

APPROVED DRMT Meeting Notes, January 13, 2016

Prepared by Sam Brend, Clallam County

DRMT Members Present: Cathy Lear/Clallam County, Scott Chitwood/Jamestown S'Klallam Tribe, Shawn Hines, Jamestown S'Klallam Tribe (alt), Robert Beebe/Riverside Property Owners, James Beebe/Riverside Property Owners (alt), Donald Hatler/Sports Fisheries, Robert Phreaner/Olympic Peninsula Audubon Society Conservation Committee, Ann Soule, City of Sequim, David Garlington/City of Sequim (alt), Judy Larson/Protect the Peninsula's Future, Matt Heins/Estuary Tidelands Riverside Property Owners

Others Present: Bill Strehl/resident, John Vavrinec/PNNL, Ron Thom/PNNL, Alana Linderoth/Sequim Gazette, Sam Brend/Clallam County, Phil Martin/resident

I. Introductions/Review Agenda/ Approve December 9 Meeting Notes

Scott Chitwood called the meeting to order. New note taker Sam Brend. Introductions were made, sign in sheets circulated. Judy Larson moved and Robert Beebe seconded the motion to accept December meeting notes.

Public Comment:

- Next meeting is the 2nd Thursday in February, the 11th because of Jamestown Tribe's Anniversary of Federal Recognition on Wednesday.
- The ribbon cutting for the bridge was on December 30th.

II. Eelgrass Restoration- Presentation

Ron Thom and John Vavrinec, PNNL Marine Science Laboratory

Ron Thom and John Vavrinec gave a presentation about the loss of eelgrass around the world and in Puget Sound and the restoration work they are involved in.

Ron Thom

Overview, Biology and restoration, Climate variation and change. Tried to orient towards home but have done work all over the country and other countries.

- Eelgrass is a flowering sea plant. One of 60 species that occurs globally. Black Brant, dungeness crabs, squid eat eelgrass and it provides habitat for over 50 species. It is protected in the NW.
- The plant structure consists of root & rhizomes, and the leaves. They flower. There are many species around the NW. *Zostera Marina* is the most common, the native, and also the most widespread globally of all species and *zostera japonica* is considered an invasive weed which came in in the 1930's and has been spreading. It was designated a nuisance weed now so it can be eradicated. Roots come out at nodes, puts new shoots out along the way so is continually moving as it grows.
- Some of the functions that eel grass provide are: food for juvenile salmon; lots of nutrients and microbes, nurturing and spawning areas; shoreline erosion protection; improves water transparency because it traps the sediment; added oxygen to water; sequesters carbon from atmosphere, important for climate change. There has been a global review of carbon sequestration in seagrass. Seagrass meadows occupy less than .2% of the area of the world's oceans, but sequester 10% of the carbon yearly. Done through a review of about 1,000 samples throughout the world seagrass sequesters about 22 billion tons of carbon per year. They raise PH through photosynthesis which is good for ocean acidification.
- Have been looking at what eelgrass needs to grow. Graph showing density of shoots and depth of plant. Peaks at around -5 meters or so, then gradually goes down. Just because of light distribution. When things get turbid, moves things up.

