street' right-of-way which will negate the need of large capital intensive, experimental filtering vaults. Green streets criteria and techniques also address safety and multimodal issues of our streets. The Silver Beach Neighborhood and the city need to work together to address the streets in areas 3,4,5 6, 11 and 15 that are prime candidates for green street projects. Silver Beach Avenue would fall into this group and would be an excellent model project.

**TA - 2:** Install crosswalks on Barkley Blvd, Britton and Northshore, and Electric Ave. to improve pedestrian safety. People, especially the young and the elderly, need to cross these busy streets to get to school, to catch a bus or for many other reasons.

- TA - 3:** Resurface and improve the design of North Shore Drive to better accommodate all modes of traffic and improve stormwater runoff treatment. This project is currently scheduled for 2008 and should not be delayed for any reason.
- TA - 4:** Resurface and improve the design of Electric Avenue. A sidewalk should be included on at least one side to provide separate and safer lanes of travel for pedestrians and bicyclists.
- TA - 5:** In concert with WTA develop a local loop shuttle bus service that facilitates easy access to Barkley Village and the Sunset Mall for residents of Silver Beach Neighborhood. Additionally, improve access for those residents who live south of Alabama by relocating at least one route so it travels on Electric.
- TA - 6:** The project planned to connect Big Rock Garden, the Silver Beach Elementary School and the Klipsun trail is an important link that warrants immediate attention. This would provide a pathway system around the watershed management area connecting the residential areas on either side and allow the center of the area to be returned to its natural state. This also provides safe routes to Silver Beach Elementary School.
- TA - 7:** Northshore from Britton southeast to the city's border will be upgraded up to the standards of the other secondary arterials in Silver Beach neighborhood. This is both a watershed quality and safety issue.
- TA - 8:** Academy on both sides of the lake will be upgraded for safety reasons. The road is heavily traveled and in both cases the intersections of Northshore and Academy have poor sight lines.
- TA - 9:** Any city plans for residential streets that are currently being considered for connection with other segments as was done with Haggin will be put on hold and readdressed by the neighborhood. A traffic circle with a rain garden should be considered to slow traffic on Haggin and break up the long straightaway.
- TA - 10:** Existing alleys need to be evaluated and improved when possible. With little work some may provide opportunities as alternative, and safer, bicycle or pedestrian pathways through the neighborhood. They should also be evaluated with regard to their contribution to stormwater runoff and improved if necessary.

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## Chapter 4: Housing

Silver Beach is primarily a single-family residential neighborhood. There are few employers in the neighborhood and only a small amount of land is used for commercial or education purposes.

### **Part 1 Existing Stock**

According to the 2003 City of Bellingham census there were 948 single-family homes and 522 multifamily units, for a total of 1,470 housing units located in the neighborhood, approximately 5% of the housing units in Bellingham. There has been significant growth since this time with the construction of several single-family homes being built since 2003. While 50% of the housing units in Bellingham are multifamily, only 35% of those in Silver Beach are.

The city has stated in its 2006 Comprehensive Plan that the neighborhood should have an additional 67 housing units and 172 new residents to meet its share of the city's in-fill requirements. That number is less than 2% of the total requirements for all city neighborhoods, reflecting the limits on new construction within the Lake Whatcom Watershed.

The number of single-family homes also represents approximately 15% of the 6,500 single-family homes located in the Lake Whatcom Watershed. (COB Lake Report 2007).

The single-family home average assessment was \$116,062 in 2003, which ranked 6th out of Bellingham's 22 neighborhoods. (2003 census). The average sale price of a single family home in the Bellingham area since that time has increased 60%. (Whatcom County Real Estate Research Reports, 2004-2006) It is likely that the home values in Silver Beach have experienced a similar increase. The styles of homes vary widely from new, expensive, multistory lakefront homes to small, one-story older homes. The lot sizes vary from newer lots as small as 1/10 of an acre to several acre lots where typically older homes are located.

The Bellingham Housing Authority has approximately 1800 Section 8 housing clients; few are located in the Silver Beach Neighborhood. (Phone interview, Bellingham Housing Authority, 9/4/2007) While there are approximately 530 public housing units in the city, there are approximately 30 public housing units within the neighborhood. (ibid)

### **Part 2 Analysis and Objectives for Housing**

#### **Analysis**

Silver Beach's residential nature is fairly homogeneous, the vast majority of homes being single-family though there are a wide variety of home styles and values. Due to the limited number of buildable lots, especially along the lake, smaller homes are sometimes demolished and replaced with newer, often large homes. It is likely that this will continue to happen.

The neighborhood has approximately 5% of the city's public housing units, which reflects the percentage of the city's population that lives in Silver Beach.

#### **Objectives**

**Housing Objective (HO)– 1:** Maintain the residential character of the neighborhood.

**HO – 2:** Protect and improve property values within the neighborhood.

**HO – 3:** Ensure the neighborhood's share of affordable housing opportunities through support of both public and private programs.

## **Part 3 Prioritized Implementation Strategy**

**Housing Action (HA) 1:**

**HA2:**

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## Chapter 5: Capital Facilities

### Part 1 Existing Facilities

There are three public capital facilities in the Silver Beach Neighborhood. They include the Silver Beach Elementary School, the Bloedel Donovan Park, and the Dakin Water Storage Facility.

The **Silver Beach Elementary School** is located northeast of the lake on Academy Drive. It is situated on approximately 10 acres of and housed in two buildings totaling approximately 48,000 square feet. It is administered by the Bellingham School District and educates approximately 400 students. Large areas of pavement surround the school and the design of the larger building is reflective of the 1970's when it was built. It is available for rental, but is rarely rented other than the daily use by the YMCA for its before and after-school programs. The facility and grounds have large areas of impervious surfaces.

The **Bloedel Donovan Park Facilities** are located within the Bloedel Donovan Park and are managed by the City's Parks and Recreation Department. These facilities are discussed further in 'Chapter 9: Parks and Open Space'

The **Dakin Water Storage Facility** is located in the northwest area of the neighborhood at the end of Balsam Lane, adjacent to Big Rock Park. It consists of 2 large storage tanks and provides potable water to the households in the northeast area of Bellingham. It is surrounded by Watershed Management Property.

### Part 2: Analysis and objectives for Public Facilities

All three facilities play a vital role in our neighborhood. The school not only provides educational opportunities for the community, but its facilities provide a gathering space for neighborhood groups and before and after-school programs. It is centrally located and as such keeps the distance the children need to travel to school to a minimum. Its presence helps to sustain the multigenerational character of our neighborhood.

While Bloedel Donovan Park is addressed primarily in the park section it should be mentioned here that its buildings and outdoor facilities not only provide meeting and recreational opportunities for the neighborhood, but for the city as a whole. Their importance in the community's fabric should not be underestimated.

The water storage facility is part of the City's Water Department and plays a vital role in providing safe drinking water for the community. Protection of and ongoing maintenance of the facilities and the site are worthy of attention.

### Objectives

**Capital Facilities Objective (CFO) - 1:** Ensure that the elementary school remains in the neighborhood.

**CFO – 2:** As capital facilities in Silver Beach are updated or renovated their use should stay compatible with our residential character and their design should support improvement of the watershed and reservoir.

## **Part 3: Prioritized Implementation Strategy**

### **Actions**

Capital Facilities Action (CFA) – 1: The City, Bellingham school district and Silver Beach neighborhood should develop a communication plan and process that allows early neighborhood involvement when updating or changing public facilities in the neighborhood

**CFA – 2:** The city and Silver Beach neighborhood will jointly explore the feasibility, vision and funding of Bloedel Donovan park as a centerpiece of Lake Whatcom and a demonstration project for watershed management best practices.

**CFA – 3:** The grounds of the Elementary School have large areas of impervious surfaces, which in any future remodels should be designed to treat runoff on-site before it reaches the lake.

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## Chapter 6: Utilities and Services

### Part 1 Existing Facilities and Services

Silver Beach Neighborhood is served by private utility companies that provide electricity (residential and commercial lines), natural gas, cable TV, satellite TV, telephone (via land lines), cellular telephone, and waste pick up (solid, recycle, yard and edible). These private companies pay a franchise fee to the city and the city also levies taxes on these services.

The city also provides water, sewer, stormwater control, street sweeping, police, fire, medical response, emergency services, and litter control. The closest city fire and medic station is located on Yew Street within minutes of most Silver Beach residences. A neighborhood police sergeant is assigned to the Silver Beach neighborhood and the neighborhood is routinely patrolled. Response times for police assistance have increased in the past several years, particularly during night hours. However, crimes statistics show that Silver Beach has a relatively low occurrence of crime with property crimes being the largest component. The city has installed fiber optic lines along Barkley for its own use.

Lake Whatcom is the source water for our drinking water and the preservation and protection of this resource is covered in Section 9 of this neighborhood plan.

### Part 2 Analysis and Objectives for Utilities and Services

#### Analysis

In general the private and public sectors do a good job of providing the neighborhood with adequate utilities and services.

The fees and taxes levied on the private providers are currently retained by the city for general fund uses. Allocating a portion of those funds to the neighborhoods would provide a source of money that the neighborhood could use to mitigate the impact of these utilities.

Timely and comprehensive advance notification of proposed projects and maintenance work within the neighborhood has not been provided in the recent past, resulting in strained relationships between the City, private providers and the neighbors. Advance and clear communications are crucial to maintaining a cooperative atmosphere between the neighborhood and those that provide utilities to its residents.

In identifying remediation needs, the city, Silver Beach neighborhood and the utilities should began timely dialogue on how best to fit these utilities into the neighborhood so that services are provided with a minimal impact to the neighborhood.

#### Objectives

**Utilities and Services Objective (USO)-1:** A portion of franchise fees and taxes levied on public utilities should be returned to the neighborhood to mitigate the impact of these utilities on the neighborhood.

**USO-2:** Communications between the city utility and service departments, the private utility providers, and the residents of the neighborhood should be improved to maintain, if not increase the safety of the neighborhood.

### **Part 3 Prioritized Implementation Strategy**

**Utilities and Services Action (USA) -1:** The city will create a long term utility remediation fund to cover costs associated with burying cables, power and telephone lines, restoring trees to streets and removing unneeded structures.

