City of Mercer Island

Wednesday, July 15, 2009

PLANNING COMMISSION REGULAR MEETING AGENDA

PLANNING COMMISSIONERS

Bryan Cairns

Adam Cooper

Jon Friedman

Eric Laschever

Steve Marshall

Kristen White

COUNCIL LIAISON

El Jahncke

CALL TO ORDER & ROLL CALL 7:30 PM

APPEARANCES
This is the time set aside for members of the public to speak to the Commission about issues of concern. *(Please note: Time will be allowed to provide testimony during the Public Hearing for Agenda Item #1. If you wish to comment on Agenda Item #1, please do so during the time set aside during the hearing.)* If you wish to speak, please consider the following points:

- Speak audibly into the podium microphone
- State your name and address for the record
- Limit your comments to three minutes

(Note: The Commission may limit the number of speakers and modify the time allotted. Total time for appearances: 15 minutes)

APPROVAL OF MINUTES Minutes from July 1, 2009

Agenda Item #1 7:50 PM

East Cove 5-lot Subdivision, File SUB08-006

Public Hearing of a request for preliminary long plat approval to subdivide one existing parcel into five lots, and associated improvements.

Agenda Item #2 (If time allows)
Regulation options of SMP update for shoreline stabilization structures (i.e. bulkheads/soft shore armoring)

OTHER BUSINESS

Council Liaison Report

Staff Comments

Planned Absences for Future Meetings

Announcements & Communications

Next Regular Meeting: August 5, 2009

ADJOURN

AGENDA TIMES ARE APPROXIMATE

CITY COUNCIL CHAMBERS
MERCER ISLAND CITY HALL
9611 SE 36TH STREET
MERCER ISLAND, WA 98040

PHONE: 206-275-7605
WEB: www.mercergov.org

Memorandum

To: City of Mercer Island Planning Commission
From: Travis Saunders, Planner
Re: July 15, 2009 Shoreline Master Program (SMP) Update Workshop
Date: July 8, 2009

Commissioners and Councilmember Jahncke:

This evening's Shoreline Master Program update workshop contains the following agenda items:

Agenda item 1:
As a continuation of the July 1, 2009 meeting, the Commission will be reviewing shoreline modification standards (WAC 173-26-231) for shoreline stabilization measures (bulkheads/soft shore armoring). A presentation of draft language will be provided by staff. Following the presentation, Commission discussion and deliberation, the Commission's preliminary recommendation is requested for shoreline modification regulations.

Due to the continuation of discussion regarding shoreline stabilization, the packet from June 17, 2009 meeting is necessary for the July 15, 2009 meeting. Please bring the meeting's packet with you. If you need an additional copy, please contact George Steirer, as I will be out of the office. Alternatively, a packet can be found online at: "http://www.mercergov.org/files/6-17-09 PC Packet.pdf"

During the course of the July 1, 2009 meeting, the Commission requested of staff the following items:

1. Request: Further research of the science behind grated decking within 30 feet waterward of the OHWM. Staff findings: According to Mary Reed, Senior Scientist for the Army Corp of Engineers, the biggest issue is predators; the amount of time it takes for a salmon's eyes to adapt to a change in light is quite long and may be the reason why they avoid going into dark areas. The adjustment to change in light may make it difficult to avoid predators. Ms. Reed also pointed out that the key is that juvenile salmonid behavior is changed and their migration may be longer than normal, which may make it harder to compete with other juveniles once in the ocean. The Corps does not see a reason to reduce or eliminate grating out past 30 or 60 feet. Exhibit A in the Commission's packet is a section from a white paper that discusses shading and ambient light changes. The paper was prepared by Jose Carrasquero, Herrera Environmental Consultants, for the Washington Department of Fish and Wildlife, Department of Ecology, and Department of Transportation.

