Meeting Notes

Shellfish Aquaculture Regulatory Committee

March 10, 2008
9:15 a.m. – 3:45 p.m.
Ecology Headquarters Building
Lacey, Washington

Members Present: Sarah Dzinbal, Ward Willits, Dave Risvold, Bryan Harrison, Sally Toteff, Lisa Veneroso, Krystal Kyer, Yongwen Gao, Nick Jambor, Eric Hurlburt, Diane Cooper, Bruce Wishart, Laura Hendricks, Jeff Dickison, Morris Barker (alt.), Peter Downey (alt.)

Ecology Staff: Perry Lund, Jeanne Koenings, Tom Clingman, Kathy Taylor

Interested Agency Staff: Russell Randy Carman (WDFW), Jessie DeLoach (DOH), David Nyswander (WDFW), Jeff Gaeckle (DNR), Jo Ellen Henry (USFWS), John Stadler (NMFS), Casey Ehorn (USACE), Andrea LaTier (USFWS), Shelly Spal (USFWS), David Fyfe (NWIFC), Adrienne Stewart (Rep. Lantz's office), Laura Hamilton (Governor's Office)

Other Interested Parties: Marilyn Showalter (Shine), Bill Burrows (Harstine Island), Paul Sparks (WCTU), Bill Dewey (Taylor Shellfish), Melinda Gray (Amec C&E), Brad Newell (self), Jerry Johannes (Anderson Island), Kyle Deerkop (Shellfish Industry)

Presenters: Dan Penttila (WDFW), Russell Rogers (WDFW), Blain Reeves (DNR), Doug Myers (People for Puget Sound)

Facilitator: Annie Szvetecz, Department of Ecology

Note taker: Candice Holcombe, Department of Ecology

INTRODUCTIONS AND COMMITTEE BUSINESS

Agenda Approval, Meeting Goals, and Announcements

After reviewing the proposed agenda and meeting goals, the Committee approved the agenda. A committee member suggested coming up with a process for recording requests for follow-up information. Agreed to note these on the flip chart and include a recap of action items from last meeting on each agenda.

Sally Toteff will replace Dick Wallace, who has accepted a position outside of Ecology. Her presence will help maintain continuity since she is already familiar with all of the issues and the work of the committee. Annie Szvetecz will now be the meeting facilitator.

Task 1 update: Jessie DeLoach (Washington Dept. of Health) is working to coordinate a multi-agency technical subcommittee on administrative efficiency in aquaculture permitting – currently focusing on data. The technical subcommittee will present either issues or recommendations in mid-summer.

Perry Lund has asked Rick Mraz of Ecology's SW Regional Office to work with group of local government representatives to put together a framework for putting recommendations into SMPs, answering the question "What do local governments need to make these recommendations work for their Shoreline Master Programs?" Representatives from counties (Mason, Kitsap, Pierce, Thurston) have been asked to help with this.

Sea Grant update: Sea Grant will be coming to a future meeting when there is enough information to report. The may be a written update circulated by email in the meantime.

Task 3: Environment, Fish & Wildlife Topics and Potential Guidelines for Geoduck Aquaculture

Panel Presentation

- Forage Fish – Dan Penttila (Washington Dept. of Fish & Wildlife)
- Eelgrass and Macroalgae – Blain Reeves (Washington Dept. of Natural Resources)
- Salmon and Nearshore Habitats – Doug Myers (People for Puget Sound)
- Genetics and Disease – Russell Rogers (Washington Dept. of Fish & Wildlife)

Forage Fish – Dan Penttila (Washington Dept. of Fish & Wildlife)

