From:	Nathaniel Kale
To:	Scott Boettcher
Cc:	Pat Allen; Mark Biever; colronjanaverill@comcast.net; dcurtis@westconsultants.com
Subject:	RE: Thurston County Chehalis Local Project Recruitment Monitoring Telemetry Proposal
Date:	Tuesday, July 17, 2018 4:18:40 PM

Scott,

Dave put me in touch with your vendor OneRain, specifically Mike Zukowski (not sure about the spelling there). I ran the IT side of the grant request by him, which is basically 1) we contract with a vendor to develop an API to make our data available on the web, and 2) OneRain writes the software necessary to pull data into their system from the API that our contracted vendor develops. Mike confirmed that the additional $5k that I added to the grant request at Dave's request is sufficient to do that, and that the proposal is technically sound.

Do you need anything else from us?

Nat Kale
(360) 786-5549 office
(360) 480-1605 cell

From: Scott Boettcher [mailto:scottb@sbgh-partners.com]
Sent: Saturday, July 14, 2018 9:21 AM
To: Nathaniel Kale <kalen@co.thurston.wa.us>
Cc: Pat Allen <AllenP@co.thurston.wa.us>; Mark Biever <Bieverm@co.thurston.wa.us>; colronjanaverill@comcast.net; dcurtis@westconsultants.com
Subject: RE: Thurston County Chehalis Local Project Recruitment Monitoring Telemetry Proposal

Nat – A couple clarifying information needs from our 2019-21 local projects reviewing team re your proposed project (https://www.ezview.wa.gov/DesktopModules/Documents2/View.aspx?tabID=28124&alias=1492&mid=69498&ItemID=6168):

1. What datum are these gages set to? Is it NAVD 88?
2. Have you coordinated with Dave Curtis (cc'd above) about operationalizing connection to the Flood Warning System? We need to ensure, if funded, all costs of bringing the Thurston County gages on line to the Flood Warning System are known and understood in advance. Please confirm you two have spoken on this subject.

Thanks for your help. **Please get back to me by the end of the day July 20th at the latest**.

Thanks again.

Scott

Scott Boettcher, Staff
Chehalis River Basin Flood Authority
360/480-6600

scottb@sbgh-partners.com

From: Scott Boettcher
Sent: Tuesday, July 3, 2018 4:40 PM
To: Nathaniel Kale <kalen@co.thurston.wa.us>
Cc: Pat Allen <AllenP@co.thurston.wa.us>; Mark Biever <Bieverm@co.thurston.wa.us>; colronjanaverill@comcast.net
Subject: RE: Thurston County Chehalis Local Project Recruitment Monitoring Telemetry Proposal

Thank you Nat. Your proposal has been rec'd on time.
Scott

Scott Boettcher, Staff
Chehalis River Basin Flood Authority
360/480-6600
scottb@sbgh-partners.com

From: Nathaniel Kale <kalen@co.thurston.wa.us>
Sent: Tuesday, July 3, 2018 4:32 PM
To: Scott Boettcher <scottb@sbgh-partners.com>
Cc: Pat Allen <AllenP@co.thurston.wa.us>; Mark Biever <Bieverm@co.thurston.wa.us>
Subject: Thurston County Chehalis Local Project Recruitment Monitoring Telemetry Proposal

Scott,

Please see the attached Local Project Recruitment Form for the 2019-2021 funding cycle.

Per the instructions on https://www.ezview.wa.gov/site/alias__1492/37282/2019-21-Local-Projects-Recruitment-Process.aspx, I understand this to be everything that is required for this submittal. Please let me know if you require any additional materials.

Thanks, and have a great holiday,

Nat Kale, AICP
Water Resources Specialist
Thurston County Stormwater
929 Lakeridge Dr SW
Olympia, WA 98502
(360) 786-5549 office
(360) 480-1605 cell

From: Nathaniel Kale
To: Scott Boettcher
Cc: Pat Allen; Mark Biever; colronjanaverill@comcast.net; dcurtis@westconsultants.com
Subject: RE: Thurston County Chehalis Local Project Recruitment Monitoring Telemetry Proposal
Date: Tuesday, July 17, 2018 1:00:49 PM

Scott,

1. Currently the gages are set to an arbitrary datum; we record the staff gage value. It would be relatively straightforward for us to convert these to NAVD 88 to match the rest of the Chehalis gage network; we have had the County surveyors survey in staff gages for us in the past. We have no problem with that being a condition of the grant.

