



2020

City of Bothell's Water Quality Education Programs

Annual Summary

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Prepared for



Surface Water Division
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Prepared by



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Foreword

Christi Cox, Surface Water Program Coordinator – City of Bothell

The COVID-19 pandemic resulted in many Washington schools closing their doors to in-person learning starting in March 2020, so this year's program summary looks different than in years past. When Nature Vision realized that in-person learning was likely not going to be an option for the foreseeable future, they quickly adapted their most popular in-class programs into a virtual format. They initially partnered with Cascade Water Alliance, who provided funding to adapt Nature Vision's water conservation-related programs to the remote learning format. Because the foundation for remote student packets had already been built, City of Bothell, along with several other funders (City of Auburn Utilities, City of Lynnwood, King County Flood Control District, and King County Wastewater Treatment Division), was able to redirect existing program funding toward Nature Vision's efforts to create stormwater-related learning packets to continue meeting our specific youth stormwater education program goals.

Because of this collaborative effort, Nature Vision now offers remote curriculum options for teachers, parents, and caregivers to use during the current school year and beyond. These programs can accommodate both fully remote and hybrid teaching options for every school district Nature Vision serves. The programs are designed with flexibility to best fit teachers' schedules, student needs, and current Washington State K-12 Learning Standards (NGSS) with STEM education as a central focus.

City of Bothell appreciates its partnership with Nature Vision. Even during a worldwide pandemic like many of us have never experienced, Nature Vision took this challenge as an opportunity rather than a setback. Nature Vision's innovation and adaptability continue to be valuable resources for our schools and other community learning organizations.

Description and purpose

The City of Bothell's Water Quality Education Program continues to educate students about pollution prevention, stormwater quality, and watershed ecosystem health. Students that participate in these workshops learn how natural water systems keep water healthy, how human built water systems interact with these natural systems, and what they can all do to be good stewards of our watersheds. This program is helping to create awareness and foster sustainable practices and behaviors in the City of Bothell.

This report presents results from the eleventh year of evaluating these programs.

Evaluation goals and methods

Goal 1: Student retention

To evaluate the retention of lessons in short-term and long-term student memory (short-term immediately following the lessons, long-term after 60 days).

- **Method 1** – select classroom surveys for grades 3-12 (to account for reading levels)
- **Method 2** – follow-up surveys after 60 days when applicable
- **Method 3** – student letter analysis (when letters are more than simple thank-you letters)
- **Method 4** – select student responses to essay questions

Goal 2: Teacher satisfaction

To evaluate how the program is received by teachers (i.e. are the workshops helping teachers meet state and local education standards and therefore desired by teachers as a teaching resource).