**USA - 2:** An annual neighborhood review meeting that highlights achievements, lists current and future priorities, evaluates problems and provides recommendations will be presented by all city and private utility providers to the Silver Beach Neighborhood.

**USA - 3:** The Silver Beach Neighborhood Association will work to expand the Block Watch Program throughout the Neighborhood.

**USA - 4:** The police will patrol Bloedel Donovan Park and surrounding play areas nightly (particularly in the summer months) to insure noise ordinance compliance.

**USA - 5:** The city will provide emergency response training to the neighborhood on an annual basis.

**USA - 6:** A transparent, concise communication process that all utility providers would use will be developed by the city in conjunction with MNAC.

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**Chapter 7: Neighborhood Design**

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## Chapter 8: Parks, Recreation & Open Space

Parks and Open Space play a vital role in the Silver Beach neighborhood. This plan encourages multiple uses of our parks and trail system, providing opportunities for people to interact with and enjoy our unique natural assets in a manner that is conducive to responsible watershed management and considerate of other users.

### **Part 1: Existing Parks & Natural Areas**

#### **Parks**

##### ***Bloedel Donovan***

2214 Electric Street  
Bellingham, WA 98226

Current Hours: Daily dawn to dusk

Ownership/Maintenance: City of Bellingham Parks & Recreation Dept.

Current Pet Ordinance: The park is designated an off leash park from October 15<sup>th</sup> to May 15<sup>th</sup>. The beach area is open for a water exercise area during this time.

Current Uses: Bloedel Donovan Park includes a boat launch to Lake Whatcom for power boats, a hand-carry launch for kayaks and canoes, access to fishing, a public swimming area, a children's play area, a volleyball court, a basketball court, an open ball field, an off leash area for dogs (limited hours), picnic tables, a train engine on display and buildings available for public use and rental including a 4,368 sq ft gymnasium with seating for 200 people and a kitchen, and a 700 sq ft pavilion with seating for 50 and a kitchen.

On site storm water treatment: 2 rain gardens and 2 media filter cartridge systems treat the 2.7 acre parking lot

Bellingham Parks Department Future Plans: A demonstration rain garden with native species will be completed this year. The city also plans to provide additional fishing, swimming and kayak access at Bloedel Donovan over the next few years. A crew facility will be developed to create a kayak and canoe center at the former powerboat launch ramp when power boating is no longer viable on Lake Whatcom. (Plan approved by mayor and city council 2002)

##### ***Whatcom Falls***

1401 Electric Ave.  
Bellingham, WA 98226

Current Hours: Daily dawn to dusk

Ownership/Maintenance: City of Bellingham Parks & Recreation Dept.

Current Pet Ordinance: Pets must be on leash in the park. Trails in Whatcom Falls connect to an off-leash area north of the cemetery.

Whatcom Falls is comprised of 241 acres surrounding Whatcom Creek. The park trail system connects to the interurban trail system in several places throughout the park. Whatcom Falls is also home to a 1939 bridge, built with Chuckanut sandstone as part of a Roosevelt Works Progress Administration project.

Uses: The park includes a stocked fishing pond for children 14 and under and is home to multiple athletic fields and picnic areas, a 1,344 sq ft shelter with seating for up to 72, an 800 sq ft shelter seating 24, two playgrounds for children, tennis courts and a Washington State Department of Fish and Wildlife trout hatchery. A popular activity in warmer months is jumping off a 50 foot cliff into a 'punchbowl' pool in the creek below. Swimming in the park is unsupervised.

### ***Big Rock Park***

2900 Sylvan Street  
Bellingham, WA 98226

Current Hours: Daily dawn to dusk

Ownership/Maintenance: City of Bellingham Parks & Recreation Dept.

Current Pet Ordinance: No pets are allowed in this park.

Uses: This 2.5-acre park is part of 9.2 acres of woodland that overlooks Lake Whatcom. The park houses 35 permanent sculptures created by local and international artists. Big Rock Park holds an annual International Sculpture Exhibit, which runs May through September featuring 10-20 selected pieces from a variety of accomplished sculptors. In addition to sculptures, the park contains native and exotic plants, trees and shrubs.

Bellingham Parks Department Future Plans: Picnic tables will be installed in the sculpture garden.

### ***Scudder Pond***

Electric & Alabama  
Bellingham, WA 98226

Current Hours: Daily dawn to dusk

Ownership/Maintenance: North Cascade Audubon Society/volunteer maintenance

Current Pet Ordinance: Pets must be on leash. No pets in pond.

This 2.8 acre park is unique in that it was gifted to the North Cascade Audubon Society in 1987 and has been managed as a wildlife preserve by the Society since. Interpretive signs were added in 2001. The park is home to Virginia rails, as well as red-winged blackbirds, mallards, bufflehead, wood ducks and great blue heron. The Scudder Pond trail connects to Whatcom Falls trails and interurban trail system. Water entering the pond is a combination of surface runoff from the Alabama Hill Neighborhood and the city storm drainage system. It is important for aquifer recharge and flood water retention. Cattails and other aquatic plants improve water quality by providing a natural sediment filtration system.

## **Bellingham Open Space**

### ***Lake Whatcom Beach Site***

Northshore Drive near Britton  
Ownership/Maintenance: Department of Natural Resources

9/12/07

Undeveloped freshwater swimming and fishing access to Lake Whatcom is located off Northshore Drive near Britton Road.

***Connecticut Street-end***

This location provides public access from the street end to Lake Whatcom.  
Ownership/Maintenance: City of Bellingham

***Silver Shores***

Private access is provided to Lake Whatcom for homeowners of Silver Shores development.

***Donald Avenue Street-end***

This location provides public access from the street end to Lake Whatcom.  
Ownership/Maintenance: City of Bellingham

***George Street-end***

This location provides public access from the street end to Lake Whatcom.  
Ownership/Maintenance: City of Bellingham

**Watershed Protection Management Areas**

Property that has been acquired as part of the Lake Whatcom Watershed Protection process is located throughout the neighborhood. The largest parcel is located north of Silver Beach Elementary School. The property acquisition program began in the early 2000's and will continue to play a major role in the city's role in protecting the watershed.

Ownership/Management: City of Bellingham, Department of Public Works.

**Part 2 Analysis & Objectives for Parks, Recreation and Open Space**

Bloedel Donovan is a focal point for our neighborhood and has the greatest opportunity for enhancement of all our neighborhood parks. The buildings have received minimal investment recently and would benefit from improvements. Management of the park and future improvements should be consistent with the residential nature of our neighborhood and responsible watershed practices. Improved management of the boat launch could serve to better protect the Lake Whatcom Reservoir. Bloedel Donovan is a high use facility with significant impact on the lake. Silver Beach and Bellingham residents enjoy this park and value the trail connections available here.

Silver Beach and Bellingham residents also enjoy Scudder Pond as a park and use it to access Whatcom Falls Park on a regular basis. It provides a unique educational opportunity regarding stormwater runoff and marsh habitat for the neighborhood as well as other visitors.

The Connecticut Street-end site is heavily polluted and is another location that would benefit from improvements. None of the street-end sites have safe pedestrian crossings. Neighborhood safety would be greatly increased with the addition small-scale residential pedestrian and bicycle access points.

The Watershed Management green area is a great natural asset within our community. This type of land is vital to maintaining a healthy watershed. There is growing concern that inappropriate uses of this area are contributing to sediment runoff. Any activity in this area should be conducive to

responsible watershed management. There is current discussion of building a bike trail.

By investing in the preservation and improvement of these natural assets, we hope to encourage multiple uses of our parks and trail system, providing opportunities for people to interact with and enjoy our unique environment in a manner that is conducive to responsible watershed management and considerate of other users.

## Objectives

**Parks, Recreations & Open Spaces Objective (PROSO) – 1:** Ensure that future generations will be able to continue to enjoy these valuable public spaces.

**PROSO – 2:** Ensure that improvements are consistent with the residential nature of our neighborhood

**PROSO – 3:** Ensure that these resources become models for responsible stewardship.

**PROSO – 4:** Provide for safer access to and from all public recreation sites in the neighborhood.

**PROSO – 5:** Continue to improve programs to encourage consideration among multiple users these unique natural assets

## Part 3 Prioritized Implementation Strategy

**Parks Recreation & Open Space Action (PROSA) - 1:** Existing buildings in Bloedel Donovan Park shall be scheduled for major remodel work or rework in the near future. Future improvements shall make the buildings LEED compliant serving as a model of appropriate watershed construction within the community. The site shall be considered for a watershed education center.

**PROSA - 2:** Develop signage throughout parks and trails to indicate this area is a sensitive watershed management area.

**PROSA - 3:** Develop educational outreach pamphlets to be distributed throughout the neighborhood that promote responsible use of this natural asset.

**PROSA - 4:** A rehabilitation plan shall be developed for the Connecticut Street-end site. Signage shall be placed on site to warn swimmers that this site is polluted.

**PROSA - 5:** All Open Space sites shall have safe access for pedestrians and bicycles. Small-scale residential pedestrian and bicycle access should be developed for these sites.

**PROSA - 6:** The boat launch shall be monitored during seasonal peak use to keep park activities consistent with the residential character of our neighborhood and responsible watershed management practices (no refilling gas or oil at the boat launch, etc.). Enforce existing boat launch hours of dusk to dawn.

**PROSA - 7:** The city has over 70 pieces of public art on display, but none at Bloedel Donovan. There is an opportunity here to use public art to improve the aesthetics of the site. In addition, a sculpture or mural reminding our community of our relationship with our watershed may serve to motivate better stewardship of this resource.

**PROSA - 8:** The City will recognize that the primary users in the summer season are human, particularly in the swimming area. The off leash dates allowed in the pet ordinance shall be consistent with this.

**PROSA - 9:** The city shall install signs supporting the **Promote Basic Park & Trail Etiquette** program in support of the educational outreach process.

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## **Chapter 9: Lake Whatcom**

Silver Beach Neighborhood's location within the Lake Whatcom Reservoir Watershed and adjacent to the Lake itself are unique within Bellingham. This location demands that this plan address issues pertinent to the care of the reservoir and the protection of the drinking water source for the citizens of Bellingham and surrounding areas. The following topics are being addressed for that purpose:

### **Part 1: Public Education**

Education of the public as to the role they play in preserving and protecting the Lake Whatcom Watershed, and ultimately our drinking water's safety is vital to successfully managing this valuable resource. The city and the neighborhood, along with other partners, must continue to work hand in hand to upgrade and administer an on-going public education campaign for this purpose.