2. Dave and I did have some back & forth about connecting to the Flood Warning System, but we didn't go into technical details. He recommended that we add another approximately $5k to the request, which I did. I did leave a voicemail this afternoon; hopefully we get a chance to chat soon.

I'm leaving for a long weekend on the 20th, so I'll get back to you by the end of the day on the 19th at the latest.

Nat Kale
(360) 786-5549 office
(360) 480-1605 cell

From: Scott Boettcher [mailto:scottb@sbgh-partners.com]
Sent: Saturday, July 14, 2018 9:21 AM
To: Nathaniel Kale <kalen@co.thurston.wa.us>
Cc: Pat Allen <AllenP@co.thurston.wa.us>; Mark Biever <Bieverm@co.thurston.wa.us>; colronjanaverill@comcast.net; dcurtis@westconsultants.com
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Thanks, and have a great holiday,

Nat Kale, AICP
Water Resources Specialist
Thurston County Stormwater

Scott Boettcher

From: Scott Boettcher
Sent: Tuesday, July 3, 2018 4:49 PM
To: 'Nathaniel Kale'
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Thanks, and have a great holiday,

Nat Kale, AICP
Water Resources Specialist
Thurston County Stormwater
929 Lakeridge Dr SW
Olympia, WA 98502
(360) 786-5549 office
(360) 480-1605 cell

CHEHALIS RIVER BASIN FLOOD AUTHORITY

2019-21 Local Projects Recruitment Form
Chehalis Basin Local Flood Relief

A. What are local flood relief projects? -- In general, local projects provide predominantly localized, quantifiable benefit, are capable of being completed within the funding cycle, are supported by the jurisdiction within which the project is proposed, and are vetted and advanced through a public entity like a City, County, Conservation District, Port, etc. Local projects are additionally envisioned as helping with local flood relief (reducing flood damage and impacts), not adverse to fish, wildlife, or habitat, and (where possible) providers of multiple, quantifiable benefits (per Part IV below).

B. What kinds of local flood relief projects are likely to be logical funding candidates for 2019-21?

- Projects that complete an effort previously funded/started.
- Projects that advance improved emergency response.
- Projects that advance improved public infrastructure protection.
- Projects that advance improvements in local or community flood hazard reduction, including local flood proofing projects (e.g., elevations, buy-outs, foundation venting, etc.).
- Projects that advance Conservation District initiated flood hazard reduction (e.g., farm pads, evacuation routes, bank erosion/bank stabilization, etc.)
- Projects that demonstrate innovation (e.g., thinking beyond traditional bank stabilization techniques in favor of natural system designs), partnerships, cost-sharing/leveraging resources, multiple benefits, public engagement and community planning, and proactive vetting with agencies and tribes.
- Projects that demonstrate informed decision-making through hydraulic analysis/understanding.
- Projects that demonstrate early planning involvement, information exchange with regulatory agencies.
- Projects typically not in excess of $3M for the stage/phase being funded.

C. Are there projects that would not be good candidates?

- Projects that seek to utilize State Capitol Budget dollars for uses not typically allowed (e.g., maintenance and repair work, cost-sharing under select circumstances, etc.).
- Projects likely to increase potential for flood damage upstream or downstream.
- Projects with unmitigable adverse environmental impacts, significant uncertainty regarding potential environmental impacts, or significant concerns about obtaining regulatory approval.
- Projects not sponsored by a public entity.
- Projects not located in the Chehalis Basin.
- Projects that do not show quantifiable benefit.

Instructions:

a. Please submit project requests (via this form) to scottb@sbgh-partners.com no later than 5:00 p.m., 7/03/2018.

b. Please submit one request form for each project proposed, even past projects previously or partially funded.

c. Note: Parts III and IV [marked by "(**)"] will be scored for review/evaluation. Parts I, II, and V will not be scored.

d. See Appendix A for overview of 2019-21 Local Projects Recruitment Process (and schedule), or https://www.ezview.wa.gov/site/alias__1492/37282/2019-21-Local-Projects-Recruitment-Process.aspx.

