

Fishtrap Creek

State of the Watershed Report



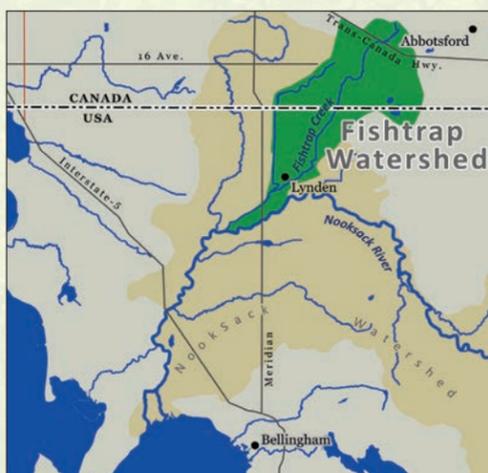
What is a Watershed?

A watershed is the area of land from which water drains to a common point. Water enters a watershed through precipitation and flows through the watershed in streams and ditches, or out of sight in storm sewers or as groundwater. A watershed's boundaries are generally determined by elevation as water naturally flows down-slope.

Fishtrap Creek Watershed Facts

- Size of the watershed: **23,665 acres; 36.96 square miles** – one of the largest lowland tributaries to the Nooksack River.
- Length of Fishtrap Creek: **17 miles**
- Length of Pepin Creek: **9 miles**
- Total length of Fishtrap watercourses: **110 miles**
- Number of threatened fish species in Fishtrap Creek: **4**
- Elevation range: **25 to 600 feet**

This report will introduce you to watershed-based management activities that are occurring in and around Fishtrap Creek. It is intended to celebrate this area and its natural resources, to understand the very real watershed challenges that we face, and finally, to look to the future. We can make the Fishtrap Creek watershed an example where solutions to these challenges are continually being pursued.



Watersheds do not follow municipal or national boundaries. The Fishtrap Creek watershed crosses an international boundary, but the border does not stop watershed issues. Water, and everything in it, flows south across the border and spawning salmon swim upstream into Canada. Working in the Fishtrap Creek watershed offers unique challenges and opportunities for international cooperation.



Fishtrap Creek Watershed

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History of the Fishtrap Creek Watershed

For centuries, the residents of a Nooksack Indian settlement (called Squa-ha-lish) depended on the salmon runs in Fishtrap Creek as their primary food source. They caught these salmon in a permanent trap that was located within the present day Lynden city limits. This trap was made of poles “resembling picket fence stakes that extended into the water, but did not reach the bottom of the creek, where a chute, some thirty feet long, extended” downstream and out of the water (Hawley 1945). The stakes forced the salmon into the chute where the fishermen could easily scoop them out of the creek.



This historical photo of a fishing wier was taken in the late 1880s on a river in Washington. Perhaps the fishtrap on Fishtrap Creek functioned like this one. *University of Washington Library*

“The whole country is one large swamp.” (Smith 1859)

The first European settlers came in the early 1860s following the Fraser River Gold Rush. They quickly noticed the incredible salmon runs in the creek. They named the creek, Fishtrap, after the simple and effective structure that they saw in the creek. Phoebe Judson, one of the early settlers, recounts the large fish trap where the Nooksacks caught thousands of salmon. (Judson 1925). Robert Hawley, another of the early settlers, describes watching “two men standing in the chute [of the fish trap], throwing out fish for hours at a time as fast as they could handle them” (Hawley 1945). The Nooksacks welcomed the early white settlers to share the bounty (Hawley 1945, Koert 1989).

Besides describing the incredible runs of salmon, these early settler accounts paint a picture of a landscape that looked quite different than it does today. Vast forests and wetlands once covered the land around Lynden.

Hawley (1945) described the landscape when he arrived: “The Nooksack Valley was a dense forest. The upland and hills were covered with fine fir, cedar, spruce, and hemlock. The lower ground, called second bottom, produced a heavy growth of cottonwood, alder, maple, birch and spruce. There were great areas of low, wet land {covered in brush}. Here and there were a few acres, which were seemingly too wet for trees and brush.”