- **Method 5** – post-workshop email survey

Goal 3: Agency goals met

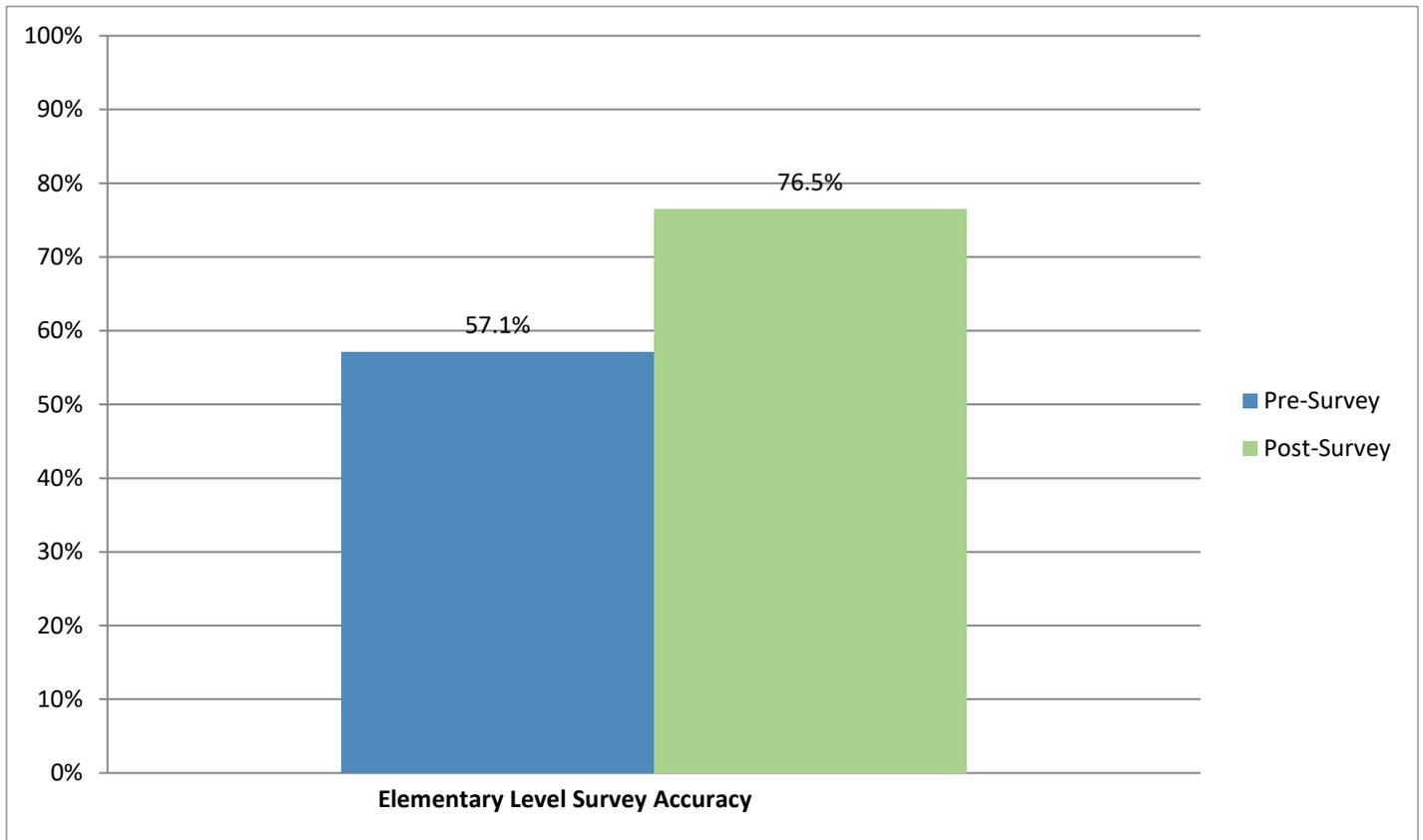
To evaluate how Nature Vision can more directly meet City of Bothell's goals within NPDES permit and budget parameters.

- **Method 6** – class observations (conducted by City of Bothell staff when school is in session, not included in this report)

Surveys and results

The five-question classroom evaluation surveys given before and after each in-class delivered program show significant short-term retention of key facts by students at the elementary school level. Significant is defined as a 10-point or greater spread between pre- and post-surveys. Four elementary level classes of students participated in the surveys. The survey results showed that the 76 students that participated had an average score of 57.1% on the survey prior to the workshop (pre-survey). The 76 students that participated in the post-survey had an average score of 76.5% immediately following

the workshop. This 19.4 point spread between pre- and post-surveys is significant. 60-day surveys were not possible this year due to COVID-19 school closures.



2020 Elementary school level pre- and post-survey results

Aside from several thank-you letters, Nature Vision did not receive any student letters with content from City of Bothell schools during the survey period, despite leaving prompts and postage paid envelopes at schools, and reminding teachers via email. Nature Vision hopes to receive some student letters with content in 2021, or when schools are open to in-person learning again.

Select student responses to questions

Further examination of specific survey questions yielded significant results as well. These results are presented below, and only include responses from students who received in-person programs from Nature Vision before COVID-19 caused school closures. For fill-in questions, results were compiled by the number of students that responded the same way. For example, if a student response to *How can we help keep water in our rivers, lakes, streams and the Puget Sound healthy?* is *Pick up after your dog* from 10 students, that means that 10 students responded to this question in the same way either in the same class or combined classes. Many students list multiple options on fill-in questions. Nature Vision only compiles the answers to the fill-in questions on post-surveys, as pre-survey fill-in questions have little to no information from students.