Part I General	
1. **Date:**	Date of Application: June 28, 2018
2. **Project Name:**	Thurston County Weather and Stream Monitoring Telemetry
3. **Project Location --** Please identify location of the project as precisely as possible, including providing decimal degree latitude/longitude coordinates.	11 sites across southwest Thurston County: LAT LON 46.92835 -123.008 46.94024 -122.988 46.80698 -123.072 46.79675 -123.012 46.8063 -122.416 46.85578 -122.579 46.90223 -123.023 46.84761 -123.048 46.86128 -122.841 46.79028 -122.734 46.79431 -123.024
4. **Project Contact** -- Please identify who will be responsible for overseeing and managing the project (i.e., name, email, telephone number, etc.).	Mark Biever bieverm@co.thurston.wa.us (360) 867-2070
5. **Sponsor --** Please identify the sponsor, lead organization, primary entity, etc. responsible for this project. Please identify key partners responsible for assisting in delivery or implementation of project.	Thurston County, Community Planning and Economic Development, Stormwater Utility

Part II Description, Timing, and Cost	
6. **Project Description --** Please describe the project, what is intended to be accomplished, the benefits to be accrued (flood hazard reduction and otherwise) and to whom. Please also identify what phase/stage of the project funding is being sought for (e.g., planning, preliminary engineering, final design and permitting, construction, etc.).	Thurston County maintains four stream gages in the Chehalis River basin and seven weather monitoring stations in and around the basin. At present none of those stations are telemetered, so they are not connected to the Chehalis River Basin Flood Authority's gage network, and do not assist in flood warning and prediction. In the past year Thurston County has successfully piloted telemetry setups using cellular monitoring equipment at water and weather monitoring sites. Data from these sites are pushed to Thurston County's newly acquired GData database, and are updated on the web every hour. Thurston County proposes to use funds to upgrade eleven existing sites with proven telemetry equipment (cellular in most cases, satellite in one remote location where cellular signal is unavailable), and add one new weather monitoring site near Bucoda. In addition, Thurston County proposes to hire a software developer to 1) update the current data retrieval packages to import the data from the new sites, 2) build an API that will allow the Flood Authority to easily pull data from any Thurston County gage at any time, and 3) make any necessary modifications to the Flood Authority's Contrail data system. Adding the Thurston County stream and weather monitoring sites to the Flood Authority network would significantly upgrade the early warning system, as the Black and Skookumchuck rivers and their tributaries are in the headwaters of the basin and should respond to major rain events before the rest of the Chehalis River. In addition, Thurston County has years, in some cases several decades, of data at each of the existing monitoring sites, which could be used to further refine and calibrate the hydrologic and hydraulic models that underpin the warning system.

Part II Description, Timing, and Cost	
7. **Project Timeline --** Please describe the timeline and phases for completion of the overall project and describe the timeline for completion of the phase to be funded by 19-21 funding.	**Phase 1: Hardware Acquisition**. Weather stations will be Campbell Scientific CR300 dataloggers with built-in cell transmission, coupled with a ClimaVue 50 all-in-one weather sensor. One exception will be the Deschutes Falls Park site, which cannot receive cellular signals and already has a datalogger and an all-in-one sensor; it will be outfitted with a satellite modem. Stream gages will be equipped with In-Situ Tube 300 telemetry devices, coupled with RuggedTROLL 200 piezometers. Staff gages and stilling wells are already installed at all four stream sites. **Phase 2: Installation**. Thurston County staff will install hardware as it arrived, swapping out old devices and making adjustments to wells, boxes, and mounting hardware as needed. Stream installations will be less than 1 day, because the hardware is already in place. Weather stations will have to be modified to accept new sensors, and could take 1-3 days each. The new station in Bucoda will have to be constructed from scratch; field time will probably be 1-3 days, but overall time to complete might be closer to 2 weeks to give time for design, material acquisition, setting concrete, etc. **Phase 3: Data Integration**. During phases 1 and 2 Thurston County will concurrently contract with a software developer for three items. First, to update and write SSIS packages to import data from the FTP site the instruments will be uploading data to, into the GData database. Second, to create an API for simple on-demand querying of data from the GData database. Third, to work with the Flood Authority to make any necessary modifications to Contrail to ingest the new data. After the sites are installed and operating, the developer will execute these three tasks. **Timeline**: In August 2019 Thurston County staff will execute Phase 1, anticipating equipment arrival in early February. In mid-September County staff will inspect the equipment & ensure it arrived intact. By the end of September Phase 2 will begin. This phase will extend through the end of December, to allow for any complications and for staff to continue to perform other duties during installation. Phase 3 will begin in January 2020 and be completed by March of that year.