The first land surveys further emphasize how wet the landscape was, especially north of Lynden. In 1859 the original land survey of the Guide Meridian north of Lynden states: “The country to the east, and west of this line is I think too low, and wet to admit of cultivation, and cannot be drained. The whole country is one large swamp” (Smith 1859). The early settlers called this area North Prairie. *See the map of these surveys to the right.*

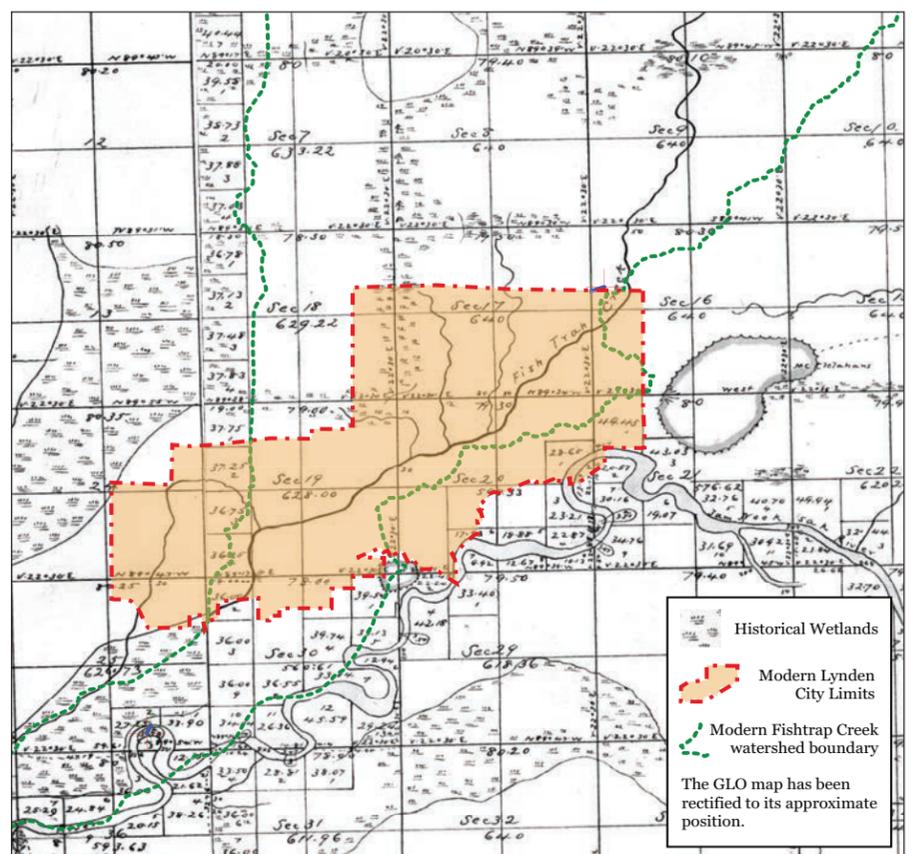
A large number of settlers came to the area in the early 1880s following

the clearing of the Nooksack River logjams in the 1870s (Hawley 1945, Koert 1989). These settlers were attracted to areas without tree cover even though they tended to be wet and required draining (Tremaine 1975). It must have been easier to dig a ditch than clear the trees. The first edition of the *Lynden Pioneer Press* in 1888 describes the early land conversion - “...where to-day are fine farms, two or three years ago was an almost impassable quagmire” (Lynden Pioneer Press Vol. 1 No. 1, 1888).

The efforts to drain the rich but wet landscape continued throughout the last century. Today, most of the tributary streams that flow into Fishtrap Creek are ditches that follow roads or drain agricultural fields.

“Where to-day are fine farms, two or three years ago was an almost impassable quagmire.”

(Lynden Pioneer Press, 1888)



The original General Land Office Survey map (drawn in 1872 by government surveyors) shows extensive historical wetlands in the area west of Fishtrap Creek and in the Nooksack Floodplain. The loss of these historical wetlands helps explain some of the difficult flooding situations we presently experience (see page 6).