#### **Objective**

**Lake Whatcom Public Education Objective (LWPEO) - 1:** All residents of the Silver Beach Neighborhood will become knowledgeable stewards of Lake Whatcom Reservoir and its surrounding watershed through continuing educational programs that provide the tools necessary to achieve this stewardship.

#### **Actions**

**Lake Whatcom Public Education Action (LWPEA) -1:** An Action Plan for Lake Whatcom Reservoir shall be developed within the next year by the Silver Beach Neighborhood Association (SBNA) in conjunction with the City of Bellingham and Whatcom County. This plan will address neighborhood activities that contribute to the deterioration of Lake Whatcom Reservoir and provide a detailed prioritized list of actions to remedy the impact of these activities through proactive educational programs. The following list will be used to guide this action:

#### **Proposed Detail Action Plan Education**

1. Craft and implement a personal outreach program utilizing city staff, SBNA, Master Gardeners, industry experts and others. This group will provide stewardship education for watershed residents that advocates appropriate stormwater management, gardening, home and auto maintenance practices, particularly during periods of peak outdoor activity.
2. Enhance existing and implement new education programs that address daily homeowner practices such as fertilizing, watering, landscape layout, construction and stormwater control.
3. Require education, training and certification of commercial landscapers who do work in the watershed.
4. Require education, training and certification for construction personnel doing concrete work, asphalt work, land excavation, earth moving, land clearing or disturbance, repair to existing underground utilities or exterior painting.
5. Provide watershed protection training to all city and county employees, including police, fire, public works, planning and also elected officials to insure that they understand their responsibility and accountability to report and respond to noncompliance with watershed regulations
6. Establish a single 24/7-point of contact for citizens to report watershed concerns and insure a timely response.

7. Provisions shall be made in the city and county budgets for funding ongoing and special watershed education programs.
8. The city will conduct an annual review of the effectiveness of current education programs with SBNA and residents.
9. Establish a coordinating group between the city and county to address watershed education concerns in areas adjacent to the city.
10. Tailor education programs to address specific homeowner practices tied to stormwater pollutants found on or near their property.
11. Develop educational programs at Silver Beach School to protect the adjacent watershed protection property.
12. The City and SBNA in partnership with Silver Beach School will plan and implement landscaping changes to enable the school grounds to be a model for best practices for watershed protection.
13. Provide moveable educational signage at key locations during different times of the year, on the water, in participating yards, along rights of ways, during construction, at community meetings and schools.
14. Continue mailings, news releases, presentations at public meetings, BTV broadcasts and inserts in local print media and seek innovative messages for Lake Whatcom Reservoir Stewardship.
15. Establish 5<sup>th</sup> and 6<sup>th</sup> grade educational programs addressing Lake Whatcom Reservoir protection.
16. Redevelop and implement a Watershed Stewardship Program.
17. People have to know and believe that there is a problem, and they have to know what they CAN do about it. Only then, will they choose to act. Much of that education can be done by individuals and by the SBNA. The process of 'educated neighbors-talking-to-neighbors' is very effective.

**LWPE – A2:** Every household in the Silver Beach neighborhood will be contacted within the next year and provided the Silver Beach Neighborhood Action Plan for Lake Whatcom, other educational materials and key contact information. This information will be provided to new residents by the city shortly after they establish residency.

## **II. Stormwater Management**

Stormwater runoff is a major contributor to the pollution of the Lake Whatcom Reservoir and ultimately our drinking water. There are many actions Silver Beach Neighborhood residents can take to ensure that they are not contributing to this pollution. Local and state governing bodies are also responsible to implement actions that will decrease the negative impacts that their current practices have on the watershed.

The goal of these efforts is that any water flowing from or across any and all upland properties within the Lake Whatcom Reservoir watershed, including gullies and creeks, should be as free of pollutants as is feasible, such that the water entering the Reservoir remains clean. This responsibility rests with citizens as well as the governments. For background information on Stormwater Management see Appendix 3.

### **Objectives**

**Lake Whatcom Stormwater Management Objective (LWSMO) – 1: Clean water.** Ensure that materials and chemicals that are harmful to the reservoir don't get into the runoff stream or Reservoir itself.

- LWSMO – 2: Source Control at home.** Within four years, one-half of the properties in the Silver Beach Neighborhood will achieve on-site, treatment.
- LWSMO – 3: Source Control on the Road.** Within two years, the City will maximize the effectiveness of the runoff treatment facilities in the Silver Beach Neighborhood.
- LWSMO – 4: Report results.** The public will be told, annually, how the public stormwater treatment facilities are working, and the City and the County will keep them at best performance levels.
- LWSMO – 5: Financial Resources.** These programs receive adequate funding.

## **Actions**

- Lake Whatcom Stormwater Management Action (LWSMA) – 1:** Individual property owners and occupants should install on-site treatment or infiltration/recharge facilities on their own properties, and minimize the amount of water that flows off-site.
- LWSMA – 2:** Roadway signs and pavement markings highlight the path and effect of chemicals from vehicles. The City's infiltration/recharge and treatment facilities on public properties will substantially reduce the amount of pollutants that are carried off the road surfaces. The City will conduct a national search for known best practices, and collaborates with researchers on this topic for even better practices.
- LWSMA – 3:** Stormwater treatment facilities that are installed and operated by the jurisdictions shall have a maintenance program that assures that the facility meets the original specifications. They shall have regular and effective water quality testing of inflow and outflow to determine the success or failure of each facility. The City and the SBNA shall publish and distribute these reports.
- LWSMA – 4:** Everyone who lives or travels in the reservoir should refrain from allowing such materials to be placed on the land in such a way that those chemicals can enter the runoff stream or the Reservoir.
- LWSMA – 5:** The City implements a program of taxes and/or fees for those who benefit from living in the Lake Whatcom watershed, and fines on those who cause harm.

## **III. Monitoring**

Lake Whatcom Reservoir and tributaries must be monitored to ensure that natural processes and contamination levels are identified and recorded. This monitoring will guide aggressive actions leading to reservoir recovery. (see Appendix 4 for background on the monitoring of Lake Whatcom)

### **Objectives**

- Lake Whatcom Monitoring Objective (LWMO) –1:** Establish a baseline for all pollutants of concern based on historical data and, where insufficient data exists, instigate reservoir and tributary monitoring. Such a program requires the city to develop, fund and implement a program of periodic monitoring for all pollutants of concern in the watershed.
- LWMO –2:** Determine the interbasin flow and circulation dynamics in the reservoir and the flow of water into the reservoir from precipitation, tributaries and groundwater.

### **Actions**

**Lake Whatcom Monitoring Action (MA) # 1** - Continue the current annual reservoir water column and enhanced tributary monitoring program.

**LWMA 2** - Characterize organic contamination in lake water and sediment including traditional organic compounds on the priority pollutant list such as pesticides, herbicides, phthalates, phenols and polycyclic aromatic hydrocarbons, and add other emerging compounds of concern such as pharmaceuticals, flame retardants and endocrine disrupters. Continue a program of periodic monitoring to track any changes. Each organic pollutant of interest should be monitored at least once during each 5-year period, more frequently for pollutants with concentrations trending upwards.

**LWMA 3** - Regularly monitor benzene contamination of the reservoir and the city's treated drinking water. Determine the pathways by which benzene enters the reservoir.

**LWMA 4** - Determine the impacts to aquatic organisms, water quality and potentially human health from the leaching of contaminants from oxygen-depleted bottom sediments during reservoir stratification.

**LWMA 5** - Determine the impact of increasing algae concentrations on the reservoir and drinking water.

**LWMA 6** - Continue monitoring mercury concentrations in water, sediment and fish tissue to insure we are not surprised by air transport deposition from global industrialization. Mercury monitoring should be conducted at least once every five years, more often if mercury contamination appears to be increasing.

**LWMA 7** - Groundwater at multiple depths in the immediate vicinity of old dumps and other potential sources of groundwater contamination that might find its way to the reservoir shall be sampled and analyzed for a broad range of pollutants including pharmaceuticals, flame retardants and endocrine disrupting compounds. Sites identified as contributing to groundwater contamination shall be monitored at least every 5 years.

**LWMA 8** - Conduct hydrologic measurements and modeling in the watershed to identify and record the flow of water into the reservoir from precipitation, tributaries and groundwater.

**LWMA 9** - Conduct scientific studies that characterize flow in the reservoir at different depths during different times of the year.

## **IV. Land Acquisition**

Land acquisition and proper management of that land, will help to prevent pollution, particularly phosphorus, from entering Lake Whatcom Reservoir by controlling land use and maintaining and increasing natural forest cover.

**Lake Whatcom Land Acquisition Objective (LAO) – 1:** Eliminate the potential for additional negative impacts on water quality by purchasing or otherwise controlling the land use of all remaining undeveloped lands within the watershed.

**LWLAO – 2:** Maintain at least 75% of the watershed in natural forest cover to provide natural stormwater control facilities for the long-term protection of the Lake Whatcom Reservoir. Natural forest cover would include but not be limited to preserving soils, associated living organisms and soil-building processes; maintaining or restoring diversity of forest structure and composition; encouraging the growth of native species; and controlling invasive non-native plants.

**LWLAO – 3:** Purchase and return developed lands, with willing sellers, to a more natural state to begin the recovery of the watershed with the goal of removing our drinking water

reservoir from the Department of Ecology's Water Quality Assessment (303d) list for impaired water bodies and eventually being pollution free.

- LWLAO – 4:** Manage and monitor all acquired and protected land for water quality protection and wildlife habitat (mammals, fish, reptiles, and invertebrates) through the use of adaptive management strategies to allow ongoing evaluation of results of actions and conception of new strategies.
- LWLAO – 5:** An enforcement program that includes a "Watershed Ranger" and City Code Regulations to support watershed protection will be developed and implemented.
- LWLAO – 6:** Permanently deed restrict all acquired property using third party conservation easements (e.g. Whatcom Land Trust) to oversee management for water quality protections.

