



## Clean Water Advisory Committee

January 20, 2022

**Committee Members in Attendance:** Jenny DeGroot, David Duggins, Vicki Heater, Laura Jo Severson, Kimbal Sundberg

**Ex-officio, County support staff, and members of public:** Krista Davis, Erin Halcomb, Kai Hoffman-Krull, Steve Krueger, Wendel Raymond, Byron Rot, Kendra Smith, Brooke Sullivan, Cathy Winings, Cindy Wolf

8:38 AM Welcome and Coast Salish Acknowledgement

*Let us acknowledge we reside on the ancestral lands and waters of the Coast Salish people who have called this place home since time immemorial and let us honor inherent, aboriginal and treaty rights that have been passed down from generation to generation.*

8:39 AM Introductions

Meet Steve Krueger, new Environmental Inspector for San Juan County - describes background (consulting, familiarities with code), new challenges with rain, culverts. Kendra explains more how the position works.

8:49 AM Public Comments

*none*

8:50 AM Orcas and San Juan Island Culvert Updates

*Kendra Smith*

Two culverts going in this summer, technical details being discussed (Kendra shares screen to show designs)  
Culvert at Cormorant: 10' wide box culvert, will be skewed because of how creek meanders. Box fills with culvert at bottom, 4-5 feet clearance for water to flow through, 3' feet of cover on top.

Bayhead creek culvert: challenges with uncooperative property owners on either side, it's a tight area. An arch that will get filled, 8-10' clearance, 5' cover on top. This scenario could be used at other sites.

Refinements on cost estimates, Cormorant is over \$500K to both construct and design. Killebrew will be equal or more. Going forward discussing replacement, think of a minimum \$500K whenever we need to fully open and not just put in pipe – the ones that need to be fully fish passable will be more expensive.

And there was an emergency replacement at Eagle Cove last week – the third in a series of jury-rigged culverts (along with Doe Bay and Cormorant) all failed because two pipes spliced together and clogged.

Now hoping for federal money to help with some of these repairs. Only other funds are for salmon recovery, Salmon Recovery Chapter update could help with support for fish passage. We have a \$1.7 million for the county, and I just showed two culverts at a half million each from two years ago.

We're getting hit both directions, rising seas and storms. Roads projects looking at types they call 'small straw at the bottom of a large hill'. Trying to avoid what happened at Killebrew road

ACTION ITEM: there's video of that event at Killebrew, Cindy can share it with Kendra

Engineering firm looked at gauging stations, modeling predictions for climate, etc. – take home is that we won't see more water but it will come to us in shorter-duration high-density storms. 24-37% increase in the 24-hour-storm volume. These events will flush off the landscape faster and water won't sink in. Longer droughts and shorter more intense rainfall periods. We'll try to get that report out and share key findings

Kim: after November meeting I sent some information about the 1990-91 precipitation disaster event which occurred during a la Nina (cold eastern Pacific) oceanographic event. We have been in la Nina for the past two years. When we switch back to Neutral and El Nino (warm eastern Pacific) we'll see less moisture

Krista: Thanks for sending that information, I'm gathering from various sources (weather stations etc.)

9:15 AM San Juan County Forest Stocking Survey Results, Fire Risk, and Clean Water Kai Hoffman-Krull  
Kai shares screen, photos (sent by Byron) contrast same area 1932 vs. 2019, in 1932 more savannah-like lands. Every act of suppression is an act of management. The wilderness burned historically on regular intervals – both anthropogenic (e.g., Salish peoples with Garry oaks) and natural fires caused by lightning  
Example from California: Badger Fire. This had all the elements of a largescale catastrophic fire but it was contained because of pre-thinning and fire-wise forest management.

Percolation of water is possible through soils – large pores. But when compacted or paved, no capacity for absorption – water run-off and sediments move to undesirable locations. Developed matter/soil structure is key to water-holding capacity of forests. California is a sign/warning to what we can and shouldn't do.

One study found thinning of forest soils decreased water storage significantly, with water storage transferred above-ground (access to sunlight, evapotranspiration) rather than below (Roche et al)

Another study (Prevey) showed effects of thinning on species richness over time. Goal is variable thinning. Kai shows data for "stand inventory" i.e., acres mature (60 years and over) vs. young conifer vs. hardwood  
Historically 20-30 trees/acre in SJI's but now more like 200/acre. That can still be within sustainable model, but a high amount of stress. Another way to model stress is height/diameter ratio (they grow *up* fast rather than *out*) when ratio gets close to 80 means high wind-throw capabilities. Kai reviews study parameters.

Differences between SJI and Orcas – Orcas has much higher concentration of mature conifer

One purpose for this study was to assess viability of bioenergy from excess forest biomass. Current gross total biomass around 9 million tons. Review of current Wildland Urban Interface (WUI), shown on map

Key conclusions: About 3 million tons excess woody biomass, high concentrations in WUI could be thinned  
Sustained yields – if there were 2% annual growth could yield 120K tons biomass per year

Soil research with Dr. Tom DeLuca and Si Gao, thoughts on how agriculture influences water in the county  
Shows how Biochar helps soil: 35% soil moisture retention, reduced nitrogen and phosphorus leaching, kept nutrients in topsoil and out of water systems. Biochar meta-analysis study showed 41% increase in biomass (Thomas et al 2015). Must think about different strategies for using biomass in a sustainable/beneficial way, not just focus on fire suppression. See this challenge as opportunity as we move through changing climate  
QUESTIONS, Cindy: history of lime kilns and harvest on these islands?