References

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- Smith, 1859 *Puget Sound Guide Meridian Township No. 40 N. [Survey Field Notes] General Land Office*.
- Tremaine, D.G. 1975 *Indian and Pioneer Settlement of the Nooksack Lowland Washington, to 1890*. Bellingham WA: Center for Pacific Northwest Studies, Western Washington State College.

What You Can Do

No one can change history, but we all influence the future. Through both history and place, everyone who lives here is connected to the Fishtrap Creek watershed.

Remember stories of the past:

Tell your story of growing up in the watershed. Share your memories of swimming in the creek, seeing the fish in the creek, or the way land was used.

Reflect:

What can we learn from our history and the ways our ancestors used the land and water?

How will our management of the watershed be remembered?

Imagine:

What kind of place do you want your great-grandchildren (and theirs) to live in?



Photo: A Rocha

Fish in the Fishtrap Creek Watershed



NSEA works with local schools through their *Students for Salmon* program teaching children about watersheds, fish life cycles, and water quality. Here students from Isom Elementary explore Fishtrap Creek. *Photo: NSEA*



NSEA spawning survey volunteers gather data from the carcass of a Chinook salmon that spawned in Fishtrap Creek. *Photo: NSEA*

The name “Fishtrap” reflects a historical abundance of native, wild fish. While the numbers of fish have declined, there is still an impressive return of salmon to this stream every year.

Fish species that live here include the fall Chinook, chum, coho, steelhead, cutthroat trout,

lamprey, stickleback, Salish sucker, and Nooksack dace. Chinook salmon, steelhead trout, Salish sucker and Nooksack dace are listed as threatened under the Endangered Species Act.

Salmon spawn in gravel reaches of freshwater streams. The young develop in these creeks (many of the “minnows” in Fishtrap Creek are juvenile salmon) before traveling downstream to the ocean, where they spend most of their adult lives. After two to six years, depending on the species, they return to freshwater streams to spawn (reproduce). In the freshwater streams, they require clear, clean, cold water, gravel for digging their spawning redds (where they lay their eggs), and complex in-stream rearing habitat that provides shelter and food for the maturing fish. One way of providing that complexity is by adding large woody debris to the stream as a part of ongoing habitat restoration projects.

Salmon spawn in Fishtrap Creek and its major tributaries wherever sufficient gravels are present. Juvenile salmon use Fishtrap and its tributaries in areas that provide sufficient rearing habitat – clean, cold water with plenty of places to hide.

Ditches throughout the watershed, especially along Benson, Depot, Bender and Assink roads, provide winter rearing for salmon and trout but are typically dry during the summer and early fall months.

Lynden is a community where people are still deeply rooted in the land. Open fields, abundant produce, and streams teeming with fish are important components of this place. Because salmon are still here, we have the opportunity to

preserve this legacy of the Pacific Northwest. Some present-day stream and land management methods still conflict with habitat needs of salmon. We who live on and manage land in the watershed need to be thoughtful and creative in its management so that human and salmon communities can thrive here for generations to come.

What You Can Do

- Look for the salmon when they are here. Spawning Chinook, chum and coho can be seen in the creek from early-October into December – every year!
- Remember that the urban storm water system in Lynden drains directly into Fishtrap Creek. Keep chemicals, fertilizers, and lawn pesticides away from streams and roads.
- Plant riparian (stream-side) vegetation along Fishtrap Creek and its tributaries to promote healthy salmon habitat. Contact NSEA (see page 8) if you would like a riparian planting on your property.
- Report stream issues, highlights, and unique fish stories to A Rocha (see page 8).



Photo: A Rocha



Lynden Christian High School (LC) students prepare to release coho salmon fry into Fishtrap Creek. LC biology teacher Harlan Kredit has been connecting his students to the watershed for decades. Every year, the students raise and release 50,000 salmon fry and have planted 20,000 trees along Fishtrap Creek to improve riparian habitat.