2. Request: Further research of the science for translucent canopies. Staff findings:
The following information is contained within the Army Corps of Engineers RGP application for watercraft lifts in fresh and marine/estuarine waters within the State of Washington: "Project Impact Reduction and Conservation Measures - *While the individual activities described above will have minimal impacts to the aquatic environment, direct, indirect, and cumulative impacts from these structures have not been fully avoided. Salmonids, including juvenile chinook salmon and sub-adult and adult bull trout use the nearshore areas of Puget Sound for feeding, rearing, and/or as a migratory corridor. As small individuals, they stay in shallow waters to avoid large fish predators found in deeper water, and to rear and feed. The watercraft lift structure itself and canopy inhibits light from entering the water. This loss of light reduces the ability of*

aquatic vegetation to grow. This subsequently has an impact on the feeding and rearing habitat of fish. Also, the shadow created by the structures may provide cover for predators of salmonid fish species. Therefore, the amount of shade created by these structures needs to be minimized. Also, because the shallow water habitat is an important habitat feature, structures should be placed in deeper water to minimize impacts to the shallow water habitat. The purpose of these measures is to offset losses to the aquatic environment resulting from direct, indirect, and cumulative impacts of watercraft lifts and canopies. These mitigation measures will restore or create important fish habitat to offset the impact of the project."

3. Request: A cost comparison between grated decking and traditional decking. Staff findings: The west coast distributer of ThruFlow decking, a commonly used grated decking material, stated that the retail cost for his product is $6.75 per square foot, and wholesales at $5.80 per square foot. The cost of wood decking is approximately $2.79 per square foot (OW Natural Select Wood Decking from Dunn Lumber).

   According to a local contractor, the material cost for grated decking is approximately 50% more than lumber decking. The contractor stated that in addition to the cost of grating, the grating requires a stringer every 16" versus 36" for lumber, adding additional material and labor costs. In addition, the contractor stated that installation of grated decking is more labor intensive, since the panels interlock.

   A second contractor, Dave Douglas of Waterfront Construction, estimated that decking replacement from wood to grating averages $40 per square foot, including disposal, labor, and materials. Mr. Douglas also stated that grated decking requires no maintenance, which is a long term savings. Both contractors acknowledged that grating is already required by the Washington State Department of Fish and Wildlife and the Army Corps of Engineers.

4. Request: Further research regarding the terms "if feasible" and "where practicable". Staff findings: The City Attorney will provide an oral summary at the July 15, 2009 meeting.

5. Request: Staff to provide a strike and delete of the existing Shoreline Master Program provisions for shoreline stabilization structures by incorporating the applicable language in WA 173-26. Staff findings: A copy of the request has been provided in Exhibit B.

Itemized below are exhibits in for the July 15, 2009 Planning Commission meeting:

Exhibit A: Excerpt from Over-Water Structures: Freshwater Issues, prepared by Jose Carrasquero

Exhibit B: Draft language for shoreline stabilization measures

Should you have questions regarding the materials or the update process, in my absence, feel free to contact George Steirer.

- Why do subyearling fall chinook salmon avoid bedrock cliffs and manmade boulder (riprap) areas in the Snake River? Does this avoidance expose them to increased predation?

Habitat Function

- Do fish respond to the actual shoreline structures, or to the habitat characteristics resulting from riparian zone alterations (e.g., vegetation and woody debris removal) associated with placement of the structures?

- What is the relationship between the cumulative effects of increased number of docks in Lake Washington and the decline in sockeye salmon freshwater survival?

- Can the effects of shoreline development be fully mitigated? How?

- Can habitat function in highly developed shore-zone areas be restored? How?

- In lakes and slow-flowing rivers and reservoirs, does large woody debris enhance salmon habitat or provide habitat for salmon predators?

Shading and Ambient Light Changes

Light is very important in the life of organisms. For juvenile salmonids, light is necessary for orientation, prey capture, schooling, predator avoidance, and migration navigation (Simenstad et al. 1999). Docks, piers, pier skirting, floats, houseboats, boathouses, barges, marinas, pilings, wharves, log booms, and log rafts all shade aquatic habitat and limit ambient light, affecting macrophyte and phytoplankton primary production. This shading could result in a decreased survival rate, or at least promote behavioral changes in various components of the biological community. Lighting associated with these structures may possibly alter fish species behavior, posing increased risk of predation and causing disruption of fish migration patterns. Empirical evidence exists (see discussion below) that indicates that changes in the underwater light environment may have an impact on juvenile salmonid physiology and behavior (Simenstad et al. 1999).

Predation

No data were found supporting a direct link between lighting and an increase in predation of fishes. Research results found were inconsistent, however may provide insight into the effects of lighting associated with over-water structures with regard to increased predation.

For example, under varying light intensities, within the natural range of light intensities occurring at night, it has been shown that predation rates on juvenile salmonids increase with increasing light (Patten 1971; Ginetz and Larkin 1976; Mace 1983, as cited by Tabor et al. 1998).