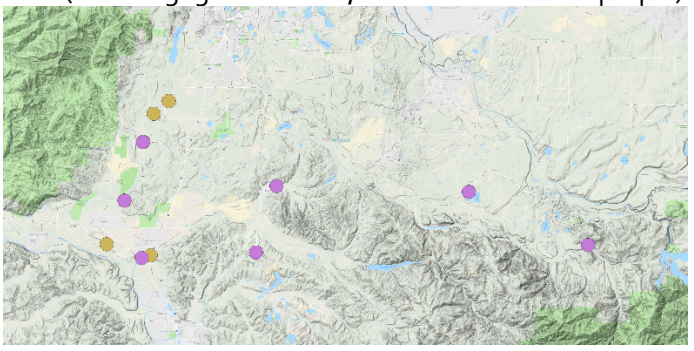
Part II Description, Timing, and Cost	
8. **Project Cost and Funding --** What is the cost of the overall project (or anticipated cost)? What is the cost of the phase to be funded by 19-21 funding? What are the on-going maintenance and operation requirements and costs? Is it clear who will be responsible for covering on-going maintenance and operation costs?	Thurston County has recently received quotes for all the equipment described except the ClimaVue 50, which is not yet offered through Campbell Scientific. However, it is offered through the original vendor for $1,600, and Campbell Scientific pricing is expected to be comparable. CR 300 $950 X 7 ClimaVue 50 $1,600 X 7 Tube 3G $1,050 X 4 RuggedTROLL 200 $700 X 4 GOES Modem $3,000 X 1 Tax & Shipping $2,785 10% Subtotal $30,635 Development $120 X 160 hr. Subtotal $19,200 **Total** **$49,835** Thurston County is requesting the equipment and IT development costs described above, for a total of $49,835. The County commits to providing ongoing maintenance and support of the monitoring sites once installed. Thurston County's monitoring program has operated continuously since the late 1980s, and has mature data collection, site maintenance, and fieldwork procedures. It is funded by the Stormwater Utility, a stable source of County revenue distinct from the General Fund. The monitoring program currently employs three staff, two of whom are field technicians and would assume primary responsibility for maintenance.
9. **Other Funding --** Please explain the extent to which other funding sources, funding partners are available for this phase and any other phase of the project.	The Flood Authority and Thurston County are the only funding sources for this project.

Part III (**) Completion, Doability, Alternatives, and Impacts	
10. **Project Completion --** Does the funding requested complete, substantially complete, or continue a project already started? If so, please explain.	The requested funding expands existing monitoring efforts by adding telemetry. The sites included in this request have data records extending, in some cases, to the early 1990s. Thurston County has begun a process to add telemetry to monitoring sites on a site-by-site basis; at the current pace it would be approximately 10 years before every site was equipped with telemetry. There are no current plans to outfit GData with a publicly-accessible API outside this request.

Part III (**) Completion, Doability, Alternatives, and Impacts	
11. **Project Doable --** Can this project or the stage/phase for which funding is sought be completed by June 30, 2021? Please describe any circumstances with potential to impact the project's doability or timeline (e.g., permitting or regulatory unknowns, lack of availability of other cost-share funding resources, etc.). Please describe any advance coordination or vetting with agencies, tribes, other entities, etc. and the outcomes of that effort.	This project can be completed by the end of 2019. Every site is entirely within County control, excepting the proposed Bucoda weather station, where a possible site has been located but not acquired. The amount of work is within the capacity of Thurston County staff to perform. The greatest threat to the proposed timeline would be departure of monitoring staff from the County. The re-hiring process could delay the project by 4-6 months, which would still allow for completion by the end of 2020, well before June 30, 2021. Another potential roadblock for this project would be if Campbell Scientific delays the release of their ClimaVue all-in-one sensor until after January 2019, or decides not to release it at all (it is currently scheduled for summer 2018). Tipping bucket systems would be substituted in this case; while they do not record as many parameters, they are simple, reliable, and Thurston County staff has extensive experience installing and maintaining them.
12. **Project Alternatives --** Please describe alternatives to the project that were considered (including doing nothing), and the rationale for selecting the project described, proposed here.	The alternative to this project is the current pace of telemetry installation. Thurston County may have telemetry in place in all stations in the Chehalis Basin by 2028 without this grant. There are no current plans to create an API to allow access to GData outside of the existing dashboard (http://www.thurstoncountywa.gov/sw/Pages/monitoring-dashboard.aspx). Most likely without this funding the Thurston County gage network will not be integrated into the Flood Authority gage network. This project would leverage the considerable effort already expended by Thurston County in creating and maintaining these monitoring sites to benefit the Flood Authority's core function of flood warning. Adding telemetry would add new gages the Flood Authority could use to issue warnings and to build models. Flood warnings are obviously of direct benefit to County residents, but the County would also benefit from telemetry by making high-flow measurements easier to collect, reducing maintenance needs at weather stations, and providing near-real-time data to residents.
13. **Project Impacts Avoided, Mitigated --** Please identify how project impacts will be avoided and mitigated, and if that mitigation will be accomplished by June 30, 2021?	There are no impacts anticipated from this project. The one new site installed would affect no more than a 4'x4' area, and the rest of the sites are already in place.