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- Question: Judy Larson: An earlier slide about ocean locations, a 20-meter limit, does it have to do with light limitations?
 - Yes it does, light and temperature really impact growth, at 20 degrees Celsius the eelgrass is really uncomfortable. In the lab, where there is plenty of space to grow, but it just won't grow (above 20 degrees C) it's just too hot. This is an important piece of information relative to climate change. Padilla Bay has the largest expanse of eelgrass on the West Coast, 3 or 4 thousand hectares. In 80's while going out for research, heard fizzing, is the sound of photosynthesis. Jeff Rice from the Puget Sound Institute, went out and recorded it about 2 years ago.
- Question: How does eelgrass make the water more alkaline?
 - Well, its photosynthesis so they're taking up CO₂.
 - How much of a change do they contribute?
 - About a point and a half, something like that, depends on how big and how dense the meadow is.
- Puget Sound is up around 23 thousand hectares now. Measure the productivity rate, end up with about one million wet tons of eelgrass produced annually.
- Question: Judy: Are there any data sets with productivity rates in the Puget Sound versus the Straits?
 - Ron says there is a break down, the State has it, but he doesn't have it. DNR monitors eelgrass all over the state, and kelp too.
 - Is there a specific reference?
 - Can give link to DNR publication. Go on website and look at Marine program.
- The eelgrass is rolling down the slopes, moving into deeper waters, not just sitting in the shallow areas. It's getting transported.
- Organize their thoughts into a conceptual model so they can know what is wrong and how to restore it. Controlling Factors: light, salinity, sub-strata... Take plants from Puget Sound that look different, get them in the labs with the same controlling factors and they look different after three years, so there is some local adaptation going on.
- Question: Which is the most important stressor?
 - That is what we are trying to figure out, but it is difficult to know. There are some things that are obvious and some things that aren't. The straits have about 4% of the shoreline armoring, Hood Canal is less. More research is being done on this stressor. The mechanistic connection is unclear, but shoreline armoring is a problem. The other is nutrients. Getting nitrogen increases in the past 10 to 12 years in Puget Sound. Too much Nitrogen from agriculture increases algae blooms that cloud water and smother the eelgrass.
- Chart measuring stressor; controlling factor; magnitude; spatial extent; temporal extent rated low, medium, high; reversibility; trend; case study endurance, direct or indirect; knowledge score, threat score. (expert opinion then literature).
- Question: Didn't previous slide say nitrogen was the primary stress factor?
 - It's one of the main ones.
- Question: Judy: Do overwater structures, such as the new large pier the Navy wants to put in in the Harbor affect eelgrass.
 - Ron says yes. Did 10 year studies at ferry terminals, got a lot of information, extra shading, prop scour are two main problems. Additional turbulence. Clinton Ferry terminal: suggested to make it narrower and longer (instead of short and wide) to reduce effect on eelgrass. There are things you can do to reduce impact.
- Question: Judy: Do sulfides have any significance to eelgrass.
 - Yes, they will die, don't like. Too organic rich and they will die.
 - What about outfalls from sewage treatment plants?
 - Yes. A lot of fresh water coming in could kill them, the salinity aspect.

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- Climate – sea level variation has the greatest effect. Mean sea level can vary up to 50 cm from longer term average (which we see in El Nino years-sea level is 30 to 50 cm higher for months). Oceanic Nino Index correlated with variation in sea level.
- The optimal temperature for eelgrass is around 7 degrees Celsius, and above 25 degrees Celsius will kill eelgrass. Doesn't like to dry out.
- The Blob, is a mass of warm water in the Pacific Ocean. Don't know the causes. Potentially something about a breakdown in the pressure systems in the North Pacific.
- Have been measuring the growth rate at the same spot in Sequim Bay using interns in the summer since 1991.
- 3 to 5 growth periods, leaf growth method over 3-5 two week periods in June. Use a hypodermic needle to mark the plants, come back and measure the growth rate. Usually do 30 replicates. Also measure light and temperature right at the site.
- Growth rate data: Pattern in chart, all over the place, didn't know why. Then started looking at Ocean Nino Index, and it kind of follows that pattern. Then started looking at sea levels, and they were as high as they've ever recorded them.
- Question: I thought I understood that sea level rise was a risk, a detriment long term, so where does it cross over, when slight rise is a benefit?
 - Plants are resilient to these large changes. Plants have room to spread up, but at some point they can't go any further.
- Question: Judy: Did the Washington Harbor project and the various structures have an impact on the eelgrass? It was located somewhat distant from it, but nonetheless you changed the course of the waters and so forth in the Washington Harbor area.
 - We are interested in that, it is a cool restoration project. Ron has mapped out locations of eelgrass in Washington Harbor before they did the project, then went out last summer and did it again, and it's pretty much in the same locations. No change, besides this year there was a big change. The sediment has shifted around the bay. We were interested in that, but we haven't really seen anything. They have stakes out there.
- A lot of variation in 2014. 2015 had the highest temperatures, guess that its temperature that effected growth rates. Even though there was plenty of water it was just too hot.
- Most of eelgrass gone from research site since 1991, they suspect it has to do with large groups of Canada geese because they rip up the rhizomes and eat them, the brant geese only eat the leaves above the growing zone. Hypothesize that the Canada geese are switching from terrestrial grass to eelgrass. Was there less watering going on in the Sequim Valley in terms of agriculture, or more fields not being cultivated?
 - Yes, in late August there were fewer fields being irrigated.
- Question: James Beebe: Changes in salinity in the Straits due to less irrigation in August?
 - It grows in a wide range (of salinity) it grows best around 30, so it has to be a significant decrease. Water through aquifers? Haven't studied aquifers.
 - In June, I would say there was very little difference in forage growth in the valley. Maybe minusculely less, started curbing pretty hard in later part of July and August. –Maybe just bigger populations of Canada geese.
 - Ann Soule – does the agriculture community know where the Canada geese forage on land?
 - -They come in heavy after we harvest our barley, middle to end of July they come in heavy. Very seldom do we get big flocks in our watered forage fields, they like grain fields, Schmuck road on Plateau.
- Morro Bay, California- major stop over for brant geese. Do they have a different variety of eelgrass, I assume their ocean temperatures are warmer. The ideal range is surprisingly low. –Same species, probably due to local adaptation.