In contrast, Tabor et al. (1998) in conducting freshwater laboratory experiments found decreased predation rates at higher light intensity. These researchers speculated that rather than increased inhibition of sculpin predatory behavior, the light may have actually influenced salmon behavior, by enhancing the ability of the fry to detect and avoid sculpin, which resulted in reduced predation. Tabor et al. (1998) proposed that differences in study components (such as salmonid species, environment) between their work and earlier studies of Patten (1971) and Mace (1983, as cited by Tabor et al. 1998) may explain the difference in the results they found.

Tabor et al. (1998) in the analysis of their research results, speculated that the reason increased predation did not occur may have been a result of the predator being sculpin, a non-obligated visual fish. In the darkness, sculpin may use some other sensory mechanism besides vision (i.e., their lateral line) to detect prey and therefore, the increase in light intensity may not have enhanced its foraging ability. However, these researches suggested that in the case of visual predatory fish such as cutthroat trout, rainbow trout, juvenile coho salmon, as well as some bird species, increased light intensity might result in an increased predation rate on juvenile salmonids. Consequently, studies using any of these visual species might find an increased predation rate correlated with increased light intensity. The speculation of Tabor et al. (1998) regarding their research results may not be accurate, as other research shows. For example, Petersen and Gadomski (1994) found in laboratory experiments with increasing light intensity a decreasing predation rate between northern squawfish (a visual predator) and juvenile chinook salmon.

In addition to differences in experimental condition, the reason for the lack of consistency in the aforementioned research results may be that simultaneous variables contribute to the effect of potential light-mediated predation rates on juvenile salmonids. In the field, physical/chemical and biological variables may have confounding, interrelated, and simultaneous interactions on fish responses to artificial light associated with over-water structures. To better interpret research results providing indirect evidence of the adverse effect of lighting on fish, such variables need to be studied and further understood. Unfortunately, this is usually difficult, particularly when field experiments are performed.

One example of a physical variable confounding the results of experiments on the effects of light on fish is a study conducted by Vogel and Beauchamp (1999) regarding the effects of light, prey size, and turbidity on reaction distance of lake trout (*Salvelinus namaycush*) and salmonids. They found that with increasing light, reaction distances increased rapidly (i.e., from less than 25 centimeters at 0.17 lux to about 100 centimeters at a light threshold of 17.8 lux). Above this threshold, increasing light contributed no further advantage for prey detection and therefore no further risk to prey. Vogel and Beauchamp (1999) also found that the “reaction distance declined as a decaying power function of turbidity.”

Artificial light associated with shoreline development can also have an effect on predation of juvenile salmonids through the alteration of their migratory behavior. It has been proposed that in the Cedar River, increased artificial light intensity levels may delay fry emigration and cause fry to move to areas of lower water velocity where most predation appears to occur (Tabor et al. 1998). Therefore, one might expect that a delay in emigration due to the increasing incidence of nighttime lighting associated with shoreline development or over-water structures could lead to increased predation on emigrating fry. However, this has yet to be researched.

Behavior

Regarding fish attraction to shade and its potential effect on predation, Helfman (1979) found that in Cazenovia Lake, New York, experimental floats attracted prey fishes (small bluegill and adult golden shiner) and suggested that this aggregation may attract predatory fish species. However, this conjecture was inconclusive in this study. Helfman (1979) speculates that largemouth or smallmouth bass would gain an element of surprise by hovering in shaded regions. Conversely, prey fish would have an advantage by being able to see approaching predators before the predator sees them. This is because floats are shade-producing objects, which reduce the conspicuousness of fish in shade while enhancing their ability to view predators approaching from sunlit surroundings.

As juveniles, predator fish might also seek protection from their own predators by occupying shaded areas. Helfman (1979) speculates that attraction of predatory fish to floats might be because of predator-protection-seeking behavior imprinted as juveniles. Consistent with this, Haines and Butler (1969) show that structures that provide darkness are most often selected by yearling smallmouth bass.

Shade from over-water structures may have effects other than those reported by Helfman (1979) that promote fish aggregation under shade-casting structures. On a species-specific basis, those effects may vary with fish physiology. For example, in their review, Simenstad et al. (1999) analyzed empirical data pertaining to the juvenile salmonid light perception in the context of behavior and physiology. Their review indicates that 1) ambient and artificial light have been reported to induce behavioral responses consistently different between species and ontogenetic stage, and the responses vary with the dispersal patterns of the species; 2) upon a stimulus, the progression of changes the fish eye must undergo from one state to another is influenced by the intensity of the introduced light to which the fish has been exposed; and 3) there are threshold light intensities for different behaviors of juvenile salmonids.