Results from **Watershed Ecosystems** pre- and post-surveys

- **Program taught 2/28/20 at Crystal Springs Elementary (Thomas)**

Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-survey

of students: 10/19

Percent: 52.6

Post-survey

of students: 13/19

Percent: 68.4

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-survey

of students: 13/19

Percent: 68.4

Post-survey

of students: 14/19

Percent: 73.7

Question #3: Only people get their water from a watershed. A) True B) False

Pre-survey

of students: 17/19

Percent: 89.5

Post-survey*

of students: 17/19

Percent: 89.5

** This is an unusual result and may be considered an outlier*

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-survey

of students: 11/19

Percent: 57.9

Post-survey*

of students: 8/19

Percent: 42.1

** This is an unusual result and may be considered an outlier*

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams, and Puget Sound healthy.

Post-survey

of students

Pick up pet waste

8

Take shorter showers

1

Conserve water

2

Fix leaks

4

Go to a commercial car wash

5

Plant water-conserving plants

2

Use compost

2

- **Program taught 2/28/20 at Crystal Springs Elementary (Ames)**

Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-survey

of students: 14/19
Percent: 73.7

Post-survey

of students: 17/19
Percent: 89.5

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-survey

of students: 9/19
Percent: 47.4

Post-survey

of students: 16/19
Percent: 84.2

Question #3: Only people get their water from a watershed. A) True B) False

Pre-survey

of students: 16/19
Percent: 84.2

Post-survey

of students: 18/19
Percent: 94.7

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-survey

of students: 7/19
Percent: 36.8

Post-survey

of students: 12/19
Percent: 63.2

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams, and Puget Sound healthy.

Post-survey

Pick up pet waste

Conserve water

Fix leaks

Go to a commercial car wash

Use efficient appliances

Reuse water

Plant water-conserving plants

Use compost

of students

6

2

4

3

2

1

2

6

- **Program taught 2/28/20 at Crystal Springs Elementary (Yoder)**

Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-survey

of students: 13/18
Percent: 72.2

Post-survey*

of students: 13/18
Percent: 72.2

** This is an unusual result and may be considered an outlier*

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-survey

of students: 11/18
Percent: 61.1

Post-survey

of students: 15/18
Percent: 83.3

Question #3: Only people get their water from a watershed. A) True B) False

Pre-survey

of students: 15/18
Percent: 83.3

Post-survey

of students: 16/18
Percent: 88.9

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-survey

of students: 10/18
Percent: 55.6

Post-survey

of students: 14/18
Percent: 77.8

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams, and Puget Sound healthy.

Post-survey

Pick up pet waste
Conserve water
Fix leaks
Go to a commercial car wash
Plant water-conserving plants
Use compost

of students

7
1
3
3
3
1

- **Program taught 2/28/20 at Crystal Springs Elementary (Romano)**

Question #1: What is a watershed? A) Shed filled with water B) Area of land where water drains and collects at the lowest spot C) An area set aside to protect wildlife

Pre-survey

of students: 17/20

Percent: 85.0

Post-survey

of students: 19/20

Percent: 95.0

Question #2: Plants help keep water in a watershed. A) True B) False

Pre-survey

of students: 8/20

Percent: 40.0

Post-survey

of students: 11/20

Percent: 55.0

Question #3: Only people get their water from a watershed. A) True B) False

Pre-survey

of students: 16/20

Percent: 80.0

Post-survey

of students: 19/20

Percent: 95.0

Question #4: Roads and parking lots are also part of our watershed. A) True B) False

Pre-survey

of students: 7/20

Percent: 35.0

Post-survey

of students: 8/20

Percent: 40.0

Question #5: List 3 or more ways you can help keep water in our rivers, lakes, streams, and Puget Sound healthy.

Post-survey

Pick up pet waste

Fix leaks

Recycle

Plant water-conserving plants

Use compost

of students

5

1

2

2

1

The four classes surveyed had been learning about water conservation prior to Nature Vision's visit, which affected their responses to question #5.