Photo: Harlan Kredit

Nooksack Dace, Salish Sucker

These two fish species live in a very restricted geographic area around Puget Sound. They are formally considered “At Risk” in British Columbia. This status is equivalent to the U.S. threatened list. The issues facing them include: fragmented habitat, dredging, lack of cover, high temperatures, low oxygen, and competition from introduced species

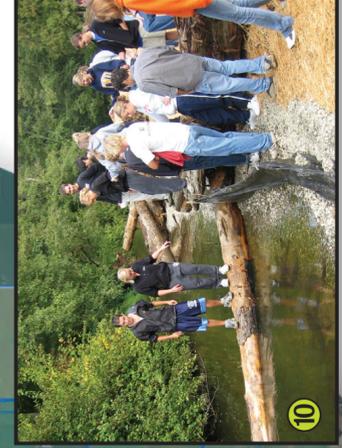
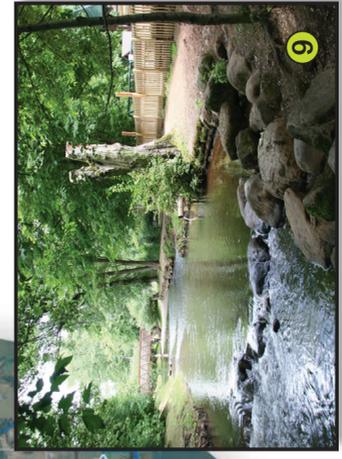
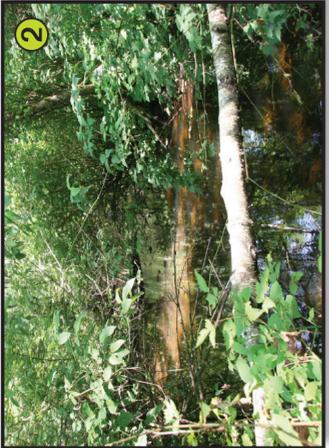


Nooksack dace. *Photo: Mike Pearson*

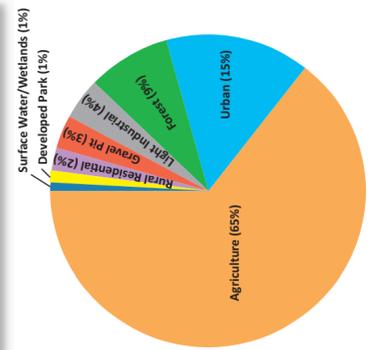


Salish sucker. *Photo: Mike Pearson*

THE FISHTRAP CREEK WATERSHED



1. A significant portion of the upper watershed is currently being quarried for gravel. *Photo: A Rocha*
2. In Pepin Creek, some of the best habitat for rearing and spawning is north of the border. *Photo: A Rocha*
3. Restoration projects along Pepin Creek and the border include placement of large wood and planting of riparian vegetation. *Photo: A Rocha*
4. The largest tributary of Fishtrap Creek has two names: north of the border it is called Pepin Creek; once it crosses the border it is split into two ditches and called Double Ditch Creek. *Photo: A Rocha*
5. In many areas, agricultural pastures are directly in contact with drainage ditches. This close contact can contribute to poor water quality. *Photo: A Rocha*
6. In degraded areas, Fishtrap Creek is choked by non-native, invasive reed canary grass and blackberries. *Photo: A Rocha*
7. While the historic wetland has let to great berry growing land, the wetland soils and amount of water create drainage challenges. The close proximity to some fields can lead to poor water quality. *Photo: A Rocha*
8. A volunteer with NSEA plants trees along Fishtrap Creek in 2002. Today, this part of the creek flows under dense canopy and is beginning to gain complex fish habitat. *Photo: NSEA*
9. Fishtrap Creek flows through a city park and under many urban road crossings. Remember that runoff from city roads flows straight into the creek. *Photo: A Rocha*
10. Lynden Christian High School students worked with NSEA on this large woody debris placement and riparian planting project. *Photo: Harlan Kreed*