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- Shown graph of variation in number of hectares by year. Up in 1970 (200 hectares), down in 1997, up in 2007, down to 2 hectares by 2013. They believe the drastic reduction of eelgrass is correlated with the drought in California. Caused by a wasting disease, the fungus doesn't like fresh water, so it allowed it to spread when less fresh water was present.
- Question: Judy: Is aquaculture a stressor in CA?
 - Yes, it can adversely affect eelgrass. When high tides go up the grass floats straight upward, and when the tides go down, the grass gets caught on aquaculture lines and dries out and dies.

John Vavrinec

- Has worked with PNNL Marine Science Laboratory for 10 years, and is Chief Diving Officer, got his PhD from University of Maine in Coastal Ecology.
- Question: Has there been anything done to improve the eelgrass situation on the east coast?
 - Yes, restoration by planting, distributing seeds, continue to monitor stressors and controlling factors of what eelgrass prefer, etc. Replanting on east coast is actually a lot easier.
- All sea grasses have lost an increasing amount of area, just like coral reefs and mangroves. And estimated 30% since the 1940s. The rate of change has increased over time, so it's at about 7% loss per year (1% back in the 40's). In the sound, some places are doing well, some aren't. Think overall there has been a decrease, but don't have the numbers to quantify that. Between 2001-2003 at Wescot Bay in the San Juans, eelgrass disappeared.
- Eelgrass is recognized as critical habitat. Is protected from County to Federal government level. In 90's state established no net loss policy. In 2010 the DNR and the Puget sound partnership listed eelgrass as a "vital sign species," their goal is to increase the amount of eelgrass by 20% by 2020.
- Answer the question, What are the problems, and what can we do?
 - Reduce stressors, improve water quality, restore habitat, and protect plants. More direct intervention? Trying to do active restoration.
- Eelgrass has two modes of reproduction, sexual, where it sends out seeds, and asexual, where it sends out new shoots vegetatively. It tends to reproduce sexually in times of greater stress, but the seeds are negatively buoyant and don't fall very far. Might be places where the conditions are right for eelgrass, but for whatever reason have been previously decimated. Can go in there and plant eelgrass for parent stock for the future.
- Question: How far do the rhizomes travel in that type of propagation?
 - Depends on depth, temp etc., but they can go centimeters a year, I've seen up to 20 cm of lateral growth.
- Approach they take to active restoration:
 - Modeling shorelines, numerical models that choose the best area, best time
 - Identification of potential areas
 - Field surveys- look at site, is it cobble vs. sand vs. mud, etc.
 - Do test plots, evaluation- plant a tiny bit and see how they do.
 - Once they see that they do well in some places ,they undertake full restoration
- Question: Light under the 3 mols...
 - PAR- Photosynthetically active radiation is the part of the visible light spectrum that the plants use for photosynthesis, so they don't use all the visible light you see, just specific sections. It's in the middle.... 400 – 700 nanometers. If you drop below that 3 mols, then it becomes problematic for the plants, too deep or too cloudy, too turbid.
- Data sources-
 - Biomass model- above ground biomass (leaf shoots) vs. below ground biomass (rhizomes), photosynthesis, respiration, related to response functions like temperature, transport, between