- Involved in investigation of forage fish in western Washington and Puget Sound since 1972.
- Last year produced forage fish review summarizing current knowledge.
- 3 species that spawn in intertidal and nearshore zone.
  Pacific herring on lower end and shallow marine vegetated beds surf smelt and sand lance on upper intertidal on sand beaches.
- Protection of spawning habitats (critical habitat under Growth Management Act) is listed as part of No Net Loss; they are a habitat of importance under hydraulic code.
- Also concerned with No Net Loss of existing spawning habitat sites in Puget Sound.
- Each species occupies about 10% of shoreline
- Smelt: there are still undocumented spawning sites.
- There are certain "hot spots" where all three species occur together.
- In other places the occurrence is relatively sparse. Not all sites that would appear "likely" are used for spawning, certainly not on the entire scope of those beaches and vegetative beds that look likely.
- Scattered liberally across Puget Sound basin – there is no place that is not within a few miles of a spawning site – also sites along Straits of Juan DeFuca and outer coast and estuaries.
- Information is available on PHS database and SalmonScape database through DFW website.
- When? Spawning January–June for herring, with most in February and March. Surf smelt spawn year round—particularly in north Sound, with a hiatus in April. South sound and Hood Canal, fall-winter. Other areas—summer. Sand lance—November–February Sound-wide.
- Mother Nature has the biggest influence on trends in forage fish spawning.
- Have had No Net Loss in the hydraulic code since mid-1970s. It is mentioned in the Growth Management Act under critical areas, agencies expect local jurisdictions to map and conserve forage fish spawning sites already there when formulating Critical Areas Ordinances and Shoreline Master Programs.
- How has data been gathered? Protocols for data collection vary by species. Have trained a number of Non-governmental Organizations to conduct surveys of interest to them, of sufficient quality to include in WDFW databases.
- Clarifying questions:
  - **Lisa V: What tide heights are associated with surf smelt and sand lance?** Smelt – if substrate is adequate up to extreme high water mark in spring tides – eggs generally found no lower than +7 ft. Use specific grain size to lay eggs – fluffy, silt-free – that sort of materials given hydromorphology of Puget Sound beaches tends to occur in upper third of intertidal zone, in a lot of beaches can vary from a couple of feet wide to a few yards wide depending on sediment budget of beach – lances slightly lower, lower edge +5 feet.
  - **Bruce W.: No Net Loss under Hydraulic Code since we don't understand how forage fish select spawning sites?**
  - **Laura H.: You said the substrate has to be silt-free for spawning– if [harvesters] are liquefying beaches, doesn't that affect substrate?** Dan: I don't know. There will have to be some adaptive management to account for future knowledge about silt that might drift up-beach as a result of harvesting.
  - **Laura: Do we know that they are sensitive to substrate**? Dan: I don't know. Can speak to that more when times comes.

Eelgrass and Kelp: Blain Reeves (Washington Dept. of Natural Resources)

- We believe if you maintain and protect eelgrass and kelp, you are protecting ecological function. They are critical habitat under the Growth Management Act and soon under Shoreline Master Programs.
- DNR's PSAMP – Puget Sound Assessment and Monitoring Program
- Broad view of data: WA state shorezone inventory (data from 2001) – done by helicopter with biologist and hydrogeologist describing what they saw along shorelines. Then characterized for presence/absence of floating/non-floating kelp and continuous, patchy, or absent eelgrass (*Zostra marina*). Also have tabular data that can be queried.
- What we see is eelgrass evenly distributed in central Puget Sound, virtually nonexistent in south Puget Sound.
- Kelp limited to straits and outer coast.
- Understory kelp is broadly distributed.
- Submerged Aquatic Monitoring 2000-2007, entire focus on has been on *Zostra marina*
- Two different strata: Flat strata (shallow embayments - Padilla Bay, for example); fringing eelgrass beds – along fringe in narrow bands.
- Randomly selected transects.
- There is an estimated 21,000 hectares of eelgrass distributed in Puget Sound , with the greatest amount in Padilla and Samish bays.
- Eelgrass depth sound-wide (relevant to shoreline planners) – they have a pretty good understanding of this. It varies--closer to oceanic waters, eelgrass beds are deeper. Deltaic forms very shallow, low intertidal to shallow subtidal. Have site-specific information on maximum/minimum depth for eelgrass beds.
- Key findings slide: no clear pattern where there is decline – decline site can be right next to site with no change – no apparent spatial pattern.
- Kelp monitoring – have spatial data available (1989-2007). Have seen increasing trend in study area during that time – new data in 2007.
- With geoduck aquaculture, have to look at impacts. If sited directly in eelgrass beds, it has impacts. Low oxygen can contribute. Green algae coming in – residential development is increasing nutrient supply.
- Recommended guidelines for siting geoduck operations (on PowerPoint presentation).
- An activity log is very important, maybe even a photo record to document effects over time. Could be that tubes create perfect habitat for eelgrass.
- There are research gaps: don't know what kind of rocks kelp like to settle on, or the light, sedimentation on those rocks.
- **Eric: how do you define an eelgrass bed?** Response: Threshold is 4 shoots per square meter; minimum size. Even one square meter with 4 shoots, should be buffered. No scientific paper will tell you how much to buffer –,monitor and adjust as necessary.
- *Zostra japonica* is not a native species.