## **Actions**

- Lake Whatcom Land Acquisition Action (LWLAA) – 1:** In partnership with Whatcom County, Bellingham will seek state and federal and private funding to assist in acquiring all of the remaining undeveloped land in the watershed through outright purchase, conservation easements, or purchase of Development Rights.
- LWLAA – 2:** Bellingham will develop and implement a public campaign to encourage donation of land in the watershed for watershed protection reserves.
- LWLAA – 3:** A neutral third party such as the Whatcom Land Trust will hold conservation easements on all city owned watershed property to oversee and enforce the goal of management for water quality protection.
- LWLAA – 4:** All property acquired in the watershed will have all development rights permanently removed through the use of deed restrictions and/or other legal means.
- LWLAA – 5:** Bellingham will develop and implement a public recognition program for landowners donating all or part of their watershed properties or entering into a conservation easement that limits future use of the land to watershed protection. The program would only pertain to properties for which all development rights were removed.
- LWLAA – 6:** Bellingham will develop and implement an effective Transfer of Development Rights program to remove development rights from the watershed.
- LWLAA – 7:** Bellingham will develop a forest management plan aimed at maintaining or restoring diverse forest structure and composition with native plants within one year of acquiring control of each specific property.
- LWLAA – 8:** Bellingham will begin forest restoration activities within three years of acquiring control of property that includes elimination of invasive non-native plants.
- LWLAA – 9:** Bellingham will remove unnecessary roads, culverts, and built structures from all acquired property within three years of acquiring control of the property.
- LWLAA – 10:** Bellingham will target purchase or conservation easements of developed property with willing sellers to provide natural stormwater treatment in key locations to prevent pollution sources from reaching the lake.
- LWLAA – 11:** Each acquired property will have a baseline-monitoring inventory that states existing characteristics, habitats and detailed restoration goals and actions.
- LWLAA – 12:** Periodic monitoring will be compared to the baseline inventory, goals and action plans to ensure that management strategies are producing the desired results.
- LWLAA – 13:** All reports of misuse of protected land are addressed either through adaptive management or enforcement.

- LWLAA – 14:** Signs detailing allowable activities will be posted on all watershed protection properties.
- LWLAA – 15:** The Watershed Ranger will have a visible presence in the watershed by providing ongoing education about and enforcement of watershed protection regulations and activities.
- LWLAA – 16:** Bellingham will strictly enforce its policy of not allowing hookups to City water outside of UGA's in the watershed.
- LWLAA – 17:** Bellingham will renegotiate its contracts with Water Districts in the watershed to eliminate future extension of City water to building lots created after 2007 and to reduce current contractual agreements for hookups so that fewer new homes are built in the watershed.

## **V. Water Habitat**

Improving the quality of the Lake Whatcom Reservoir includes restoring the habitat for native aquatic and riparian species. More specifically this would include improving the habitat of the native stocks of kokanee and cutthroat trout in Lake Whatcom Reservoir and associated streams.

### **Objectives**

- Lake Whatcom Water Habitat Objective (LWWHO) –1:** Restore Silver Beach Creek to the same water quality as Olsen Creek by improving riparian area buffers and preventing pollution from stormwater runoff, septic system runoff, or other non-point sources from entering the creek.
- LWWHO – 2:** Eliminate non-native fish species from Lake Whatcom Reservoir.
- LWWHO – 3:** Improve water quality in Lake Whatcom to support health fish stocks, monitor fish for mercury and other contaminants, and use adaptive management strategies to ensure the return of a healthy ecosystem.

### **Actions:**

- Lake Whatcom Water Habitat Action (LWWHA) - 1:** Implement the strategy for conservation and recovery of native fish populations currently being developed by Washington Department of Fish and Wildlife.
- LWWHA - 2:** Monitor water quality in Silver Beach Creek to guide restoration of water quality.
- LWWHA - 3:** Restore legally mandated riparian areas buffers along side of Silver Beach Creek with native vegetation both inside of the city limits and in the county. If the buffers prove to be insufficient, expand the buffers as necessary.
- LWWHA - 4:** Develop and implement a plan to work with property owners adjacent to the Lake Whatcom Reservoir or tributaries to modify activities or land uses to enhance stream and hence Lake Whatcom Reservoir water quality protections.
- LWWHA - 5:** In conjunction with the Washington Department of Fish and Wildlife, develop and implement a plan to reduce or eliminate non-native fish species from Lake Whatcom Reservoir.
- LWWHA - 6:** Monitor fish species for contamination. Post advisories at popular fishing locations and boat launch areas. Report advisories in local media and place notices in the City Sewer and Water billings.

## VI. RECREATION

It is vital to the health of the Lake Whatcom watershed and the quality of our drinking water that recreational activities on Lake Whatcom Reservoir support the natural processes of the reservoir and its watershed.

### Objectives

**Lake Whatcom Recreation Objective (LWRO) – 1:** Allow limited and safe modes of recreation that do not contribute to degradation of the water or natural ecology of the watershed.

### Actions

**Lake Whatcom Recreation Actions (LWRA) –1:** Use Bloedel Donovan Park as a model to demonstrate 'Best Practices for Care of the Watershed' by providing the interpretive examples of caring for the watershed, advocating pesticide/phosphorus free lawn care and labeled plants in rain gardens.

**LWRA - 2:** Clearly and publicly post all boating, park rules, and swimming rules

**LWRA – 3:** Establish position of Lake Ranger/Sheriff to allow for better enforcement of city rules on the lake, with additional support on holidays.

**LWRA – 4:** Establish position of Lifeguard/Lake Steward/Educator (combined role) for summer and holidays at park.

**LWRA – 5:** Increased Compliance with Watershed Guidelines during community events and activities (see appendix 5)

**LWRA – 6:** Develop and implement safe swimming guidelines (see appendix 5)

**LWRA – 7:** Enforce current and proposed boating and water sports regulations including: WA State Navigation law (Note: New legislation in force 1-8-2008.) (see appendix 5) Possession of Washington State Boater Education Card. Legal age requirements for boat operation, and rules therein. Guidelines of the Lake Whatcom Management Program, '*Boatnotes: A handbook for Boater's on Lake Whatcom*' (see appendix 5)

**LWRA – 8:** Introduce boat trailer parking Fees at Bloedel Donovan Park.

**LWRA – 9:** Provide written guidelines to boaters at the fee collection kiosk, including 'Boatnotes', posters and information displays.

**LWRA – 10:** Adopt and enforce new powered personal watercraft regulations including:  
Power watercraft must proceed out 200 feet from shoreline without generating a wake, or exceeding 5 MPH;  
Remain at least 100 feet from swimmers at all times;  
Proceed out and return to shore in a straight line;  
Ban personal powered watercraft rental and watercraft racing; and  
All watercraft noise should be 80 decibels or lower (this is also the current tractor trailer trucks guidelines for roads.)

**LWRA – 11:** Review existing and update regulations for seaplanes and amphibious aircraft in the Watershed. This would include:  
Developing a plan for handling a fuel spill, human injury or other disaster.  
Publishing this plan so that it can be reviewed by the public and emergency response professionals  
Prohibiting place from being refueled on the lake or in the watershed.

**LWRA –12:** Replace boat docks with aquatic-ecosystem friendly docks

- LWRA –13:** Ban all use of fireworks in the watershed, because they pollute the air, soil and water with heavy metals, and also cause noise pollution, litter, and add other toxic elements in our water supply.
- LWRA – 14:** Develop City supported workshops and an on-line link to the Neighborhood web site
- LWRA – 15:** Encourage public and private partnerships between agencies and groups to promote overall goals as stated.
- LWRA – 16:** Establish an annual Community ‘Best Practices’ Award for Sustainability.
- LWRA – 17:** Establish an easy reporting and enforcement mechanism, so citizens are encouraged to file nuisance reports due to unacceptable loud noises on the lake, observed safety violations, vandalism, or polluting activities on the lake.

## VII: Pure Drinking Water

Pure drinking water is essential to the health of a community and its residents. The fact that Lake Whatcom is the reservoir that provides the drinking water for Bellingham and sections of the county demands that action be taken to continually improve the quality of its waters. Ideally the water would no longer require chlorination of Bellingham’s drinking water. It is important that the city cooperate with the county and other governments to facilitate the management of Lake Whatcom Reservoir, its watersheds and the drinking water treatment facilities associated with them.

### Objectives

- Lake Whatcom Pure Drinking Water Objective (LWPDWO) – 1:** Stop human caused pollution from entering Lake Whatcom Reservoir. In particular, reduce the impact of fossil fuels on the Reservoir and aim for a “fossil fuel free reservoir.”
- LWPDWO – 2:** Reverse the deterioration of our drinking water reservoir.
- LWPDWO – 3:** Reduce the impact of burning on the Reservoir’s water quality.
- LWPDWO – 4:** Reduce the Reservoir’s pollution attributable to pets and Canada geese.
- LWPDWO – 5:** Place the control of the Reservoir, its watersheds and the drinking water treatment facilities under a single government entity.

### Actions

- Lake Whatcom Pure Drinking Water Action (LWPDWA) - 1:** Create a city department to be responsible for the Lake Whatcom Reservoir, its watersheds and associated drinking water treatment facilities. Pending creation of this department, all jurisdictions shall establish and implement the same regulations pertaining to the Reservoir, its watershed and associated drinking water treatment facilities; a single individual shall coordinate these regulations.
- LWPDWA - 2:** Determine the pathways by which benzene enters the Reservoir and determine procedures to interrupt these pathways.
- LWPDWA - 3:** Establish a program that requires an annual inspection and permit for any fossil fueled vessel to operate on Lake Whatcom Reservoir. Permitted vessels shall prominently display a permit sticker when on the Reservoir or when entering or leaving the Reservoir. Fees collected by this program shall be used to enforce the program and monitor the effect of fossil fueled vessels on the Reservoir.
- LWPDWA - 4:** Prohibit fueling of boats at public boat launches on the Reservoir – this would include all of Bloedel Donovan Park – and on roads within 1,000 feet of a launch site.