Feedback from teachers

Teacher Michelle taught us a lot about salmon and their importance to a healthy environment. She had lots of great classroom management strategies and overall students were engaged. They really liked the salmon "puppets" and I wish they could have used those tools as hands on models for the salmon cycle

in conjunction with the actual salmon eggs. They could have even done a game where they have to get in the correct order of the cycle or something that would have been active. Students LOVED the pelts, skulls, and the salmon eggs too. Thank you for a great class!

- Kerry Pigott, Westhill Elementary, 2nd grade (Michelle – 1/21/20 – Salmon Cycle)

I want to first thank Nature Vision for coming out to teach my class about the life cycle of salmon. We studied cycles in the beginning of the year so it was cool to make another connection to the concept.

Are there any improvements you would like to suggest? *My only improvement suggestion would be making the presentation a little shorter; my students were excited and engaged but they got a little wiggly towards the end.*

Would you like to see these programs in your school next year? *I would love to have another program next year!*

My students already compost and we talk about water use but I think now that they know about salmon and how important water is for them they might be better at conserving water when they can. Thank you again for coming out to Westhill! We had a great time!

- Ashley Amundsen, Westhill Elementary, 2nd grade (Brooke – 1/31/20 – Salmon Cycle)

Are there any improvements you would like to suggest? *It was great!*

Would you like to see these programs in your school next year? *Yes!*

Please share any special stories or examples of how this program helped your students gain awareness, understanding, or appreciation of ecological concepts. *The students loved examining the worms and components of the compost. They learned a lot.*

- Karen Kapovich, Woodin Elementary, 4th grade (Sarah – 2/6/20 – Healthy Water, Healthy Soil)

Would you like to see these programs in your school next year? *Yes. Having them virtual made it very easy to show when we needed them to. Would we prefer in person, yes, but this was good.*

Would you encourage this sponsor to fund this program next year? *Yes. It reaches many children and brings awareness to salmon in our state and what they can do to help.*

- Maria Hettle, Woodin Elementary (Maureen – 9/29/20 – Remote Salmon Cycle)

In-person program effectiveness

This eleventh year of evaluating the City of Bothell Water Quality Education Programs has shown the programs to be effective in helping students learn about and understand stormwater quality, pollution prevention, how natural water systems work, and human interactions with these water systems. Additionally, students have learned best management practices to help keep our watershed healthy alongside their families and friends.

The short-term retention of the key messages and concepts is on par with previous years' results. Students are showing an excellent point spread between pre- and post-surveys, indicating significant short-term retention.

As mentioned before, the classes could not take 60-day surveys due to school closures. Exposure to key messages in schools each year is helping students to develop the desired culture of sustainability in our watersheds. Nature Vision believes this is a result of students participating in Nature Vision's programs from year to year as they progress through grade levels, and schools being willing to integrate standard-supportive environmental education programming into their curriculum. Students that participate in these classes through elementary and secondary education build a strong knowledge base, so Nature Vision can take them much further in their learning and thus willingness to take action.

Programs delivered and students reached in 2020

Under KCD funding from 1/1/20-6/30/20 we taught 8 programs for 179 students. We taught 7 programs for 178 students under SNO funding. We taught 15 programs for 357 students total in winter/spring 2020.

Under KCD funding from 9/1/20-12/31/20 we taught 3 programs for 69 students. We taught 4 programs for 89 students under SNO funding. We taught 7 programs for 158 students total in fall 2020.

In 2020, Nature Vision delivered **22 programs for 515 students** in schools within City of Bothell, despite schools being closed for a time, and then moving to remote learning for COVID-19.

Teachers are already registered for some winter/spring 2021 programs as well. From 1/1/21-6/30/21, Nature Vision has 36 programs within City of Bothell for 871 students registered. These numbers will increase in January with upcoming advertising.

Adapting to remote learning with student packets

Nature Vision was unable to complete as much in-person programming as usual this winter/spring and in fall due to COVID-19 closures. However, teachers, parents, and students did receive access to eight weeks of robust remote curriculum in the form of student packets.