Land Use Percentages

Floods, Flow, and Land Use

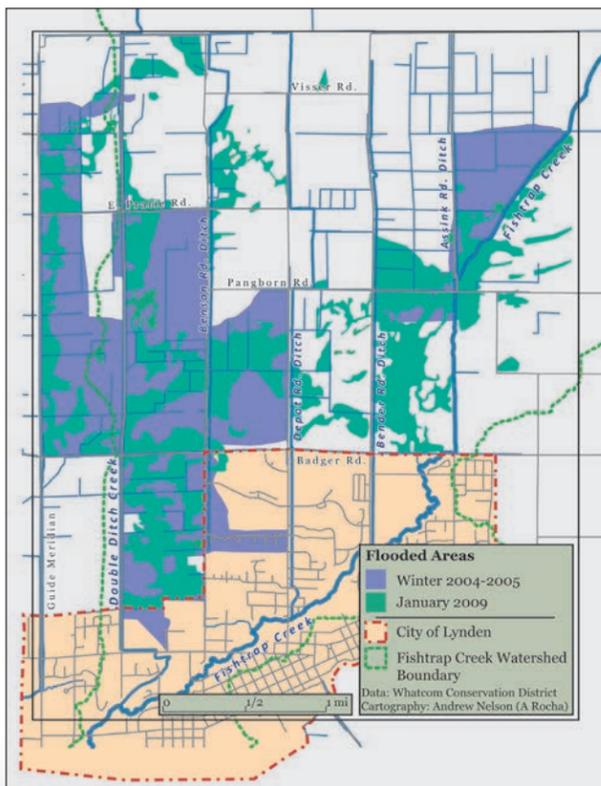


The flood of January 2009 dramatically impacted the fields and basements of many North Lynden residents. Photos: Whatcom Conservation District

A key problem in the Fishtrap Creek watershed is flooding associated with wintertime storms. Historically, most of the area north of Lynden and south of the border was covered by immense wetlands. These wetlands helped to buffer the seasonal variation in stream flow. They stored “excess” water in the winter and slowly released it through the dry summer months.

Over the past 100 years, as our population has increased in the watershed, we have drained a majority of those wetlands and decreased the permeability of the ground with buildings, rooftops, and parking lots.

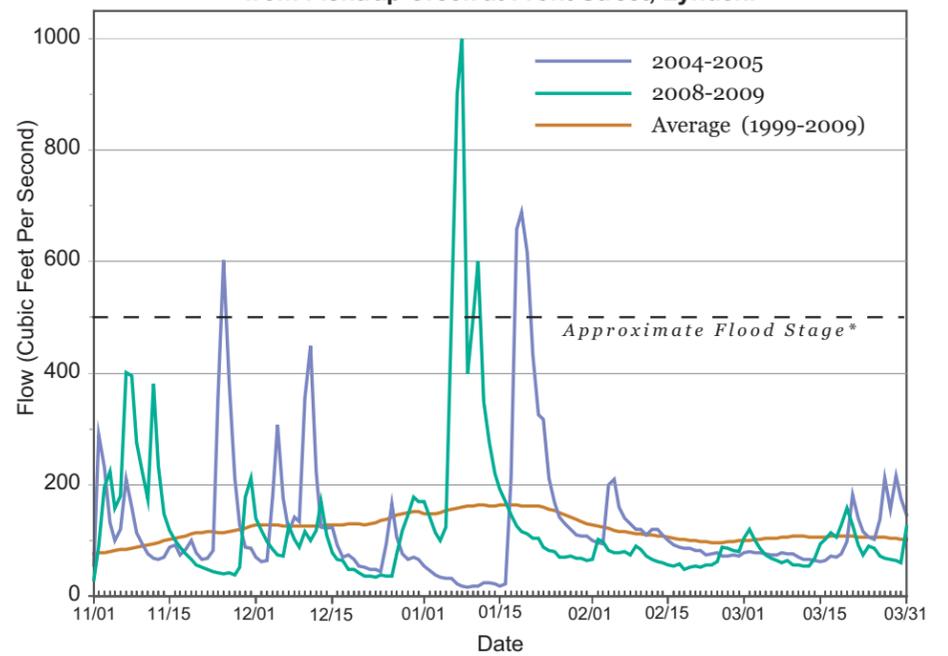
As a result, we have run into increasing difficulties dealing with the high winter flows. They are no longer stored in the ground but deflected into the stream channel and ditches, which are quickly overwhelmed and flooding occurs. These difficulties were particularly thrust into the forefront of our attention when the winter floods



of 2004 and 2009 inundated huge areas of agricultural land, roads, and many north-Lynden basements.