- LWPDWA - 5:** Only permit fuel tanks that attach directly to engines on the Reservoir; prohibit all other fuel containers from use on Lake Whatcom.
- LWPDWA - 6:** Exclude all carbureted two cycle engines from Lake Whatcom Reservoir.
- LWPDWA - 7:** Require that the few remaining septic systems within Bellingham's city limits be connected to the sewer system.
- LWPDWA - 8:** Lift the Sudden Valley golf course's exemption from the phosphorus fertilizer ban in the watershed. Examine and implement ways in which the Sudden Valley golf course may be managed to reduce or eliminate the use of all fertilizer.
- LWPDWA - 9:** Require chipping and ban burning of material left over after any form of land clearing.
- LWPDWA - 10:** Require that wood burning stoves meet EPA criteria for smoke emissions and work to upgrade stoves already in use which do not meet these criteria.
- LWPDWA - 11:** Ban the use of fireworks inside the watershed.
- LWPDWA - 12:** Study and implement methods of reducing the Canada goose population in the Lake Whatcom watershed. This would include discouraging the planting of grass adjacent to water frequented by Canada geese and promote alternatives to lawn in areas where geese are known to feed or nest.
- LWPDWA - 13:** Determine the deleterious impact of unused pilings in and near the Reservoir. Prepare and implement a plan to remove unused pilings, beginning with those determined to be most harmful to water quality.

## **VIII. Enforcement**

Enforcement of the codes and programs that have been and will be established to protect the Lake Whatcom Reservoir and watershed are vital to the protection of this valuable resource. Lack of enforcement has led to many incidents of unnecessary pollution in the watershed and reservoir.

### **Objective**

Lake Whatcom Enforcement Objective (LWEO) – 1: The City of Bellingham shall have no higher priority than the execution, staffing and funding for the enforcement of existing and proposed regulations and ordinances to protect Lake Whatcom Reservoir.

### **Actions**

**Lake Whatcom Enforcement Action (LWEA) – 1:** The City shall vigorously pursue enforcement of the laws, by increasing staffing and resources. A "Lake Ranger" position will be funded and supported, no later than January 31, 2008.

## **IX. Long Range Planning**

Maintaining a clean source of drinking water is complex and ongoing process. The City must stay ahead of the problems that arise by continuing and improving long term planning in this arena.

## **Objective**

**Lake Whatcom Long Range Planning Objective (LRPO) – 1:** The City will be prepared to respond to future events, unforeseen circumstances and unpredictable events that threaten our drinking water.

## **Action**

**Lake Whatcom Long Range Planning (LWLRPA) - 1:** The City will conduct a biennial review of long range planning alternatives to our current drinking water system in response to future events that might include:

Moving the water intake

Changing water treatment processes

Changes to the Middle Fork Nooksack River Diversion

Acquiring a totally new water source

Renegotiating agreements to provide water to non-city residents

DRAFT

## Appendices

### **Appendix 1 Notification & Meeting Record**

Notification and Meeting Record

### **Appendix 2 Green Streets Discussion**

#### **Why do we want our streets to be Green Street?**

Streets make up 60 to 70% of the impervious surfaces of our built environment. Our roofs are the other major component. These surfaces collect pollutants from the atmosphere, oil, gas and other cast off debris from vehicles, soils from disturbed earth and the like. Under the prevailing street designs, when it rains, the runoff water washes the pollutants into storm sewers where it may or may not be treated before it enters streams or lakes. In our case this means lake Whatcom. Green streets are designed as a means to mitigate the negative effects of the run off before it enters Lake Whatcom

#### **Characteristics of Green Streets:**

Green streets are a component of watershed management that tries to mimic nature in dealing with stormwater runoff from impervious surfaces within the street right.

Green streets eliminate as much impervious surface as possible. This is done by designing streets as narrow as possible for their use and using pervious paving as much as possible.

Green streets direct the runoff that cannot infiltrate into the ground into bioswales. Bioswales help slow down the runoff remove pollutants from the runoff, and can direct the runoff into rain gardens that further slow and treat the runoff. Rain gardens and check dams in the bioswale can make this technique work on steeper streets where a bioswale itself would not work.

Rain gardens and other street plantings help intercept rainwater. The removal of forest and fields for the development of our built environment has had the effect of making our developed areas 10 to 12 degrees warmer in summer. Street trees help mitigate this. A medium sized tree can intercept as much as 2380 gallons of water per year and can also redirect rain away from impervious surfaces as it falls. These trees along with a green street design can decrease the temperature of stormwater runoff thereby keeping the temperature of the Lake lower. Care must be taken with both plant materials and placement to minimize visual impact where possible.

The green street design improves the visual quality of the neighborhood.

Green street design calms traffic, making the interaction between pedestrian, bicycle, and car safer.

Green streets are in their infancy as far a design standards, materials, and implementation. Portland, Or., Seattle, and Vancouver BC are in the forefront of their development and implementation and their experience can provide guidance. The following are web sites that give document green street work going on around us.

Portland Or.

[www.portlandonline.com/shared/cfm/image.cfm?id=82898](http://www.portlandonline.com/shared/cfm/image.cfm?id=82898)

Seattle:

9/12/07

## Appendix 3 Stormwater Runoff background

### Background on Stormwater runoff:

Stormwater runoff can carry pollutants from the land to the water, an undesirable situation that can be at least partially remedied by two types of action. The first type is "**Source Control**", the keeping of undesirable pollutants from becoming mixed in surface water. This should happen on all properties within the watershed basin, including public properties - roadways are a large contributor. The second type of action is "**Treatment**", the removal of undesirable pollutants from the water flow as it moves between the origin point (the source) and where it enters the Reservoir. Treatment may be done by individual property owners and by public agencies.

The simplest, cheapest and best action overall is source control - don't let crap get into the water in the first place - at the source! The public jurisdictions are responsible for roads, parks, schools and other lands used for public purposes, so they may be ordered to act. Their limitation is usually financing and the political will. But implementation of much source control is the responsibility of individual occupants and all others who visit watershed basin lands.

### A. Runoff From Individual Properties:

Individual landowners, renters and all those (including even delivery drivers) who visit watershed basin lands must, in almost all cases, be encouraged, rather than forced, to act. Exceptions include when seeking permits for land-management actions, a time when a jurisdiction may require certain actions as conditions for approval. Those costs of compliance will be borne by the owner or developer - then may be passed on an eventual buyer. But for properties not being otherwise modified, what's needed is a method of motivation of the owners, and that motivation may take several forms.

Education of "landowners" (*letting that word represent everybody*) is a necessary first step. People have to know and believe that there is a problem, and they have to know what they CAN do about it. Only then, will they choose to act. Much of that education can be done by individuals and by the SBNA. Neighbors talking to neighbors are often very effective.

Thus, a major element of this Silver Beach Neighborhood Plan (SBNP) incorporates processes and information to encourage and facilitate neighborhood education on source control of pollutants. The public needs to know - without hesitation - What are the pollutants? How do they get brought into the watershed (not always in shopping bags)? How do they get released? How to keep them from being released? Additionally, how to do local cleanup on-site, another valuable element of a clean-water program.

This SBN Plan thus specifies or gives ready references to information on pollutants and on methods of elimination and control. The first recommendation is: Don't put polluting materials in such places that they may be washed into the Lake. The second recommendation is: Do install surface water retention methods on your individual properties, to eliminate or reduce the runoff flow from leaving your property. The third recommendation is: Help your neighbors do these things. And finally, help the City and County to deal with these needs, on public properties.

### B. Runoff From Roads

#### i. Status of problem

A notable part of the pollution in runoff that reaches the Lake Whatcom Reservoir originates on roads. People leave trash there. The operation of vehicles deposits many toxic materials on the surface of the roadways, including petroleum products, metals-residue from brake-linings, and many others. The only ways that the best practice, "source control", can be used, are the reduction of vehicle traffic within the watershed, and the reduction of droppings from each vehicle. So long as the watershed lands have urban development, there will be such traffic to access those properties.

ii. pervious sidewalks, driveways, and roadway shoulders;

Runoff is greater across impervious materials, and can be reduced by using pervious materials anywhere possible. An easy place to do so is on sidewalks, since the loads applied to them are far less than on roads, thus the service-life of the materials is longer. For driveways (which cross sidewalks) sturdier materials might be required, but there are materials that can carry light traffic -- coarse gravel is an example. Even so, the major portion of sidewalks and driveways can be done in a way that allows water to infiltrate into the soil, minimizing the amount of runoff and thus, the transport of undesirable materials into pipes, streams, and the Lake.

Also, in the vast majority of cases and places in residential areas, a sidewalk only needs to be on one side of the road, thus reducing the area covered (and the costs).

Driveways may and should be pervious. This has already been specified in the City codes, as part of the Silver Beach Ordinance of (2004?). Continued enforcement is of great value. Additionally, even existing impervious driveways can be replaced with materials and methods that provide better water control, reducing runoff and transport of toxic materials into the Lake.

iii. Continue search for Solutions

The most direct beneficial action regarding roadways pollution is to reduce the amount of traffic using those roads. Two processes are readily available for accomplishing a substantial gain this way:

a. Reduce or eliminate through-traffic within the watershed area. Allow only traffic whose destination is a property within the watershed. Other traffic should avoid passing through the watershed.

b. Reduce the number of vehicle-miles driven within the watershed area. All the techniques of public transport apply here - carpooling, increased availability of bus-service, and biking and walking (which also contribute directly to your health!)

c. Increased care of the road surfaces, by sweeping and other methods of picking up undesirable materials for careful disposal elsewhere, perhaps with treatment to reduce toxicity.

d. Naturally, the incorporation of effective stormwater treatment facilities on public roads (and other public lands) brings the benefit of improved water quality.

## **C. Runoff In Streams**

i. Condition of Silver Beach Creek

Silver Beach Creek has been consistently identified as the most polluted tributary of the Lake Whatcom Reservoir. The reasons are obvious: urbanization, poorly done with regards to runoff pollution control, and which continues to be done and allowed by both jurisdictions - the City and the County.

ii. Involve County especially for Silver Beach Creek

The upper areas of the sub-watershed of Silver Beach Creek are under County jurisdiction, while the lower areas are in the City. Thus, the solution requires similar actions by both jurisdictions. What the City does in support of protection of environmental quality here MUST be replicated by the County!

iii. Tighten restrictions on clearing land & exposed soil

It is no mystery that exposed soil and any action that involves clearing land makes it subject to transport of silt and pollutants when water is present. The risk is greater during the traditionally wet seasons, but it is present at all times. Thus, for the urgent and serious case of protection of our sole source of drinking water, stronger restrictions on activities that might result in polluted runoff within the watershed are needed. New rules should be written and enforced, to substantially eliminate any runoff from land being "worked."