Thus, one may argue that the shade cast by over-water structures that occur over juvenile salmonid migratory corridors may disrupt their migration by creating visual barriers and promoting disorientation. Over-water structures such as docks can create sharp underwater light contrasts by both casting shade and casting light (from lighting) under ambient daylight and nighttime conditions respectively (Simenstad et al. 1999). In this regard, there is empirical evidence which indicates that changes in the underwater light environment will have an impact on juvenile salmonid physiology and behavior, and these changes may pose a risk of affecting fish migration behavior and increasing mortality risk. (See Simenstad et al. 1999; a full review is beyond the scope of this white paper.)

Similarly, it has been suggested that changes in light intensity may modify the behavior of sockeye salmon fry (Tabor et al. 1998). Tabor et al. (1998), conducting simulated stream experiments, found that increased light, especially that above natural levels, appears to slow or stop emigration of fry, which makes them more vulnerable to predation by sculpin. Tabor et al. (1998) found that as light level increased, and in the absence of sculpin, fry emigrated downstream at a slower rate. In the presence of sculpin, fewer fish emigrated but did so at a faster rate than in the absence of sculpin (Tabor et al.1998). Similarly, McDonald (1960) found that the downstream migration of sockeye and coho salmon fry was closely related to light intensity. He found the presence of artificial lights over experimental stream channels at night inhibited the downstream migration of sockeye and coho salmon fry in these channels until the lights were extinguished. Consistent with this finding, Godin (1981), based on a literature review of diel timing of salmon fry migration, indicates that natural light intensity appears to be the major environmental factor controlling the daily onset and termination of the downstream and upstream migrations of salmonid fry. His findings indicate the physiology of these organisms is involved in the process. As changes in the underwater light environment will have an impact on juvenile salmonid physiology (Simenstad et al. 1999), it follows that both the artificial light associated with over-water structures and the shade that these structures produce have a potential for disrupting salmon fry migration and thereby increasing exposure to predators.

In terms of fish attraction to lighting generally, the only data found during this literature review comes from an indirect source (Collis et al. 1995). While conducting an unrelated study on northern squawfish predation on salmonids, Collis et al. (1995) observed that juvenile salmonids were attracted (i.e., surfaced) to work lights in a Columbia River reservoir. However, such attraction may not hold in all systems and for all different ontogenetic stages (Simenstad et al. 1999). In many different second and third order creeks on the Olympic peninsula, night snorkel surveys of juvenile salmonids indicated no attraction to the light produced by flashlights when shined from under the water or from the surface (Carrasquero 1997 unpublished observations). Instead, fry and presmolt salmonids held position, at times even regardless of the proximity of the surveyor.

Habitat Function

In terms of the effects of on-and over-water structures on the light environment, another concern of shading and ambient light changes relates to the potential effects on habitat function. This includes reduction of the ambient light beneath a structure due to light obstruction by an over-water structure (shading), as well as changes of the ambient light (increase in intensity) due to lighting associated with the structure.

As noted previously, shading can affect habitat function by creating visual barriers to migrating fish. The physical design and elements of the over-water structure (i.e., deck height and width, piling numbers and type, pier skirting and batter boards, etc.) can influence whether the shadow cast on the near shore covers a sufficient area and has sufficient intensity to constitute an underwater visual barrier for fish (Simenstad et al. 1999). Also, to the extent that phytoplankton and aquatic macrophytes require light during photosynthesis, over-water structures that reduce or modulate the amount of light will ultimately affect macrophytes beds and reduce phytoplankton primary production, with corresponding effects on habitat function, the food web, and consequently the ecosystem.

Because epibenthic communities depend on light (of certain intensity) to persist, artifacts that may diminish light intensity beneath a structure will affect such communities and their habitat. For example, shading from pile-supported structures may modify wetland habitat, and depending on the amount of shading, algae and aquatic vegetation that occur beneath the structure may be reduced or absent (Mulvihill et al. 1980). However, piling and piers offer substrate for algae to grow in areas where bottom depth is below the photic zone or presents unstable sediment conditions (Mulvihill et al. 1980). A loss of phytoplankton primary production due to shading may be compensated by the primary production of algae that grow on pilings, particularly in areas with bottom conditions as described above.