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- above and below ground, density dependence: if get really dense there is less light and they stop growing, mortality estimates, linked to temp and salinity, etc. – what the model does is give them an estimate of amount of biomass created or lost.
- Hydrodynamic Model- light data, physiological response- are there plants or not?
- Habitat suitability model- biomass model, presence/ absence of plants, bathymetry of potential area (big wide open area better than smaller fringe area), landscape conditions, stressors, overwater structures, shoreline armoring – allows to fine tune effort, creates a more fine tuned map. Then can give to divers to go check specific sites. Can use drop cameras first.
- Site Surveys (go out only once- so don't know what is happening the whole year)
 - Presence of eelgrass?
 - Does it have appropriate substrate?
 - What are the stressors?
- Test transplants in a 5m x 5m checkerboard, around 500 shoots per plot.
- Question: Where do the source of the nuclei come from?
 - Most of the time, take it from natural meadows, never harvest more than 1 – 5 % of the site so we aren't impacting. They are doing studies right now to see how much they can take.
- Planting- use large metal staples and degradable twist ties to lodge into ground, allowing the rhizomes to eventually attach themselves. Harvest eelgrass from another site, go back to lab, bundle the eelgrass and put on PVC plates, so they can slide them off. Four shoots on a staple, will do 5 staples in a ¼ meter square. Put out lines and a grid to create the checkerboard planting and pull up and move when done.
- Question: do you need the rhizomes or vegetative growth for the planting?
 - Need at least the marrow stem region, but really need some green material. Tried just planting rhizome material, but don't think it will come up.
- If they go back and the plantings look good they will do a large scale restoration project which includes long lines of 10s of thousands of transplants. Leave markers behind so know where the restoration site is. Go back and count in the 5 x 5 meter square to see how many survived.
- Recent large scale restoration: Port Gamble, off Bainbridge Island, in the south sound, some in the San Juans.
- Question: Judy: Is there historic information about eelgrass, and how far back does it go?
 - Yes, but not as resolute as they would like. There are historical accounts from the early 1900's but it is observational, not quantitative.
 - When was aerial photography started in this area?
 - – Yes, have to be taken at low tide though, but doesn't happen, so it's not a great quantitative tool we have right now.
- Then will go back out and evaluate how well the large scale restoration works. Does active restoration always work? Not always, but usually the large scale will work. Somethings they learned are that undulations in sediment can trap algae and block out the growth of eelgrass, and sediment needs time to compact, otherwise crabs tend to dig in loose sediment and pop up the staples.
- Science is a process, and they hope to evaluate, monitor and reevaluate continually.
- Question: What is the longest term project you have been able to continue monitoring?
 - The Clinton Project they were able to monitor for 12 years.

III. Railroad Bridge Project Update

Powell Jones, Dungeness River Audubon Center

- December 30th was the grand reopening, it was very cold. A special thank you to Randy, project manager, had a lot to do with success of this project.

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- Why we picked that specific design- for pedestrian benefit as well as habitat. This specific structure supports restoration and maintenance of ecosystem functions, allows natural movement of sediment, disperses high energy of flows and allows it to spread out more, improves the stability of spawning habitat, engenders channel meander for evolution. Allows formation of stable side channels for successful spawning, maximizes the interaction between riparian vegetation and fish habitat. Have seen in the last month it has maximized the amount that the river can recruit that amount of vegetation into the river and it has done a lot of recruit in this park especially.
- In 2007 they placed engineered log jams upstream in the park.
- The old creosote pilings created an artificial dam under the bridge.
- Some people ask why the new rails are so high. They are not technically rails they are trusses which also act as rails, because of the necessity of the height which was required by this specific bridge design: a long span, a certain clearance off the river and match previous bridge.
- Since the new bridge has been put in - the river has avulsed 250 ft to the side.
- The creosote piers (187) went to Oregon to be disposed of and the new bridge was constructed by Nordland Construction. The new pilings were driven to remission (until they couldn't be driven down any farther). They put in seismic bearings, and removed a pier that wasn't in the initial bid to allow the river to wander there as well. This is not the first time this bridge has been damaged; had to do work in the 1960s.
- There has been constant flooding this year and the restoration effort is not totally done yet, need to do revegetation. Western WA University is working on an active versus passive revegetation study.
- Art is going in, will be steel placed in concrete and will be tribal art.
- Next portion of project is to re-deck the bridge. First Federal started a foundation when they went corporate, applied for a grant and they gave us \$100,000 to re-deck the bridge. PCT is putting in about \$38,000 work of time to do this project. Ramp is getting enforced, resurfaced too. The knockouts will be the only things not in concrete.
- Question: Judy: Could the bridge be considered a historic designation and perhaps encase the creosote structure for environmental purposes.
 - Unsure if this could be done.
- Would the old trestle system have survived?
- A temporary fix would have been a waste of time and money and if the project hadn't been started until after the flooding events and erosion, it could have added an additional ½ million to the project.

IV. Riparian Floodplain Protection/ Restoration

Robert Knapp, Jamestown Tribe Planning Dept.