As our population within the watershed continues to increase, as we build more buildings and parking lots, and large storm events occur on a more frequent cycle, these floods are only going to get larger and more severe. This reality is forcing some difficult decisions regarding solutions to this on-going problem.

Hydrographs of Winter 2004-2005 and 2008-2009 Floods from Fishtrap Creek at Front Street, Lynden.



* No formal flood stage has been defined for Fishtrap Creek. This estimate is based on the two-year flood level and is very approximate.

What You Can Do

- Choose to landscape with permeable surfaces that allow water to soak into the soil and rain gardens to reduce your home’s runoff.
- Install rain barrels to harvest and productively use roof runoff.
- Plant a buffer around creeks and ditches. This will help shade out reed canary grass, which decreases flow capacity in the stream. The Whatcom Conservation District (see page 8) implements the Conservation Reserve Enhancement Program (CREP) that pays landowners to plant these buffer.
- Replace undersized culverts to allow conveyance of flood flows.
- Consider areas of your property where flood flows could be impounded during storm events to reduce downstream flooding.

Contact NSEA or the Whatcom Conservation District for further resources.

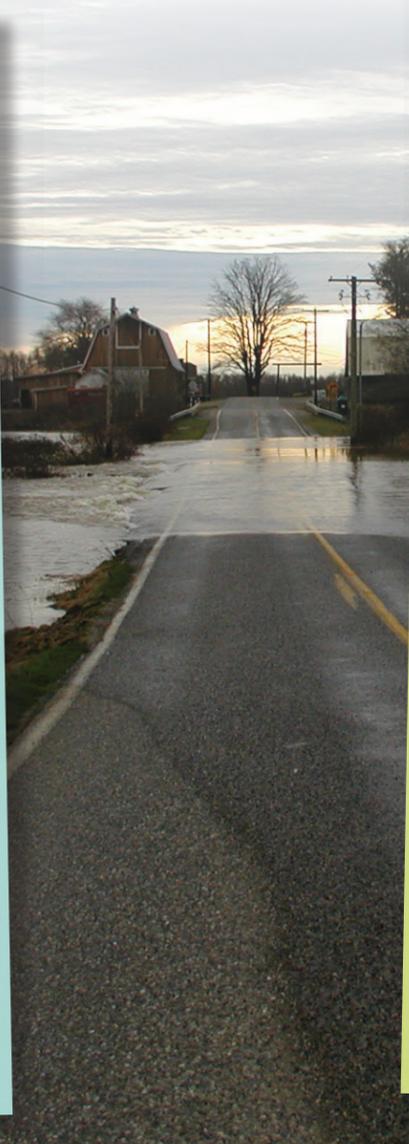
A Potential Solution: Increase the Water-holding Capacity on the Land

While every flood event can not feasibly be prevented, one potential method of reducing flood damage is to determine areas of the landscape that would hold the flood waters during high flow events. This water could then be released as the channels are able to handle the increased flow.

How could this be done?

- Reconstruct wetlands throughout the watershed that would hold water during flood events and throughout the dry summer months.
- Delineate a large water-holding area north of Lynden’s city limits where current agricultural land would be used to store high winter flows before it reaches the constrained channels in the city. This discussion would have to include fair financial compensation to the farmers for delayed planting, cutting, or cultivation in those areas. This compensation would likely be a small price to pay compared to the costs of frequent flood damage.

The City of Lynden is currently putting together plans and funding for a substantial channel reconstruction project along Double Ditch creek south of Badger Road (in an area that is very prone to flooding). This project would move the channel away from Double Ditch and Benson roads and direct water to a new channel that would be able to hold more water and also provide suitable fish habitat.