Salmon and Nearshore Habitats - Doug Myers (People for Puget Sound)

- Chinook recovery. 22 independent species in Puget Sound area. Nearshore is important—parts of the life history types (delta fry and fry migrants) most sensitive. Project looks at landscape classes and stressors.
- Nearshore Ecosystem Restoration Project. Material coming off bluffs creates the nearshore structure. Feeder bluffs and depositional areas. Doing a change analysis using geomorphological info from 1850s.
- Guiding Restoration Principles—paper by PSNERP.
- Submitting a Reserve proposal to DNR for the Nisqually reach area, encompassing Anderson and Ketron Islands. This incorporates research and outreach. Suggest that an area of Ketron Island might be good for research—tidelands owned by Pierce County.
- PSNERP doing a net benefit analysis too. Looking at all the things together: land uses, climate change, expanding land use, prioritized on a level of importance in the future. Ecosystem goods and services. E.g., a stressor whereby upland issues are leading to eutrophication—PSNERP analysis might recommend putting in shellfish as a way to improve water quality.

Genetics and Disease, Russell Rogers (Washington Dept. of Fish & Wildlife)

- Strauss, et al. does an excellent job summarizing current knowledge about geoduck aquaculture genetics and disease issues.
- Thinks a small change in disease rules would address the genetic threats to native geoducks posed by intertidal aquaculture. Could be easily rolled into existing system for disease control.

- **Diane: Are you familiar with our BMPs for hatcheries? Do you feel those capture your concerns?** Response: When I talk with geneticists, population size and out-planting are not being addressed by many hatcheries (perhaps Taylor does, but many don't).

Perry: these presentations are largely based on papers that came out of the Nearshore Partnership report. We will put them on a compact disc and distribute them to the committee so everyone has full info along with some other key pieces, such as the Sea Grant literature review, nearshore guidelines, etc., Links to all of these are on our website and others.

Question and Answer session:

- **What does No Net Loss mean for forage fish habitat?** Dan – impacts: depends on species. Considerable amount of habitat was already gone by the time we started looking into this. Herring: dredging of marine vegetation zones, bulkheading and filling for port development, over-water structures (piers, bridges), aquaculture and its behavior toward eelgrass when it gets in the way.
- Smelt and sand lance: higher on beach, armoring and filling that bury narrow band of substrate high in intertidal zone or interruption of sediment budget that maintains beaches. Over-water structures – be careful of linking this – structures can be built that will span the beach and forage fish will come on beach and lay eggs; deforestation of shoreline, cutting of riparian corridor shade for surf smelt (a factor in warm weather only, not winter). I tend to focus on spawning habitat only because we don't have data on water quality impacts to forage fish; they will maintain in wretched environments – not particularly sensitive to what we consider degraded water quality (yet, this is a data gap).
- **Bruce: I understand avoidance of these habitats; when I hear No Net Loss I think in terms of other kinds of mitigation. Is that something you have looked at as an agency?**
- Dan: We don't know how to mitigate - recreate this habitat. Surf smelt sand lance will spawn on created beaches with proper grain size and tidal elevation. Pocket beaches created at the edge of industrial fill will sometimes be used for spawning.
- **Bruce: What about places we would expect spawning and it's not happening and we don't know why?**
- Dan: the experiment that hasn't been done is creation of a likely looking beach at some distance from nearest naturally occurring spawning habitat currently used. How far away do you get from naturally occurring site (we don't know if they back to the hatch beach) with expectation that forage fish would find and use it? And where the habitat used was created, there was residual natural nearby within roving distance. Distribution of spawning activity might still be evolving. We have no data, but hypothesize that where fish have selected to lay eggs, factors not only where suitable substrate is but also where larvae drift, presumably into a better rather than worse rearing situation, no study on this yet. Might be why, for example, the north shore of Whidbey is devoid of spawning, because current sweep larvae away. In other words, we don't have complete information on how to mitigate off-site. Really should focus on avoidance in the meantime until we have more information.
- Regulatory: we don't allow people to change the physical structure of spawning habitat due to uncertainty.
- Dan: most notable example I've seen: discovery of surf smelt and sand lance eggs in tiny pockets at ends of industrial fields in Commencement Bay. If you build it they will come, question is how far away?
- **Diane: forage fish interaction with geoduck farming: surf smelt and sand lance use beach at +5? Is there interaction with geoduck farming (+3 and below)?** Answer: There is no documentation of any. Don't know how forage fish behave pre- or post-spawning. **Diane: Herring Feb-March mostly (peak)** Dan: except up in Cherry Point and somewhere else. **Diane: Activities that might disturb?** Dan: assuming buffer between farming and eelgrass beds, impacts of geoduck aquaculture could be harvest siltation. **Diane: would herring spawn on bed ready for harvest if just sand and mud flat?** Dan: occasionally will spawn on wharf pilings, nets, non-living plastic surfaces, would expect in general area of spawning ground, geoduck aquaculture tubes ad predator webbing off surface of tide flat might present suitable substrate. Especially if webbing becomes fouled with natural marine vegetation. Then I'd suggest that impacts of those events should be ameliorated by postponing harvest activities until eggs are hatched. **Diane: there is nothing else but sand flat and geoduck when we're ready to harvest (no other vegetation) so herring interaction would be non-existent;** Dan: so long as siltation issue doesn't spill over into neighboring beds. The literature is full of concerns on anthropogenic impacts. Dan doesn't know how silt behaves in dry harvest. We don't know migratory life history of sand lance or surf smelt.
- **Laura: Possible substrate changes and impacts to higher elevation from siltation? The new interim guide and the report say herring spawn in eelgrass, algae, and hard substrate. Aquaculture obviously affects this because when they harvest everything is gone. You have effects to substrate – siltation tens of feet away. You say smelt will spawn in silt-free area. If this activity creates silty**

environment, it would be detrimental to surf smelt and sand lance. Dan: don't know where silt is able to move up-beach and stay there, don' t know if it has any more impact than episodic storm that would raise silt, or occasional landslide temporary devastation – goes away within a few years.) Not using intertidal worm species.