Part IV (**) Benefits Stated and Quantified	
14. **Emergency Response Benefits** -- Please describe (and quantify) how this project enhances emergency response in a flood emergency (e.g., does it keep critical access roads and transportation facilities open/functional, does it enable easy movement of cattle, equipment and farm chemicals out of harm's way, is it part of a larger hazard mitigation plan, etc.).	As described above, adding new sites to the Chehalis River Basin Flood Authority gage network would both provide new locations for which the Flood Authority could issue warnings, and help build out and calibrate the hydraulic and hydrologic models used to predict flood stages. The additional weather stations are located in areas where weather patterns can change dramatically in just a few miles, as the microburst on May 4, 2017 demonstrated. Adding more weather stations will both help capture those kinds of localized but intense events that can cause issues in downstream tributaries, and tease out regional subtleties in rainfall patterns that can otherwise confound modeling efforts.
15. **Essential Infrastructure Protection Benefits** -- Please describe (and quantify) how this project protects essential infrastructure and the risks or consequences of not acting this funding cycle.	This project protects infrastructure by improving the Flood Authority's ability to model and predict flood events.
16. **Public Health, Safety and Welfare Benefits** -- Please describe (and quantify) how this project protects public health, safety, and welfare.	This project improves the public health, safety and welfare by improving the Flood Authority's ability to model and predict flood events.
17. **Residential, Commercial and/or Agricultural Protection Benefits** -- Please describe (and quantify) how this project protects residential communities, commercial, and/or agricultural interests and benefits of acting (or consequences of not acting) this funding cycle. Consider factors like number of structures and people at risk, historic frequency of flood damage, magnitude of benefit for the cost, etc.	This project protects residential, commercial, and agricultural interests by improving the Flood Authority's ability to model and predict flood events. Additional weather stations are of particular interest to the agricultural community to help them determine whether and how much to irrigate. Telemetered stations in particular are important, because irrigation decisions are made on a daily basis and require up-to-date information. While not directly related to flooding, this is a secondary benefit of the project. Indirectly it could marginally reduce flooding by encouraging farmers not to over-water fields, thus reducing soil moisture content prior to significant rain events.
18. **Habitat Benefits –** Please describe (and quantify) how this project benefits or improves existing or future habitat conditions.	This project provides habitat benefits by improving the Flood Authority's ability to model hydrology and hydraulics, which in turn allows better design of habitat restoration projects and better prediction of habitat impacts from other proposed projects. Stream flow monitoring of streams, in particular, can be translated into metrics to predict Benthic Index of Biological Integrity statistics (see work by Curtis DeGasperi and others, King County).