Water Quality

Declining water quality in the Fishtrap Creek watershed negatively impacts the health of fish in the creeks, people who play and fish in the creeks, and downstream aquatic and marine habitat. Some water quality challenges are listed below:

Challenge: Fecal Coliform Bacteria

High levels of fecal coliform bacteria indicate poor water quality in Fishtrap Creek. Fishtrap Creek (along with Bertrand) contributes a large percentage of the annual fecal coliform bacterial load to the lower Nooksack basin.

CAUSES: *Failing septic systems, livestock manure, waste from domestic pets and wildlife.*

Challenge: Nitrate Contamination

Although nitrogen is a critical nutrient, too much, as often occurs in Fishtrap Creek, fertilizes aquatic vegetation and algal blooms. These algal blooms remove oxygen from the water, which fish and aquatic organisms need to survive.

CAUSES: *Livestock manure, agricultural and domestic plant fertilization, failing septic systems.*

Challenge: Warm Temperature

Warm temperatures (above 62° F) stress aquatic organisms, especially salmon species. Temperatures in Fishtrap creek often reach 65° F during the summer months. Temperatures this high can be lethal to juvenile fish.

CAUSES: *Lack of canopy cover to shade stream, decreased groundwater input (which is cold) during the summer months.*

Challenge: Low Dissolved Oxygen

Dissolved oxygen is the oxygen available to aquatic organisms in the water and is necessary for their survival. Low dissolved oxygen levels frequently occur in Fishtrap Creek.

CAUSES: *Nitrogen fertilization causes algae to grow which removes oxygen from the water. Furthermore, warmer water holds less dissolved oxygen. A lack of stream complexity (rapids and turbulence) decreases places where water oxygenation occurs.*

Challenge: Pesticide Contamination

Several pesticides have been found in Fishtrap Creek in concentrations exceeding National Toxic Rule criteria. These pesticides include DDE (a breakdown product of DDT), Alpha-BHC, Chlorpyrifos, Dieldrin, Gamma-bhc (Lindane), and Parathion. These have varying harmful affects on the health of aquatic organisms.

CAUSES: *Pesticides applied to agricultural fields and urban and residential landscapes make their way through runoff and into streams.*



Remember that the water that falls on the roads, roofs, and driveways of our neighborhoods gets directed straight into Fishtrap Creek. It brings with it all the pollutants it picks up along the way. *Photo: A Rocha*

WATER QUALITY AND THE SHAPE OF A STREAM

In the Fishtrap Creek watershed, large streams (Fishtrap and Double Ditch or Pepin Creek) have a total length of only 26 miles, while small tributary ditches cover 84 miles.

Water, from these smaller streams, directly contributes both nutrients and contaminants to the larger streams. This means, from a water quality perspective, that careful land management around the smaller ditches is just as important as around the larger streams.

What You Can Do

As a farmland manager: implement farm best management practices for nutrients and pests.

As a residential landscape manager: limit pesticide and fertilizer applications to your lawn, maintain permeable surfaces so runoff can slowly filter into the soil, and be sure your septic system is functioning properly.

As a community: provide support for landowners facilitate stream buffer plantings. Support government and nonprofit stream and wetland restoration work throughout the watershed.

Contact the Whatcom Conservation District and NSEA for practical, safe methods of managing your property (integrated pest management, best farm practices, riparian plantings).



Water and contaminants in Fishtrap Creek Watershed flow downstream through Nooksack river into Bellingham Bay where they affect shellfish beds at Portage Island (pictured). *Photo: NWIFC*



Installing rain barrels to capture roof run-off is one way that residents can care for the stream.

Photos: A Rocha

Cooperators Stewarding the Fishtrap Creek Watershed



Students planting native riparian plants on an NSEA restoration project. *Photo: Harlan Kredit*



A Rocha is a nonprofit Christian conservation organization that educates the community about issues in the Fishtrap Creek watershed, organizes conservation science projects, and mobilizes volunteers to participate in restoration projects. **360-961-4061, www.arocha-usa.org/lynden**



The **City of Lynden** directly manages infrastructure in a significant portion of the watershed. Lynden Public Works is coordinating efforts to restore a significant reach of Double Ditch Creek. **360-354-3446, www.lyndenwa.org**



Lummi Natural Resources Department and **Nooksack Tribe Natural Resources Department** provide technical support and funding for salmon habitat restoration and monitoring of water quality in the Fishtrap Creek watershed.