- **Laura: planting every foot tubes, nets, liquefying, how could algae survive if they don't avoid?** Dan: I would say avoidance is the way to avoid impacts to marine algae beds. Main soft bottom alga that might be of concern is Gracilariopsis (found on tide flats in south Puget Sound). Hopefully there will be BMPs to avoid these at certain density.
- **Laura: what would be impact of liquefying whole beach?** Research program looking at how long it takes to recover preexisting grain size, consistency of bottom after harvest.
- **Lisa: I have to ultimately make decisions on best guidelines for Shoreline Master Programs on geoduck aquaculture. As we hear this info, I'd like to know from the experts in the field, what is factual and what is speculative or needs more attention, and hopefully it's being adopted in Sea Grant research. If not we should identify it as your opinion. Our task is to put into guidelines what we think will best serve as actions of the geoduck industry to protect these types of resources. The chart with dots about spawning of forage fish since 1972—we need to identify what we need to know more about if research doesn't already include it. Where are herring sites, and how do we look for them? How to include in permit? One way to get there might be to overlap herring issues known as factual and eelgrass/kelp bed info – similar eelgrass/kelp tidal zone location information and site-specific that a committee can look at and see where they are, sites we want to protect, example here's how a county and Ecology have to look at potential sites that may need to be protected. Language for permit guidelines.**
- **Bruce: how to do sampling or monitoring? Other issue is to get sense of the relative risk of an impact – how great of an impact?. Finally, we want to take precautionary approach, so if we don't know we'll be more cautious than if we do know. I don't think we know enough about life-cycle effects.**
- Dan: For the ground you're considering as an aquaculture lease site, marine vegetation protocols can be used where impacts may be an issue. Consultants can be trained to know what herring smelt look like. There may be undocumented spawning grounds there.
- Shorezone survey should be used as a starting point only to cue locals in on where to do on-the-ground surveys.
- **Laura: Concern about comments. We're not supposed to be rushing through this. My understanding is that forage fish are in decline. Is that correct?** Answer: No. We don't know if they are in decline. We don't have methodology to know stock size in any given year.
- **Laura: If we don't have baseline, how do we know if we've done damage? We're concerned about rushing through this**.
- **Diane: response to Bruce on precautionary approach. Believe it's critical to apply Best Available Science and Best Management Practices. And we do right now and we're moving ahead pretty cautiously. Back to forage fish. Thought I heard you say limiting factor for forage fish is spawning habitat.** Dan: I didn't talk about limiting factors. It is the one element of their life history that we have some control over. Limiting factors might be more than maintaining spawning habitat. May be water quality, plankton productivity. **Diane: So when we look to develop guidelines, avoidance, minimization, then mitigation, for sand lance and surf smelt, we avoid their spawning habitat.** Dan: If the committee thinks we need to. **For herring?** Dan: It remains to be seen whether survival rates are the same off of artificial structures. **Diane: if we avoid removal of gear when herring spawn are present?** Dan: Yes, should be left undisturbed. **Diane: So what other kind of guidelines?** Dan: Want to see you avoid native marine vegetation beds, or with appropriate buffers until we know if silt after harvest isn't harming it beyond the buffers. **Diane: So Best Management Practices using Best Available Science?** Dan: Yes.
- Gracilariopsis. In absence of native eelgrass, may be primary herring spawning ground.
- **Bryan: will forage fish just give up if the eelgrass has been damaged in their previous spawning ground?** Dan: there are probably no spawning areas in Puget Sound so tiny that a geoduck operation will ruin it all. Honing areas are not that specific, just a few miles within spawning zone.
- Dan: has to be perennial beds of marine vegetation between February and March.
- **Eric: if we have a guideline of avoidance of marine algae, would this protect forage fish?** Dan: yes, that will do it. And keep in mind that marine vegetation beds in absence of spawning events still have other value.
- **Blain: all marine vegetation should be looked at; some are increasing dramatically.**
- **Laura: Since the protected bays and estuaries are essential for most species, would it be a concern if aquaculture also used those areas?** Dan: Yes, the intrusion of nearshore/intertidal aquaculture

practices into these types of sensitive habitats would be of "concern", since the industry has not paid particular attention to minimizing negative impacts in the past, in my opinion.

Panel feedback:

- What does “no net loss” mean for WDFW and forage fish:
    - Herring – direct impacts.
    - Surf Smelt – “sediment budget”.
    - Sand lance – structures – same shoreline deforestation.
- Avoidance:
    - How to regulate?
    - Can get spawning on “created beaches”.
    - WDFW does not allow physical change in structure on spawning habitat.
- Possible substrate changes and impacts to high elevation forage fish habitat:
    - Spawning need silt-free areas?
    - Severity of siltation from geoduck aquaculture “harvest siltation” needs to be studied.
- More details on genetic risks.
- Clarification of disease regulations for private lands aquaculture.
- Need more data on water quality impacts to forage fish.
- Herring and geoduck = direct overlap with tidal elevation:
    - Impacts
        - Siltation.
        - Tubes and webbing structures – might be suitable substrate accident.
        - Harvesting interaction not unless other siltation issues.
- Issue of low oxygen and forage fish:
    - No fish kills? Not known.
    - Effect on spawning—not seen.
    - Surf smelt – different – more nearshore.
- Don’t know other life cycle information for forage fish beyond spawning.
- Avoidance is key for protecting eelgrass also other species.
- Impacts from geoduck and burying sand lances – intertidal:
    - Unknown impact from tubes.
    - Unknown impact from harvesting.
- Focus on factual impacts for guidance
    - What do herring spawning sites mean? real? potential? Sites to avoid.
    - Language for guideline/permit.
- Also need to direct more data collection prior to site selection – life cycle “important habitat”.
- Also need assessment of risks and to take precautionary approach.
- Survey protocols:
    - WDFW spawning.
    - Eelgrass – Survey needed and on ground surveys.
- Need to take time to ask questions.
- Forage fish population:
    - Unknown status of population trends.
    - “shape of stocks” – unsure.
- Apply best available science and best management practices to move ahead.
- Limiting factor for forage fish?
    - Spawning habitat – quantity.
    - Water Quality.
    - Plankton productivity.
- Potential Guidelines:
    - Surf smelt – avoidance.
    - Herring – avoid during spawning – not clear survival on aquaculture gear – gear undisturbed during spawning.
    - Avoid native vegetation beds with buffers.
    - Adaptive management, providing that siltation is not occurring or impacting beyond buffer.
    - Algae is herring spawning substrate – avoid.