## **Appendix 4 Monitoring of Lake Whatcom Water Quality**

### **Water Column**

Water quality monitoring in Lake Whatcom began in the early 1960's, but those efforts suffered from inconsistent spatial and temporal consistency and were accordingly inconclusive. The first serious program of sustained monitoring was begun in 1988 by the Institute for Watershed Studies (IWS) at Western Washington University. IWS has developed an excellent database to measure water quality parameters and more importantly track trends in water quality over time. Tributary monitoring has not historically been as robust but has recently been increased to better characterize the watershed.

**Inorganic Analysis and Bacteria Sampling** - The ongoing lake monitoring is effectively assessing water quality for temperature, pH, dissolved oxygen, conductivity, metals (As, Cd, Cr, Cu, Fe, Hg, Ni, Pb, Zn), total organic carbon, Secchi depth, ammonia, nitrate+nitrite, total nitrogen, soluble phosphate, total phosphorus, alkalinity, turbidity, chlorophyll, plankton, and coliform bacteria. This program appears to be adequate and has been of sufficient duration to chart trends in the water quality of the lake. Those trends are alarming.

**Lake Stratification** - The lake stratifies generally in May/June into a surface area of relative warm water (epilimnion), a middle layer of rapidly changing temperature (metalimnion) and a cool bottom layer (hypolimnion). Stratification stability is determined by temperature differences in the water column, water circulation and local weather patterns. Once the temperature differential reaches 5 degrees C, stratification is considered stable. Stratification persists until fall or winter depending on location in the lake when cooler ambient temperatures and shorter days cause the lake to cool and destratify (turnover).

### ***Dissolved Oxygen***

**Process:** Low oxygen in the water column can result in loss of habitat, release of nutrients (phosphorus and nitrogen) from sediments, increased algae production, unpleasant odors during overturn, fish kills, release of metals and organics from the sediment, increased mercury methylation, increased drinking water treatment costs, increased taste and odor problems in drinking water and increased risk of cancer associated with drinking water disinfection byproducts.

**Lake Whatcom:** Dissolved oxygen during stratification has consistently been near zero for decades. From when IWS began consistently monitoring the lake, dissolved oxygen in the hypolimnion in Basin 1 has dropped during August from 2 to 4 mg/L in 1988 depending on depth to near zero irrespective of depth. Basin 2 has experienced a similar history. It appears that this downward trend is limited only by the fact that dissolved oxygen has nearly reached zero. The agent for this trend is likely increased respiration of biota like algae, plankton and bacteria thriving from warmer temperatures, an infusion of essential nutrients and biodegradation of sediment materials. Basin 3, deeper, colder and with fewer nutrient inputs than basins 1 and 2, has not yet experienced the same level of oxygen depletion.

## ***Phosphorus and Nitrogen***

Phosphorus and Nitrogen are the prominent nutrients affecting Lake Whatcom algae. Most algae use inorganic nitrogen in the form of nitrate for growth although ammonia and dissolved nitrogen gas can be used as well. Nitrogen depletion was evident at all sites indicating uptake by phytoplankton. Times of nitrogen depletion corresponded with times of high bluegreen algae densities.

Ammonia, along with hydrogen sulfide, is an indicator of low oxygen conditions. Ammonia is produced during the decomposition of organic matter. In oxygen rich environments, ammonia is rarely present in high concentrations due to rapid conversion to nitrate and nitrite through biological and chemical processes. In low oxygen environments, ammonia accumulates in the hypolimnion until the lake destratifies. High ammonia concentrations were measured in Basins 1 and 2 just prior to lake turnover. There has been a significant increase in ammonia and hydrogen sulfide concentrations since 1999 in Basin 2. Both basins 1 and 2 have elevated levels of ammonia at turnover.

Although nitrogen is required by Lake Whatcom microbiota, phosphorus is what usually limits microbiota growth. Soluble phosphorus is easily taken up by microbiota and is therefore rarely found in high concentrations in the water column. Insoluble phosphorus can be present in the water column bound to tiny particles and suspended organic matter. Competition for phosphorus is intense and micro biota have developed mechanisms to extract up to about 50% of the phosphorus bound to particles and organic matter. When oxygen concentrations are low, however, phosphorus bound in the sediment becomes soluble and leaches into the overlying water. Soluble phosphorus levels were usually low in all basins except in the hypolimnion in Basins 1 and 2 just prior to turnover. Elevated total phosphorus levels were present in the hypolimnion in Basins 1 and 2 during stratification. Prior to turnover, the accumulating phosphorus in the hypolimnion can be taken up in microbiota hovering at the oxygen rich/depleted oxygen boundary. When the lake destratifies in the fall, phosphorus in the hypolimnion will be mixed throughout the water column. As oxygen levels increase due to destratification, any soluble phosphorus not taken up by biota will convert to insoluble forms, and perhaps be sequestered in the sediment until the next stratification.

The phosphorus dynamic in the lake is ominous. Phosphorus enters the lake from disturbed soils, fertilizers, animal and human waste, detergents, etc. This nutrient is consumed by microbiota which reproduce and die. Their bodies settle to the bottom and decompose due to bacterial action, consuming oxygen in the process. Low oxygen conditions, generally unfavorable to organisms of most kinds allow phosphorus levels to build making it available to organisms at turnover when the cycle begins again. Soluble phosphorus not consumed during the microbiota growing season converts to insoluble forms in oxygen rich environments and is sequestered in the sediment until anoxic conditions return it to a soluble form the following season. Phosphorus is thus banked, accumulates and supports more and more microbiota.

## ***Plankton***

Plankton levels have exploded from a historically stable 500,000 plankton/liter of water (#/L) in 2002 to 2,000,000/L in all basins suggesting a strong correlation between phosphorus and plankton concentrations.

## ***Eutrophication***

**Process:** Eutrophication is a process to describe the life cycle of a lake. Initially, natural lakes formed in basins gouged out by glaciers, like Lake Whatcom, are deep and nutrient-poor. Such lakes are called oligotrophic and are characterized by unusual clarity. As the soils around them

become more developed and more productive, sedimentation of the lake increases and nutrients begin to flow into the lake making life possible for plants and animals. As such life begins to thrive the lake becomes mesotrophic. As sedimentation continues and organisms living in the lake die and add to the bottom sediment, the lake becomes eutrophic, eventually filling in to become a pond, then a marsh. This is a natural process and in a lake like Lake Whatcom, should take many thousands of years.

Cultural eutrophication is a term to describe the accelerated eutrophication by hundreds or thousands of years due to human activities that add nutrients to a water body.

**Lake Whatcom:** Lake Whatcom phosphorus levels are relatively low most of the year but are increasing, especially in the summer when algae blooms are most likely. Except for Basin 1, which hovered at mesotrophic since 1997, Lake Whatcom was consistently oligotrophic until 2001. It has been mesotrophic consistently since then. Coincident with eutrophication (measured as average total phosphorus in micrograms per liter of water), near surface chlorophyll concentrations and algae counts have also increased significantly. Particularly noteworthy are increasing levels of blue green algae. Prior to 2003, blue green algae were relatively uncommon in Lake Whatcom. Since then, blue green algae have increased dramatically in all basins in the summer and fall. This is significant because if bluegreen algae increase to certain levels, large scum and algal mats on the surface of the lake can cause severe odor and aesthetic problems. Further, bluegreen algae can release harmful neuro and hepato toxins into the water when the algal bloom dies. ([http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/wat3351](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/wat3351))

### ***Metals***

Metals were generally low with iron and zinc detectable in all basins. The highest iron concentrations were measured in September at the bottom of basins 1 and 2 resulting from sediment bound iron leaching into the water column under anaerobic conditions.

### ***Total Organic Carbon and Disinfection Byproducts***

**The Process:** Algae excrete dissolved organic carbon into water, which, along with other decaying organic material, react with chlorine to form disinfection by-products, predominantly chloroform and other trihalomethanes (THMs). As algal concentrations increase, THMs increase as well. THMs are a concern because they are suspected cancer causing compounds.

**Lake Whatcom:** Long term data indicates that total organic carbon has been increasing over time, generally tracking the increase in algae and chlorophyll concentrations. Coincidentally, THMs have been increasing in Bellingham's treated drinking water exposing Bellingham residents to more potentially carcinogenic compounds. This year the City began using different chemicals to help remove organic matter before the disinfection step in the drinking water treatment process at an additional cost of \$10,000 to \$12,000 per year. This provides a brief reprieve. This new treatment is not 100% effective at organic matter removal and if algal densities continue to rise, THMs will again increase.

### ***Storm Water Treatment***

The City's storm water treatment vaults (Park Place, Brentwood, Alabama Hill) were monitored for total solids, total suspended solids, heavy metals, total organic carbon, total nitrogen and total phosphorus. Sampling at the inlet and outlet of these vaults demonstrated that of the two measurements most critical to lake health, phosphorus and total suspended solids (TSS) only TSS concentrations were reduced with treatment. Phosphorus concentrations actually went up after treatment in some cases.

## Sediment and Tissue

The 1998 Lake Whatcom Watershed Cooperative Drinking Water Protection Project was the first comprehensive look at Lake Whatcom sediment and tissue contamination. A screening study, samples were taken from one site in each of the 3 basins, from 2 storm water vaults and 1 tributary in the Lake Whatcom watershed and analyzed for a broad variety of chemical compounds.

**Nutrients and Bacteria:** Nutrients were generally low in the sediments, tracking the historical data of the IWS long term water column monitoring. However, nitrogen and phosphorus enrichment in Basin 1 sediment was evident. (It must be noted that these sediment samples were collected and analyzed in 1998, 4 years before plankton levels increased dramatically.) The Park Place drainage appeared to be a significant source of nutrient enrichment into Basin 1. Hypolimnion conditions in Basin 1 were ideal for the release of sediment phosphorus and ammonia into the water column.