Nature Vision released seven packet topics, each with one packet for K-2, 3-5, 6-8, and 9-12 students: Ecosystems (two weeks of curriculum), Watersheds, Humans and Water, Ecological Impacts, Water Quality, Human Systems, and Invasive Weeds. We sent the curriculum as it was released to teachers in City of Bothell schools. Teachers had the ability to ask questions and attend or watch our accompanying Facebook live sessions for each packet.

See <https://naturevision.org/student-packets> and <https://www.facebook.com/NatureVisionorg/live/>.

These packets were downloaded a significant number of times from their release date until the present.

Packet downloads in 2020

From the Nature Vision website, we can track how many times each packet was clicked on since the release date. If each of these is a teacher, then we can assume they are using for their entire classes. However, we know some of these clicks are students, parents, and funders too. Each click can be considered a download.

Ecosystems Packets

From 4/10 (1st release)-12/11/20

- K-2: 1543 clicks
- 3-5: 1304 clicks
- 6-8: 362 clicks
- 9-12: 282 clicks

Total: 3491 so far

Watersheds Packets

From 4/24-12/11/20

- K-2: 433 clicks
- 3-5: 474 clicks
- 6-8: 186 clicks
- 9-12: 144 clicks

Total: 1237 so far

Humans and Water Packets

From 5/1-12/11/20

- K-2: 342 clicks
- 3-5: 360 clicks
- 6-8: 138 clicks
- 9-12: 152 clicks

Total: 992 so far

Ecological Impacts Packets

From 5/15-12/11/20

- K-2: 346 clicks
- 3-5: 336 clicks
- 6-8: 113 clicks
- 9-12: 132 clicks

Total: 927 so far

Water Quality Packets

From 5/22-12/11/20

- K-2: 159 clicks
- 3-5: 183 clicks
- 6-8: 90 clicks
- 9-12: 88 clicks

Total: 520 so far

Human Systems Packets

From 5/29-12/11/20

- K-2: 137 clicks
- 3-5: 162 clicks
- 6-8: 81 clicks
- 9-12: 90 clicks

Total: 470 so far

Invasive Plants Packets

From 5/29-12/11/20

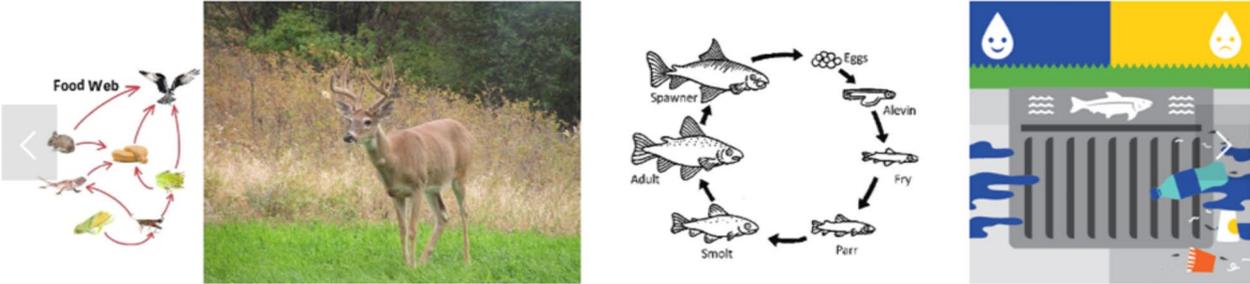
- K-2: 138 clicks
- 3-5: 153 clicks
- 6-8: 56 clicks
- 9-12: 85 clicks

Total: 432 so far

The download numbers will continue to increase over time. Teachers have been focused on how to best run remote classes and are coming back to science more heavily beginning in January 2021.