- Size of herring spawning area is big enough not to be totally overlapped with a geoduck farm.
- Interaction between herring and eelgrass – perennial beds of marine vegetation in February and March.
- Avoidance of marine vegetation – covers algae – but what algae?

Q – Ecological carrying capacity?

- Not known – it is a concern.
- Cumulative Impact of other aquaculture should be addressed.

- Potential for geoduck larvae? – "consuming filtering capacity".
- Issue of sediment plumes nearshore? DNR making policy decision to set buffer and monitor impacts to eelgrass.
- No evidence of sediment impacts to eelgrass starting with 10 foot buffer, what about previous 180 foot proposed buffer?
- Impacts of light transmission and impacts to eelgrass.
    - Research needed on stressors of eelgrass and primary predecessor – nutrient loading associated.
    - What is "stressed" threshold?
- "Hotspots" with all.
- Look beyond site specific → address cumulative scale of development.
- Need baseline studies for siting.
- Sand lance – impacts to life cycle – no information on how geoduck farming will impact.
- Salmon recovery – restoration of water quality will also benefit aquaculture.
- "Pocket estuaries" importance to salmon depends on type: are they properly functioning, not functioning at all, or at risk. Question is how to overlay with geoduck aquaculture, which needs good water quality in a properly functioning estuary.
- Drift cells – Coastal Atlas has current information but is also getting updated.
- Broodstock and genetics: Russell: The closer the collection site is to farming site, the better.
- What is scale of:
    i. Marine vegetation resource areas?
    ii. Geoduck farming?
    iii. Size and distribution of overlap?
    - Genetics are sensitive to scale of farming.
    - Goals of disease regulations – WDFW protective of wild and farmed, Human health – DOH.
    - Need sideboards at state level.
    - Regionalized impacts.
    - Planning level.
    - Cumulative impacts should be addressed at higher level in guidelines - by this group; number of farms should not decided by local government.
    - Scale Cont – Industry is small and potential growth is not large – limited by ongoing upland impacts
    - Cumulative impacts include geoduck plus other impacts.
    - Project-by-project needs to be addressed
    - Spawning habitat data is current – must assume it is potential and needs to be Protected.
    - Social issues and criteria?
    - Guidelines need to focus on natural science issues and impacts.
    - Industry needs flexibility to address water quality within a designated "zoning" for aquaculture.
    - Cumulative impacts from other development.
    - Habitat alterations from all aquaculture.
    - State needs to look at cumulative.
    - Is current data sufficient to make decisions?
    - Is there data on rearing?
    - Timing is important to spawning and rearing.
    - Are there good sites and benefits to siting geoduck?
      Considering all current stressors, aquaculture is low.
      Aquaculture could absorb nutrients and get them removed from system.
- Siting criteria for geoduck farms is task.
- Other species in food chain and impacts – invertebrates, birds.

- Does DNR have siting protocol regarding forage fish? No – other BMPs to protect use of DNR's model.
- Chart for aquaculture impacts in Salmon Recovery Plan looked at stressors.
- Preserving spatial structure of life cycle.
- Protection within 5 miles of natal delta.
- Protect migration of slowest swimmers.
- Statements of impacts of aquaculture are mainly due to Pacific oyster.
- Avoid and minimize further degradation.
- 11 major deltas and 5 miles around includes entire Whidbey basin.