Lummi Natural Resources Dept: 360-384-2267 www.lummi-nsn.org
Nooksack Natural Resources Dept: 360-592-5176 www.nooksack-tribe.org



The **Nooksack Salmon Enhancement Association (NSEA)** is a community-based nonprofit organization dedicated to restoring sustainable wild salmon runs in Whatcom County. They have monitored salmon runs in Fishtrap Creek for over a decade and have invested extensively in stream restoration projects. **360-715-0283, www.n-sea.org**



The **North Lynden Watershed Improvement District** is a watershed-based management agency that was formed to address resource management issues within the Fishtrap Creek watershed. Much of the information in this report is summarized from the North Lynden Watershed Improvement District's 2009 Management Plan for Drainage, Flooding, Irrigation and Fish Issues. **www.piersystem.com/go/site/2012**



The **Washington Department of Fish and Wildlife** promotes stewardship of fish and wildlife in Washington State. It coordinates activities of individuals, government agencies, and landowners to maintain and improve fish habitat. **www.wdfw.wa.gov**



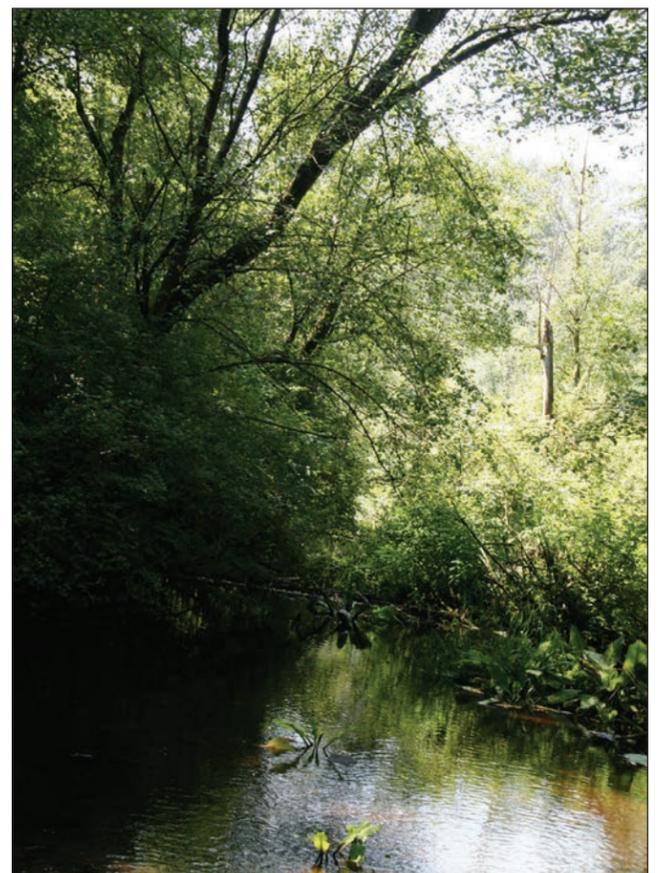
The **Washington State Department of Ecology** has coordinated watershed management plans for the Nooksack River basin (which includes Fishtrap Creek watershed) and enforces water quality laws. **www.ecy.wa.gov**



The **Whatcom Conservation District** monitors water quality, maintains landuse and other geographic information, and assists landowner implementation of best management practices to protect water resources. **360-354-2035x3, www.whatcomcd.org**



Fishtrap Creek winds its way through the rich farmland of the floodplain before emptying into the Nooksack River. *Photo: Whatcom Farm Friends*



A healthy off-channel wetland of Fishtrap Creek showing dense cover and diverse vegetation. *Photo: A Rocha*

Project Contributors

Funding: Washington State Department of Ecology and Nooksack Salmon Enhancement Association

Writing and Cartography: A Rocha USA (Andrew Nelson and Dave Timmer)

And You!!