INVASIVE PLANTS K-2	INVASIVE PLANTS 3-5	INVASIVE PLANTS 6-8	INVASIVE PLANTS 9-12
ECOSYSTEMS K-2	ECOSYSTEMS 3-5	ECOSYSTEMS 6-8	ECOSYSTEMS 9-12
WATERSHEDS K-2	WATERSHEDS 3-5	WATERSHEDS 6-8	WATERSHEDS 9-12
HUMANS & WATER K-2	HUMANS & WATER 3-5	HUMANS & WATER 6-8	HUMANS & WATER 9-12

Ecological Impacts, Water Quality, and Human Systems were developed with support from the [City of Auburn Utilities](#), [City of Bothell](#), [City of Lynnwood](#), [King County Flood Control District](#), and [King County Wastewater Treatment Division](#). Invasive Plants was developed with support from [King County Noxious Weed Control Program](#). Ecosystems, Watersheds, and Humans and Water packets were developed with support from [Cascade Water Alliance](#). All packets are now available as a free download for teachers and students.



Ecological Impacts, Water Quality, and Human Systems packets team: [City of Bothell Staff Christi Cox](#), [Nature Vision Staff Rob Healy](#), [Allie Hotzfeld](#), [Scott Jenkins](#), [Mike Munro](#), [Melissa Pendleton](#), [Michelle Song](#), [Kathryn Sooter](#), [Katie Engel](#), [Courtney Rogers](#), and [Ginny Sanchez Ballard](#).

Screenshot of student packet page at www.naturevision.org/student-packets

These packets are now available for teachers year-round. They can be integrated as post-program resources and are also available to teachers that may have trouble fitting in classroom presentations. There are many applications for this work, and it extends the reach of existing services.

Remote curriculum and classes

Nature Visions' new remote curriculum is available to schools during remote learning, and will also be available if schools return to in-person but visitors are not allowed. This programming can also be utilized if teachers prefer this as a delivery method in the future. The remote curriculum is set up in a similar way to Nature Vision's existing programming. Each program utilizes high quality videos for content and stewardship messages, alongside accompanying activities written so that teachers can assign them easily to students for asynchronous or synchronous learning. Parent/caregiver notes are also provided. These activities require few or no materials, which students can gather from common household objects. Teachers are supported in full along the way. Each class may also participate a 10-15 minute video call Q&A session with a Nature Vision Educator to follow their program. See more information at <https://naturevision.org/remote-learning-programs>.

DAY 3
Wetlands

Wetlands are places with lots of water for most of the year. You can find wetlands all over our watershed - in cities, your neighborhood, at your school, or in the forest! There are different types of wetlands, too. To name a few, some are called ponds, swamps, or creeks. Also, all wetlands have three parts and they need to have all three parts to be a true wetland.

All wetlands need to have water! It's no surprise that all wetlands have water. It can be a lot or little bit of water, but the water needs to be in the wetland most of the time.



All wetlands have plants! Not just any kind of plant, too. Plants that love water are going to do well in wetlands. Plants like cattail, skunk cabbage, or duckweed. These are great examples of plants that love water and living in a wetland.



CATTAILS SKUNK CABBAGE DUCK WEED

24



Excerpt from K-2 Ecological Impacts student packet

Remote topics available

- Watershed Ecosystems Grades K-2, 3-5, 6-8
- Salmon Cycle K-2, 3-5, 6-8, 9-12
- Water Cycles Round/Terrariums K-2, 3-5
- Toadally Amphibians K-2, 3-5
- Water Conservation K-2, 3-5, 6-8
- Water Supply K-2, 3-5, 6-8
- Natural Filters K-2, 3-5
- Coming soon: Healthy Water, Healthy Soil K-2, 3-5, 6-8, 9-12



Nature Vision Educator delivering the Salmon Cycle program remotely.

Photo credit: Nature Vision, Inc.

City of Bothell sponsorship

Stewardship videos within the remote curriculum mention City of Bothell by name as the sponsor of the programs for their schools. Emails with materials for teachers and post program evaluations also mention City of Bothell.

Additionally, many teachers are now taking advantage of 45-minute to 60-minute video call programs. Nature Vision is able to offer all topics from the City of Bothell program menus here below as a live interactive video presentation on the call platform of the teacher's choice. These programs are going very well, and Nature Vision plans to continue with them.

- https://naturevision.org/s/2019-COB-Water-Education_Elementary.pdf
- https://naturevision.org/s/2019-COB-Water-Education_Secondary.pdf

Program costs

Nature Vision used \$8926.25 of the \$8990.00 available City of Bothell program budget in 2020.