Fecal coliform bacteria were found at levels exceeding Washington State water quality standards in Park Place storm water drain, Cable Street drain and Austin Creek. Fecal coliform generally come from failing septic systems, hobby farms, pet waste, leaking sewage pipes, combined sewer overflows and wildlife. Elevated fecal coliform inputs into the lake indicates potential sewage sources which can result in increased occurrence of *Cryptosporidium*, a pathogen of considerable concern.

**Metals:** Mercury accumulations in Smallmouth Bass was of concern although standards or criteria protecting the consumer were not exceeded. Park Place had the highest concentrations of chromium, copper and nickel, followed by Cable Street, followed by Lake Whatcom and Austin Creek. Basin 1 had the highest concentration of all metals except chromium and nickel which were highest in Basin 3. Although zinc in the Park Place detention pond was above acceptable Freshwater Sediment Quality Value (FSQV), it does not appear to causing widespread enrichment of zinc in Lake Whatcom sediments.

Sediment mercury levels in Basin 1 exceeded the FSQV slightly and sediment mercury levels in all three basins fell within the range of US Geological Survey sites in Puget Sound, surprising since Basin 3 is not urbanized to any extent.

**Total Petroleum Hydrocarbons in Water and Sediment:** Heavy fuel oil was detected in measurable quantities in water at Cable Street and Park Place. This was unexpected since heavy fuel oil is usually associated with crude oil spills or refinery operations.

**Semivolatile Organic Compounds and Pesticides in Water:** Semivolatile organics, a large group of chemicals including, among other things, polycyclic aromatic hydrocarbons (PAHs), phenols and phthalates, are commonly found in environmental samples in urban areas. Sources are varied and include incomplete combustion of fossil fuels and wood, petroleum products, plastics and adhesives. The presence of caffeine in most water samples suggests combined sewer overflows, failing septic tanks or illegal domestic sewer connections. The following semivolatiles were found in concentrations above the National Toxics Register or Recommended Maximum Concentration (RMC):

### Contaminant

	Park Place Cable Street
Benzo(a) pyrene:	X
Benzo(b)fluoranthene	X

Benzo(k)fluoranthene	X
Bis(2-Ethylhexyl) phthalate	X
Butylbenzylphthalat	X
Chrysene	X
Di-N-Octylphthalate	X

Although below action levels, concentrations of some PAHs (fluoranthene, pyrene, naphthalene and phenanthrene) from Park Place were found at elevated concentrations suggesting that this drainage might be a significant ongoing source of PAH enrichment to Basin 1.

Pesticides/Herbicides were found in all 3 tributaries sampled. The following were detected at levels above the RMC:

**Contaminant**

	<b>Park Place Cable Street</b>
Chlorpyrifos	X
Diazinon	X
Malathion	X
Pentachlorophenol	X

Chlorpyrifos, Diazinon and Malathion are common ingredients in retail pesticides. Pentachlorophenol has largely been banned for home use.

**Semivolatile Organic Compounds and Pesticides in Sediment:** PAHs are preferentially adsorbed onto particles, particularly those with a high organic carbon content. Therefore, as organic carbon increases, so will the concentration of PAHs. Several semivolatile contaminants were detected in the lake and its tributaries. Those detected at concentrations above the FSQV:

**Contaminant**

	<b>Park Place Cable Street Basin 1</b>
Indeno(1,2,3-c,d)pyrene	X
Debenzo(a,h)anthracene	X
Bis(2-Ethylhexyl)Phthalate	X

**Fish Tissue:** Copper and zinc concentrations appear to be somewhat elevated in kokanee and crawfish. As of 1998, there were no regulatory limits for copper and zinc in seafood. Mercury was detected generally at moderate concentrations with the exception of one composite sample of smallmouth bass at .5 mg/kg. This sample was comprised of several larger fish taken in Basins 2 and 3. Because mercury bioaccumulates in predators at the top of the food chain, this concentration is likely due to bioaccumulation rather than any location implication. Although this level of contamination does not trigger the FDA limit of 1.0 mg/kg (or NTR limit of .825 mg/kg), mercury is of tremendous concern because of its effect on neurodevelopment effects leading some states to limit consumption to reduce risk. As of 1998, Washington had no mercury consumption risk guidelines.

Concentrations of pesticides in Lake Whatcom fish were generally lower than fish from other urban water bodies. Several of these pesticides have been either banned or severely restricted but continue to persist in the environment. For example DDE, a breakdown product of DDT is still routinely found in fish tissue 35 years after it was banned.

PCBs are similarly persistent and were found in all fish analyzed (kokanee, smallmouth bass and longnose sucker). Again, contamination levels were generally lower than fish from other urban environments. NTR criteria were exceeded in fish tissue as follows:

<b>Contaminant</b>	<b>Kokanee Smallmouth Bass</b>
Dieldrin	X
PCB-1254	X
PCB-1260	X

## **Mercury**

### ***Fish Tissue***

Concerns raised by the 1998 Cooperative Drinking Water Project about elevated mercury levels in one composite fish sample prompted a study by the Department of Ecology in 2000 to better characterize mercury concentrations in edible muscle of Lake Whatcom fish. Target sample size was 10 fish from each basin of the following species: Yellow perch, Brown bullhead, Pumpkinseed, Cutthroat trout, Kokanee, and 3 different size ranges of Smallmouth bass. Fifteen Signal crayfish were taken from each basin for the study as well.

Smallmouth bass had the highest concentrations varying from .20 µg/g in Basin 1 (low .1 µg/g) to .86 µg/g in Basin 3 (high 1.84 µg/g). Yellow perch ranged from .12 to .29 µg/g. Kokanee and pumpkinseed had levels averaging slightly above 0.1 µg/g while cutthroat trout had concentrations in the range of .06 to .08 µg/g. Signal crayfish and brown bullhead were generally low except for one crayfish from Basin 2 (.54 µg/g) and one from Basin 3 (.46 µg/g). Most results correlated well with the 1998 study except for Basin 3 smallmouth bass were much higher in the 2000 survey (mean of .86 µg/g compared to a composite sample of .5 µg/g. Differences might be attributed to seasonal variations in the bioavailability of methyl mercury, fish physiology or runoff.

Medium sized and large smallmouth bass significantly exceeded the Washington state and national average for mercury contamination in fish muscle. A strong correlation was shown in smallmouth bass between age and size and mercury concentration. This correlation holds also for yellow perch in Basins 2 and 3. Other species and sizes did not demonstrate a similar relationship.

Average mercury concentrations were higher for all species in Basin 3. Signal crayfish were collected from 3 different locations in each basin and showed increasing levels of mercury contamination from the northwest part of the lake to the southeast. Mercury concentrations in smallmouth bass, yellow perch and kokanee plotted by location taken show a similar trend and this trend does not appear to be a factor of age of the specimens.

Many factors could contribute to differences in fish contamination between the basins. One possibility is greater contribution to mercury contamination from tributaries, storm runoff or aerial deposition. Unfortunately, few data exist to examine these possibilities. Water sampling from Austin Creek, Park Place and Cable Street collected during rain events had only moderate mercury concentrations although Austin Creek was 100 times the concentration of the stormwater drains. Comparison of tissue samples from the vicinities of Park Place were lower than the average for lake tissue samples than those near the mouth of Austin Creek possibly due to the delivery of higher mercury loading from this tributary. The fish taken near the mouth of Anderson Creek also had higher mercury than fish in most other areas.

The possibility that aerial deposition is a major source of mercury contamination has not been investigated to any great degree. Mercury deposition on a regional or global scale would be expected result in consistent levels in all lakes in the area. Two sediment samples in Lake Samish revealed no mercury contamination. Interestingly, one composite sample from Lake Samish largemouth bass had mercury at 0.27 µg/g, comparable to average concentrations in the smaller smallmouth bass in Lake Whatcom.

Sediment mercury concentrations do not necessarily correlate to tissue concentrations. Western Washington University found low to moderate concentrations in sediments throughout the lake with no clear differences between the basins. A 1999 study analyzed a single sediment sample from each basin and found Basin 1 (0.5 µg/g) to have a higher concentration than Basins 2 or 3. Water chemistry may amplify mercury accumulation through increased methylation and tissue permeability. There are many examples from other studies across the country of elevated mercury in fish tissue from lakes with no known or indirect anthropogenic source of contamination yet have lake or watershed characteristics (such as sulfate, pH, alkalinity and conductivity) that promote mercury accumulation in fish tissue. Dissolved organic carbon, perhaps from wetlands or recent land disturbance, appears to increase terrestrial transport of mercury to lakes.

### ***Sediment***

**Department of Ecology:** In an effort to understand the mercury dynamic in Whatcom County lakes, the Department of Ecology in cooperation with the US Geological Survey and the Whatcom County Health Department studied Lake Whatcom sediments.

**Surface Sediments:** Thirty-one surface sediment samples were analyzed for total organic carbon (TOC), grain size and total mercury. Fifteen surface sediment samples were also analyzed for methyl mercury. Sediments off the mouth of tributaries tended to be predominantly sand and were relatively low in TOC. Basin sediments elsewhere were more than 60% fines and high in TOC as the lighter fine-grained material is transported away from the tributary before deposition. Basin 1 had the highest levels of TOC with considerable plant and wood material in the samples. Higher mercury concentrations tended to be where there was a prevalence of fine material. About 1/3 of the samples were above the Threshold Effects Level which is the level below which adverse biological effects rarely occur, and roughly 1/6 of the samples were above the Lowest Effects Level, the level at which adverse biological effects are seen in 5% of benthic species. Most values exceeding these levels were in Basin 1.

Methylmercury appeared to correlate well with TOC. Methylation of mercury can occur in the water column or in the sediments and generally under anaerobic conditions. Basin 1 has higher TOC levels and the most severe occurrence of oxygen starvation in the hypolimnion through the summer. Consequently, the highest levels of methylmercury were found in Basin 1. If the TMDL to address low oxygen levels is successful, the rate of mercury methylation is likely to decrease as well.