- Project in Chinook Recovery Plan
- Rarely have flooding into people's homes on the Dungeness, but many close calls. Problem with the Dungeness is that it is migrating not flooding, per se.
- The Robinson place was identified years ago as a place where floodplain restoration could be done but didn't get a chance until last year when the channels started moving back to the east. The property has lost armoring and had a large repair bill. The Tribe talked with them about an alternative and the Tribe now owns 5 parcels previously owned by the Robinson family. Also provided funding to help relocate existing owners.
- Notes about Dungeness restoration; the river's been channelized at a number of points, bridges, roads, armoring, etc. Strategies for Dungeness restoration included removing constrictions where possible, protect or replant riparian areas, conserving existing connected floodplain, restore connection to "once-and-future" floodplain. Over the last 3 years the Tribe has conserved near 60 acres.

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- Rivers End is passively restoring itself, another land owner recently contacted Robert about selling their property.
- Started Robinson appraisals before they had the money. The land owners weren't enthusiastic about the time they had to wait, but it actually was quick - considering it was state money. There are also added benefits: 10 tons of contaminated soil and garbage was cleared away and remediated using EPA Brownfield money. There had been gasoline and diesel that penetrated the soil.
- Question: was it a burn pit or a garbage pile?
 - It had all been burned, so there was a lot of toxic build-up. And then removed all the extra garbage that was there to prevent further burning.
- Question: Lorenz: Is the person being prevented from burning more?
 - They were politely asked not to burn anymore garbage.
- Tribe is purchasing properties on Serenity Lane; own all but one. The river took out the armoring that was put in in the 90s.
- The river could have multiple channels, can meander back and forth.
- Question: Are the islands forming on DNR or Tribal lands?
 - Could be either. Proposing to log the DNR land.
- Question: What do the titles read in that section? Do the titles go to the center of the river or are they metes and bounds that go to a certain point?
 - Previous owner owned it all and sold it off in pieces, the Robinsons owned more and more. Most landowners referenced the center of the channel of the river, one or two referenced the side channel, which is even harder to figure out. Title reports show that people own parcel to middle of river, but with river change size, shape and location, who owns what? May need to get neighboring titles to understand your properties.
- One solution is that some land is owned in township/range/ section grid so river can move where it wants but ownership boundaries remain the same.
- Funding agencies have to be flexible. The county is taxing the land as open space. At the river's mercy about how much acreage is actually there.
- Question: What is the status of the tribal bought land? Is it trust land?
 - Its tribal ownership, currently pay taxes on it, can be put into open space, not trust land, it can't be redeveloped (by deed of right). When buying property with state salmon recovery money, essentially the state is buying the property and letting the Tribe be the trustee of that property, holding for the citizens of Washington state as trust for salmon habitat.
- Question: 3 years to relocate & remove houses?
 - They are considered "displaced" people, hired a relocation firm to help relocate people. Some are low income and qualify help with rent for a certain period of time. Can't compel them to leave, 90 days.

V. Other Business/ Announcements

Cathy Lear – Dyke Design

- They are interviewing 3 teams, the firms are GEI Consultants, Tetra Tech, and Shannon & Wilson. All firms have a lot of experience with restoration projects similar to this and have all worked in the area. All proposals were very close.
- Question: Judy: how closely aligned were they, was there much difference?
 - They all have a clear idea of what needs to be done, there wasn't a wide divergence
- Question: Judy: Were they also within the parameters of what was expected for the bid cost of doing this?
 - No cost associated with these proposals, just design. Within the 15-minute open discussion time, Cathy will ask about money.

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- Question: How does Towne Road fit into these designs?
 - Have to design 3 options within a cost/benefit framework. In RFP had to talk about what they felt were the challenges. The three options are cul-de-sac'ed or discontinuous road, a road that goes through the floodplain, similar to how it does now, and then on the new levee. Those are the three they have to look at, and the cost/benefit to each.
- When will dirt be moved? A couple of years hopefully, shooting for next summer.
- Cathy will say more on it next meeting. [CONFIRMED FOR FEB DRMT MEETING]

Public Comment:

- Question: Final tallies on fish run numbers?
 - Haven't got them yet, coho surveys are still wrapping up. Haven't wrapped up Chinook or pink numbers, can we talk about it next meeting? Sure. [CONFIRMED FOR MARCH DRMT MEETING]
- Hatchery fish were half the size as normal.
- Work being done on Woodcock Road Bridge, ask county for updates. 2 supports, digging out supports to the bottom and re-armoring and putting gravel back in, this summer. Can update next meeting. [CONFIRMED FOR FEB DRMT MEETING]
- Judy-When was Woodcock bridge put in? Pre-1980. But was repaved recently.
- Joe- new phase of Dungeness irrigation piping, will be a little over a mile, 18-inch blue pipe. Will be done by the middle of next month.

VI. Adjourn