Part IV (**) Benefits Stated and Quantified	
19. **Costs and Benefits –** Project funders (and the public they represent) value cost-effective, sound funding decisions. To that end, please describe (and quantify) in general terms benefits gained for funds requested and frequency, time-scale benefits will be realized. Please also describe (and quantify): a. Funds requested. b. Costs avoided if funded (and on what frequency, time-scale). c. Costs incurred if funded (and on what frequency, time-scale). d. Benefits gained if funded (and on what frequency, time-scale). e. Impacts incurred if funded (and on what frequency, time-scale). f. Impacts and implications of not funding (and on what frequency, time-scale). Guidance Note (1): For this question, it will be helpful to think in terms of what will be the dollar value of assets protected, dollar value of impacts avoided, dollar value of monies retained or recouped, etc. for the amount of public monies invested. Guidance Note (2): Part V is intended to help project reviewers concisely summarize, compare funding requests. Answers here (and in related questions on this form) should be consistent with Part V.	**A) Funds Requested**: $49,835. **B) Costs Avoided If Funded**: $90,000 capital costs; $27,000/year labor. Capital costs assumes it would cost twice as much for the flood authority to install the same number of sites from scratch. Yearly costs are Thurston County estimated annual labor costs to maintain 4 stream sites and 7 weather sites. **C) Costs Incurred If Funded**: $49,835. This cost includes the effort required on the part of the Authority to connect the Thurston County API with the Contrail network. **D) Benefits Gained If Funded**: The benefit would be improved understanding of the hydraulics and hydrology of the Chehalis River Basin, and everything that improved understanding could bring about. **E) Impacts Incurred If Funded**: None. This project will not adversely impact anyone. **F) Impacts and Implications of Not Funding**: It is difficult to quantify the impact of better data, but better models and earlier warnings can have dramatic impacts. For instance, if improved warning systems save just one life, the impact is tremendous (in monetary terms, the US Office of Management and Budget estimates a human life is worth about $8 million). Better models can also inform permitting decisions; a difference of low-floor elevation of a foot or two could mean the difference between a ruined house and an untouched house. On the other hand, overly restrictive zoning could cost developers and homeowners many thousands of dollars in unnecessary precautions. Because the "true" risk is unknown, quantifying the value of accurate modeling is nearly impossible.
20. **Other Project Benefits --** Please describe (and quantify) any other project benefits not already discussed. This could include how this project compliments, leverages, or implements another project or planning process already underway.	The benefits of this project are captured above.

Part IV (**) Benefits Stated and Quantified	
21. **Anything Else --** Please offer any additional information (e.g., photos, maps, video, drawings, drone, etc.) that would help to better understand the scope, timing, and benefits of this project.	The following map shows the location of the proposed sites (stream gages in brown, weather stations in purple):  The map can also be viewed online here: (https://goo.gl/MbJe47)

Part V Summary of Benefits, Impacts, Costs			
	22. **Benefits –** Please summarize, tally project economic and non-economic benefits as described.	23. **Impacts --** Please summarize, tally project economic and non-economic impacts as described.	24. **Costs --** Please summarize, tally project economic and non-economic costs as described.
Quantify	Between many thousands and millions of dollars.	Minimal.	$49,835
Describe	New sites would increase the accuracy of models, and add new gages to the warning network. The benefits of improved flood forecasting are hard to quantify.	The direct impact of adding new gages would be minimal, though it could reduce late-season soil moisture via improved irrigation practices.	The only anticipated costs with this project are the capital costs requested.

Appendix A

Process/Schedule Overview (current as of 6-12-2018)	
June 12, 2018	• Post and distribute local projects recruitment request. • Allow three weeks for project proposals/submittals (i.e., due no later than 5:00 p.m., Tuesday, July 3, 2018). • Due to Scott Boettcher, scottb@sbgh-partners.com.
July 3, 2018	• Receive proposals/submittals.
July 5, 2018 (or July 12, 2018)	• Update Chehalis Basin Board on numbers received, types of projects received, distribution, dollar value, etc.
July 19, 2018 (or August 16, 2018)	• Update Flood Authority on numbers received, types of projects received, distribution, dollar value, etc.
September 20, 2018	• Update Flood Authority on status of Projects Committee's effort to review, rank, discuss with Tribes, discuss with agencies, sort and rank, etc. • Review/discuss PRELIMINARY DRAFT ranked and prioritized list.
October 4, 2018	• Update Chehalis Basin Board on status of Projects Committee's effort to review, rank, discuss with Tribes, discuss with agencies, sort, and rank, etc. • Review/discuss DRAFT ranked and prioritized list.
October 18, 2018 (SPECIAL MEETING)	• Seek Flood Authority approval of FINAL ranked and prioritized list.
November 8, 2018	• Seek Chehalis Basin Board approval of FINAL ranked and prioritized list.

June 2018 through November 2018	• Work with agency, OCB, and CBB technical staff on refining and finalizing recruitment instrument, scoring criteria, scoring instrument, categorization, and ranking, developing draft and final lists, etc.

Legend:

Chehalis Basin Board	Flood Authority