Recap:

Action items:

- Revisit future agenda for more discussion time on identified topics.
- Create a map of layered data using GIS(contact: Kathy Taylor, Ecology Coastal Atlas)
    - Forage fish spawning activity
    - 5-mile radius exclusion zone around natal deltas
    - Eelgrass
    - Pocket estuaries.
    - Algae as screening tool?
    - Salmon
    - WDFW fish and wildlife conservation areas
    - Important habitat
    - Breeding ground/habitat for endangered or threatened species,
    - Public access areas and recreational sites
    - Water quality
        - Bruce: This doesn't get at other vegetation, fish species.
        - Perry: This can also be a list of the data we require from counties or growers before starting shellfish aquaculture in a new area
        - Diane: I'm uncomfortable with this direction for baseline info. We need to temper this with practical realistic expectation of a grower. May be unrealistic to ask for this data from growers. Need to identify which data is essential, not just what we'd like to know.
        - Doug: A half-hour snorkel trip might be a way to estimate the amount of algae to confirm mapped data on the ground.
        - Jeff: I want to clarify what we're doing here. I thought we were listening to suggestions from experts on what we might want to consider doing. Their recommendations aren't binding. (Response: Correct.)
        - Laura: I don't think we can do this without baseline data
        - Lisa: Suggestions of this map as action item. We're trying to organize ourselves to make a decision – this is another step toward that. Today we heard from four different people about four different topics. As we proceed, we should somehow organize what we talk about into a summary document we can compile and make decisions from. Why don't we document what's known on each of these topics on a map, as a tool? Can help in decision-making.
        - Bruce: Should first identity range of impacts, functions to protect, species to protect, then onto matrix. Map is fine as long as we understand it's not static.
- List protective measures applicable to spawning sites.
- Criteria to assess site-level impacts and how higher scale will be flexible to address.
- DNR provide more details on 10-foot buffer. Also see Batelle's shade models.
- Buffers
- Consider a science/tech advisory committee.

April agenda:

- **Perry**
    - Sea Grant update?
    - Kathy Taylor – Coastal atlas – data availability
    - Birds (Dave Nyswander)
    - Water quality issues (DOH)
- **Others?**

- Diane: Positive impacts of geoduck aquaculture. By someone doing bivalve research – someone from Sea Grant panel?
- Jeff: Concerned with the way this discussion is going. You keep adding to list of things to talk about without getting down to ---? Not willing to expand the timeframe of this committee to going and on about these things. Would like to see it come to an end as quickly as possible.
- Perry: I believe this information is starting to get to permit-specific recommendations. We are bound by legislation to start rule-making. I understand your concern. I'll make sure the topics we address keep us on point and get us to an end that I think we all have in mind.
- Predator Exclusion has been on list for while. Do we want to explore this topic? If so, industry is probably the best to start telling us about this. Options, pros and cons (Perry asked Diane if they cold get someone to talk on this.)
- Laura: If anyone talks about benefits of geoduck aquaculture, they should be independent and not tied to industry. Perry: Yes, I believe I heard Diane suggest someone from Sea Grant.
- Krystal: Buffers –need to figure out what we're trying to protect.
- Perry – This discussion is multi-layered, will go on.
- Doug: iI you're going to talk about mapping this stuff, the scale matters. Coastal atlas allows you to rescale for appropriate size.
- Sally: Time for follow-up from March action items
- Perry: One thing to think about, maybe we want a scientific technical committee to help advise us and weigh in on these topics, even to go through the research summary. If we could give them focused, specific tasks, perhaps they'd be willing to serve as scientific subcommittee feed us that kind of information Annie: Let's table that – looks like there may need to be discussion of that idea.

Parking Lot:

- Larvae – bivalve consuming – needs scientific input.
- Impacts to invertebrates and birds (see white paper on Marine and Shorebirds.)
- HPA's for private geoduck farming

Adjourn: 3:45

Public Comment:

Bill Burrows (Harstine Island): I would like to direct the Committee's attention to a document on the SARC website's research page. This document, titled "Report on Potential Siting and Environmental Considerations in Geoduck Farming and Summary of Subtidal Methodology Advancements" was published by the Pacific Shellfish Institute. In Appendix 1 (Transcripts of interviews with Growers and biologists), I would like to read the comments of two interviewees:

Interviewee's Role in Geoduck Aquaculture: Harvester Farmer/Consultant/Seed Producer
Density: There is an optima maximum density. Look at what is present in the wild and consider lowering your planting density. Assess current and historical density information (.2 per ft2 sub tidally).

Interviewee's Role in Geoduck Aquaculture: Underwater Harvester/Researcher/Sub tidal Seeding Methodologies/Seed Producer/Farmer
Density: Plant at densities similar to wild harvest densities. If too close you might see an increase in disease, decrease in growth and increase in mortality.