Kai: it's not about transitioning back to historical numbers at time of European contact. Those trees were large old growth so had different influence in canopy than what we see now. And they took significant numbers of trees per acre then. When we're averaging 200 trees/acre means we have some high-density areas we really need to treat of 400 trees/acre and some others operating at a great framework of 70-100/acre that shouldn't be treated. Thinning projects can transition. Each pass should be 20-30% of total biomass and transition down toward 80 trees/acre, then each tree will expand out and suppress some of smaller tree – establish something closer to old growth-like conditions. Biomass/canopy are important measures of health, as much as #trees/acres. Also, species diversity, and tree size

Laura Jo: Firewise recommendations include thinning/removal of trees. A lot of property owners don't even want to remove a dead tree. Serious problem, trees infected by insects. How to convince them?

Kai: must shift general zeitgeist, history of anthropogenic manipulation. Land Bank is great with outreach.

Laura Jo: Trout Lake surrounded by overgrown forest, water source for town – authority about thinning?

Kai: need to be strategic about where we concentrate efforts. We are a port county, that's where most infrastructure is. Invest in thinning around homes (30' buffer). Not *if* but *when* a wildfire comes through

David: difference between native and exotic in response to variable thinning – it looks like native species increased which is opposite from ecological theory? Is that because of selective removal of exotic species?

Kai: It's about slow consistent thinning of no more than 25%, not large-scale making invitation for exotics

Byron: it seems like on Orcas there's a lot of public land, is thinning a non-starter on public lands?

Kai: not at all, working now on Jones Island with Garry Oaks. it's one of the most drought-resistant species. Parks are supportive. Moran not a part of those treatments yet but it's a goal to start transitioning there.

National Park/Conservation District showing interest in strategic thinning, it's a process. We have partners Kim: National Park has done some controlled burns at English camp in past

Jenny: A lot of property owners on Orcas don't want to put their land into DFL because they don't want to clear cut. It would be nice if there were another prescription. Important to be strategic. In Moran there are some areas I'm glad they're not touching – mature trees – and some others I wish they would thin

Kai: selection process over which trees taken should be made by trained professionals. Commercial logging operations not cost-effective here. some methodology for keeping carbon in soils. How do we transition into thinking about what do our forests need? Instead of human services *from* forest. The more we invest in organic matter and soil resilience that'll influence reserves of groundwater and resistance to wildfire

Brooke: the science is clear, but one challenge is finding qualified contractors to do this type of work

10:02 AM Draft Results for Water Quality Monitoring in False Bay Creek Watershed *Wendel Raymond*  
Results of False Bay Watershed Monitoring, April 2021-October 2021 data review (also some from November). Shows sampling locations on map and reviews parameters. The backdrop to this study is that last summer was very dry, until November which was extremely wet.

Wendel shows plots for total Nitrogen and Phosphorus, concentrations at different locations in watershed over time of the study. Big pulse of flow mid-august pushed out high concentration of phosphorus. Shows N:P ratio which is useful for showing potential limitations. Data show phosphorus rather than N limitation (whereas in marine system, nearshore is often nitrogen-limited)

Shows data for water temperature, found by probes. Dissolved oxygen data – a lot of variability.

Nitrate data, relevant to Ulva. Still no answer to whether Ulva response is to nutrients from land or marine.

Phosphate data, mostly low but one pulse in August. Flow data show very high flow rates in mid-November

Other data not shown plots for: Nitrite, silicate, ammonium. Also Ulva biomass estimates, aerial images via drone. Temperature loggers are in now, taking data. Shows example of drone image. Shows list of student projects from last fall, plan to continue next fall. Please let Wendel know if ideas for projects/areas of study

ACTION ITEM: Wendel can send a pdf version of this report to anyone interested

QUESTIONS, David: mechanics of how Ulva may get trapped in False Bay?

Wendel: it's drift, an ideal place to be an ulvoid – nutrients, shallow and warm. May not be one direct cause

More data coming – another offshoot project is collection of water samples for stable isotope analysis of nitrate in water and in the Ulva, can get a sense of the nitrogen source – whether it's marine or terrestrial.

Steve: have you considered taking samples further out in the Bay?

Wendel: logistical hurdles. Sometimes the nearshore station had low salinity during high rain events

Kim: with respect to Zylstra Lake, Judy Meyer has analyzed Wendel's 2021 data and is advising on limnology there – presented to the Zylstra Preserve subcommittee. Judy has characterized Zylstra as hyper-eutrophic based on P/N ratio. Nutrients and high temperatures support summer toxic blue green algae (cyanobacteria) blooms requiring public health notices to avoid contact with lake water.

David: are there dataloggers in Zylstra to look at temperature and nutrients?

Kim: there were in the past, not now. We should put permanent temperature loggers back in Zylstra Lake.

Last study was the 2020 Zylstra Lake Preserve Ecological Assessment by the Land Bank; found high temperatures all the way to bottom.

10:31 AM Adjourn meeting