**Sediment Cores:** Sampling included **sediment cores**, located in the deepest part of each basin in hopes of finding the finest sediments and the most undisturbed vertical sediment profile. Sediment cores were analyzed for TOC, total mercury and total lead. The cores were also analyzed for Cs<sup>137</sup> and Pb<sup>210</sup> to determine mercury accumulation rates and the time line for mercury accumulation. Sedimentation rates for Lake Whatcom are consistent with other lakes. Mercury concentrations began to increase above average around 1900 peaking some where between 1987 and 1995. Peak concentrations represent a two to threefold increase in mercury above pre-1900 levels. Mean surface sediment concentrations appear to be about 25% less than the peak 10 years earlier. The report suggests that mercury levels in the lake will continue to decline on a time scale consistent

with sediment mixing processes in the lake. Note: This downward trend could turn around quickly as China is commissioning new coal fired power plants at a rate of one a week.

**Tributaries:** Surface water from 10 tributaries was analyzed every other month for 9 months to determine mercury loadings (Anderson Creek, Austin Creek, Smith Creek, Euclid Creek, Silver Beach Creek, Olsen Creek, Brannian Creek, Mill Wheel Creek, Carpenter Creek and Blue Canyon Creek). Tributary sampling was limited in that it missed peak rainfall events that would mobilize most of the loading of particulates and mercury.

Mercury levels in all tributaries were generally low during the monitoring period. One sample (12ng/l) from Blue Canyon Creek exceeded the chronic water quality standard. Anderson Creek was the most important contributor of total mercury loadings from surface water entering the lake accounting for 56% of the mercury loadings during these sampling events. Since mercury loadings were consistent in the other tributaries, the Anderson Creek contribution is likely a function of flow. Higher flows mean higher mercury loading. Atmospheric or other terrestrial sources of mercury were not included in this analysis.

Concentrations of mercury in Lake Whatcom sediments do not appear to be high when compared to data from other locations in the region.

**US Geological Survey:** The USGS report utilized the same data the Department of Ecology was collecting for sediment evaluation and incorporated other data, such as Ecology's earlier study on mercury contamination in edible fish tissue into a comprehensive report on mercury contamination in Lake Whatcom and five other Whatcom County lakes. The conclusions with respect to sediment and tissue contamination were similar with a few other observations of import.

Mercury in Lake Whatcom originated from atmospheric deposition of global sources; local incinerators (Thermal-Reduction Company Municipal Waste Incinerator, City of Bellingham Sewage Sludge Incinerator, Olivine Corporation Municipal Waste Incinerator), a Georgia-Pacific chlor-alkali plant and erosion of drainage basin soils. It can be inferred from the report, perhaps erroneously, that the majority of atmospheric deposition came and comes from global sources.

Total mercury concentration of 1 nanogram/liter in the surface water of Lake Whatcom is considerably smaller than in either the volume-averaged precipitation or in tributary inflow water, suggesting that mercury is being removed from the water column of the lake and deposited in the sediments.

## **Drinking Water**

The City of Bellingham performs extensive monitoring of both raw water at the intake from the lake and water leaving the treatment plant. Nearly all compounds tested were below the limits of detection. Those that were detected were below the Maximum Contaminant Level, the health-based regulatory threshold level. Trihalomethanes, cancer causing compounds related to treatment, have been increasing over time as more chemicals have been necessary to treat algae-related TOC contamination. A new chemical treatment has recently been instigated which reduced THMs. This is likely a temporary reprieve since TOC continues to rise and will likely overtake the improvements realized by the new treatment.

## **Ground Water**

### ***Lake Whatcom***

The Lake Whatcom groundwater system can be divided into two principal flow regimes: 1) flow within the bedrock and associated overlaying sediments and 2) flow within the unconsolidated valley deposits. Flow from the bedrock is generally through fracture joints and planes with very limited ability to supply groundwater (about 2 inches of recharge per year) or along the bedrock/sediment boundary into local streams, springs and seeps during precipitation events. Flow in the larger valleys, however, is through porous, unconsolidated material. Although the deposits cover only a small minority of the basin surface area, they transmit a lot of water in contrast to the bedrock (between 7 to 50 inches of recharge per year). Accordingly, the valley sediments play a key role in the transport of groundwater to the lake with the highest estimates occurring in the valley-fill deposits of South Bay. The combined estimated groundwater inflow from South Bay/Anderson Creek shoreline and Agate Bay shorelines was 62 to 72% of the total groundwater inflow estimates for the entire lake. Groundwater totals represent about 21 to 29 % of the total combined surface water and groundwater inflow into the lake.

A network of 14 piezometers was installed around the lake and sampled 4 times during the year (fall, winter, spring and summer). Samples were analyzed for total dissolved phosphorus (TDP), orthophosphate as phosphorus (orthophosphate-P or OP), nitrate+nitrite as nitrogen (nitrate-N), ammonia as nitrogen (ammonia-N), dissolved oxygen, iron, manganese, total dissolved solids (TDS), chloride, dissolved organic carbon (DOC), boron and methylene blue active substances (MBAS). As a rule, the sampling showed low values for parameters typical of anthropogenic activity (TDS, chloride, DOC ammonia-N, OP and TDP) in the relatively undeveloped areas. By contrast, sites in the vicinity of areas of human development showed elevated levels of these compounds. For example, chloride concentrations a factor of 5 greater than the other stations were detected at 2 stations on the northern side of the lake. The highest ammonia concentrations were detected at the far southern end of South Bay and adjacent to Bloedel Donovan Park. The highest OP measurements and very high TDP concentrations were detected adjacent to the Sudden Valley golf course where phosphorus and nitrogen fertilizers were applied over the last 30 years as well as regular irrigation during the dry season. Elevated OP was noted at Bloedel Donovan Park between the January and May sampling events. OP was also high at the South Shore and South Agate Bay sites. DOC was very high, relative to other stations, at Sudden Valley. DOC was also high at Bloedel Donovan and South Agate Bay.

Most of the orthophosphate-P loading from groundwater appeared to come from the South Bay shoreline (510 to 800 kg/yr) and the Agate Bay shoreline (190 to 310 kg/yr) with the bedrock component contributing about 180 kg/yr.

### ***Y Road Landfills***

In response to citizen concerns about potential contamination of groundwater in the vicinity of the Y Road landfills, the Washington State Department of Health performed a Phase I health consultation in 2000. Well drillers' logs were consulted in an attempt to describe the hydrology of the area. The tentative conclusion by Health was that there is a shallow, perched aquifer in the area is separated by 50 to 75 feet of relatively impermeable silt and clay from a deep, confined aquifer. The shallow aquifer appears to drain to Carpenter and Olsen Creeks. The deeper aquifer presumably drains to Lake Whatcom.

Samples were collected from some of the preexisting wells for analysis. However, laboratory reporting limits for several important contaminants were above the Agency for Toxic Substances

and Disease Registry (ATSDR) comparison limits and potential health hazard could not be estimated. Anomalies in metals samples made them similarly useless for estimating hazard.

The report suggested that a Phase II sampling with a limited number of wells be conducted to determine the nature and trajectory of any contaminant plumes resulting from the landfills. It also recommended surface water sampling at Olsen Creek if it is downgradient of the landfill.

## **Appendix 5 Lake Whatcom Recreation Support Documentation**

### ***'Boatnotes: A handbook for Boater's on Lake Whatcom'***

This includes:

Proper engine care to avoid pollution (pg. 7)

Fueling rules and fuel disposal (pg. 9)

Spill prevention and absorbent materials; 911 (pg 11)

Follow boat maintenance rules (pg. 13)

Follow boater's rules (pg.23)

Speed limits, right away rules, safety equipment, age operating regulations

Dump nothing overboard (pg 22)

Enforce prohibition of two-stroke carbureted engine use (pg 5)

Power craft must have a four-stroke engine in Lake Whatcom within city limits; two stroke carbureted engines are banned

Boats should not transfer weeds from other lakes to infest LW (pg 22)

### ***Safe Swimming***

Hire and train lifeguards for Bloedel-Donovan Park, who will also serve as Lake Whatcom Stewardship advocates for education and enforcement of rules in the park during the Summer season.

Observe and enforce posting at the park for unsafe swimming (Heavy rainfall, or geese and dog wastes might impact water quality in swimming areas.)

Avoid swimming with open wounds or infections.

Proper disposal of diapers/ human waste

Stay in designated boundaries for swimming:

Follow sun protection guidelines. \*

Post guidelines such as "*Topher's Rules for Safe Swimming*"

Learn to swim

Always swim with a buddy

Swim in the designated area, and make sure an adult watches you

Wear a life jacket if you cannot swim, or you are just learning to swim

An inflatable air mattress or swim ring does not take the place of a life jacket

Don't swim in very cold water. Swimmers can get hypothermia ((dangerously low body temperature) in cold water.

Never dive or jump into unknown water

No drugs or alcohol

Obey al "No swimming" and other warning signs

Never swim in a canal

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### ***Watershed Guidelines during Community Events and Activities***

#### ***Parks***

Follow park rules for safety and clean-up

Park integrity and shoreline maintained

9/12/07

Allow only appropriate community events that do not adversely affect the reservoir and watershed

*Safe hiking in the watershed*

Stay on approved trails to minimize erosion  
Follow city park rules  
Follow rules, and posted signs for protected land.

*Continue to allow dogs in public areas*

Education and enforcement of proper disposal of dog wastes.  
Follow park rules (on and off leash areas.)

Continue Sport Fishing using guidelines

Enforce Washington State sport fishing regulations, "Seasons and Rules pamphlet."

*Decrease tourist road touring from adding to water shed degradation*

Program to encourage bicycles, walking, hybrid and electric vehicles  
Promote public transportation to offset pollution from gas engines  
Enforce the current truck ban.

*Dock and float activities- minimize aquatic degradation of lake*

Enforce existing rules in Boatnotes: A handbook for Boaters on Lake Whatcom (Pg. 17-18)  
Implement new dock guidelines for Bloedel-Donovan Park to decrease impact of harming aquatic life  
All replacement docks should be equal square footage and length, or less. A larger footprint must not be created by dock replacement.

*Public Education Program to enhance good stewardship of the lake*

Provide written and on-line materials regarding compliance with all aspects of safe lake recreation  
Adopt Washington State boating safety law requirements for boaters.  
Establish Citizen restoration projects  
Create a "Best Practices" model of watershed care at Bloedel-Donovan Park.  
Establish Community Green Awards to promote "Best Practices" and spread educational messages