Note that both these shellfish industry individuals call for a planting density close to native densities. Goodwin and Pease (1991) found that the average subtidal density in Puget Sound is 1.7/sq meter. This compares to current aquaculture harvest densities in the 17/sq meter range. The committee heard today about many concerns regarding the potential impacts of geoduck aquaculture on forage fish, salmon, and near-shore vegetation. However, there has been no discussion of planting densities and the relationship of this to the ecosystem. It seems clear that if nature averages 1.7 geoducks per sq meter and aquaculture averages 10 times that density, then any negative impacts are highly correlated to this higher density. I would urge Ecology to consider regulatory recommendations that limit planting densities to those levels determined to be safe and minimize ecological damage. Allowing the people with a profit incentive to make these decisions make no sense.

Paul Sparks (Washington Council of Trout Unlimited): My organization just gave extensive comments on the steelhead recovery plan – one of the things we urged was to have WDFW relentlessly enforce their HPA authority. What we understand is that that authority has been given to Department of Agriculture on aquaculture. One idea might be to return that authority to WDFW and make sure they have the ability to enforce it. Can you trust Mason County to make decisions on resources of statewide, if not national, significance? Can we trust this to counties? If we're really going to recover salmon, they're the only ones here with the federally mandated muscle to speak back. Other species don't have a voice. As a one time logger and commercial (fisherman?), I can say that the buffer ought to be three times what you set it at on paper. The guys in the field know the profit that can be made – a buffer too small will be enforced by a guy with a crew who speaks a different language. The 10-foot buffer was set by someone who doesn't understand sediment drift – it's an artifact.

Marilyn Showalter (Property owner in Shine, Washington, property is natural with no bulkhead): I have a single recommendation and it doesn't preclude any other, but is limited to state lands where no personal property right is at stake, and includes herring spawning ground. I am struck by the number of times scientists here have said "we don't know." Dan Penttila said you can look at likely-seeming beaches, and herring do not spawn there. We don't know whey they pick one beach over another, and the corollary is, this is not only about eelgrass. You can set a buffer for eelgrass, and it may not be sufficient. The public lands, at least, are for public benefit—the commons. If you know there are herring spawning grounds and we don't know the necessary elements other than eelgrass, then don't go there until you do know a little more. Let the three areas that have been selected for study, be studied, before allowing other sites. You don't have to take a leap of faith. There is no right to have geoduck farming on State lands – you don't have to go there. I am surprised to not hear about what happens to the biology of the substrate when it's liquefied. What are the effects of this?

Jerry Johannes (Chairman of Anderson Island Tidelands Association): Last time I gave some information on plastics, netting, and tubing on the floor of Puget Sound. I sent an email to Perry about newer research on plastic being subjected to tidal action and being ground into smaller and smaller pieces. It even goes as far as research showing they can be as small as grains of sand and be ingested by marine invertebrates (Richard Thompson in England). I do think we ought to form a technical committee to look at the plastics issue, to identify what's out there and then clean it up. I will comment on birds at next meeting. There are 635 species of macrophytes in Puget Sound: the other 634 are every bit as important as eelgrass (Gracilaria and Ulva, for example, which herrings can spawn on.) The value of macrophytes is immense: they stabilize the substrate, are used as habitat, are used as carbon sink, reduce global warming. Destroy macrophytes and you are losing a lot of function.

Bill Trandum (Case Inlet Shoreline Association): First, I applaud you for incorporating real scientists into this process, and that should continue. The information that is published, some of which comes out of this committee, appears generally to be propaganda or how-to material that comes from the shellfish industry and is passed off as if it were science. Geoducks clean the water? Okay, prove it. Harvest does not cause sedimentation? Science is this right way to process this. Consideration of whether or not it is difficult to get an aquaculture permit should not be in any way, shape, or form be a subject that should limit what this committee is trying to do. Three years ago, I wanted to change the roofline of my house. I found out it would cast unusual shadows on water and I'd be in a two-year permit process. We didn't make the change. The process to go through to make sure you're not doing harm should not be set aside because it might be inconvenient for someone.

Steve Bloomfield: Thank you. I appreciate what you're doing.

Public Comments End 4:05