In this regard, White (1975) studied the light intensity under and outside over-water structures to determine whether structures significantly reduced the amount of light available for primary production of phytoplankton. Not surprisingly, he found that light intensity was higher outside over-water structures compared with intensities beneath the structures, as a result of shading from the structures. However, surface phytoplankton production at the edge of a large over-water apartment complex and under narrow residential piers, exceeded those measured outside over-water structures. White (1975) explains these results as a natural inhibition of production that occurs at the surface of water due to light conditions, which are higher than those in which algae thrive. He suggests that under narrow residential piers, at approximately one meter beneath the over-water apartment complex, light intensity may be reduced to "optimal," resulting in higher primary production. White (1975) did not study the abundance or distribution of macrophytes under or outside the docks and piers, nor did he investigate the loss of primary production due to the reduction of macrophyte vegetation. Clearly, the loss of macrophyte vegetation due to the placement of over-water structures drastically affects primary production.

In terms of the surface area covered by piers, although suggesting that narrow residential piers do not significantly reduce phytoplankton primary production, White (1975) concludes that there is an inversely proportional reduction in such production due to the reduction of light. White's (1975) findings that there were no significant reductions of phytoplankton primary production, do not take into consideration the cumulative effects of individual piers. Analysis of alterations occurs primarily at the spatial scale of individual, recreational, and residential properties, the effects are incremental and cumulative in nature (Jennings et al. 1999).

One may argue that a shaded underwater area beneath an over-water structure is essentially a new and different habitat from that which previously existed. This shaded habitat possesses intrinsic physical characteristic that will promote changes in various interrelated parameters such as light intensity, temperature, primary production and consequently, dissolved oxygen (Simenstad et al. 1999). It is expected that the design (i.e., dimensions, materials, and location in relation to the sun path) and flow conditions at the selected site will influence how much such parameters change, due to the shade cast by the over-water structures. In turn, these changes may induce responses in the biological community with ecological consequences, which are still poorly known and much less well understood.

Shade-producing structures can introduce changes to fish assemblages and distributions, which in turn may affect the local communities, and therefore the systems they inhabit. Helfman (1979, 1981a) studied fish attraction to shade producing objects and to experimental floats in Cazenovia

Lake, New York. The experiments were conducted using underwater human observers and cameras. He found the number of fish aggregating beneath shade-producing objects is directly proportional to the size of the objects. Helfman (1981a) suggests that the amount (or depth) of shade produced is a determinant of the observed attraction phenomenon. Helfman (1979, 1981a) concludes that shade, interacting with water clarity, sunlight, and vision, is an important factor in attracting temperate lake fishes to overhead structures. In this regard, the major determinant of the apparent attraction of shade producing objects to fish is the relative visual advantage of a shade versus a sunlit observer (Helfman 1979, 1981a; Helfman et al. 1997). For example, during the day, largemouth bass are typically found near cover, which shields them from high light intensities and may provide a concealed vantage point for the occasional ambush of prey (Helfman 1981a).

The associated problems of shading are not exclusive to docks, piers, or associated piling structures. Floats can also shade the underwater environment in a fashion directly proportional to the site and shape of the structure. However, shaded areas caused by floats are usually small, and therefore a measurable effect is not expected (Mulvihill et al. 1980). No published empirical evidence of the specific effect of floats on habitat function was found.

Shading and Ambient Light Changes – Findings Summary and Data Gaps

Summary

Figure 2 schematically depicts the relationships among impacts resulting from changes induced by on-, in-, and over-water structures and associated construction and operational activities. As illustrated in Figure 2, these structures shade the underwater environment and limit the daylight available for photosynthesis, thus restructuring communities. Construction and operational activities associated with these structures impair water quality and promote algal blooms, thus reducing light penetration and disrupting salmonid behavior. Ultimately, these impacts disrupt the food web and in turn the ecosystem.

The following is a summary of findings of this literature review pertaining to shading and ambient light changes, organized by the observed type of response.

Predation

- In different species and under different environmental conditions, predation rates in juvenile salmonids have been shown to both increase and decrease with increasing light.

- With increasing light, reaction distances increase rapidly but only within a threshold, above which increasing light contributes no further advantage for prey detection. The reaction distance declines as a decaying power function of turbidity.

- Large or smallmouth bass may gain an element of surprise by hovering in shaded regions.

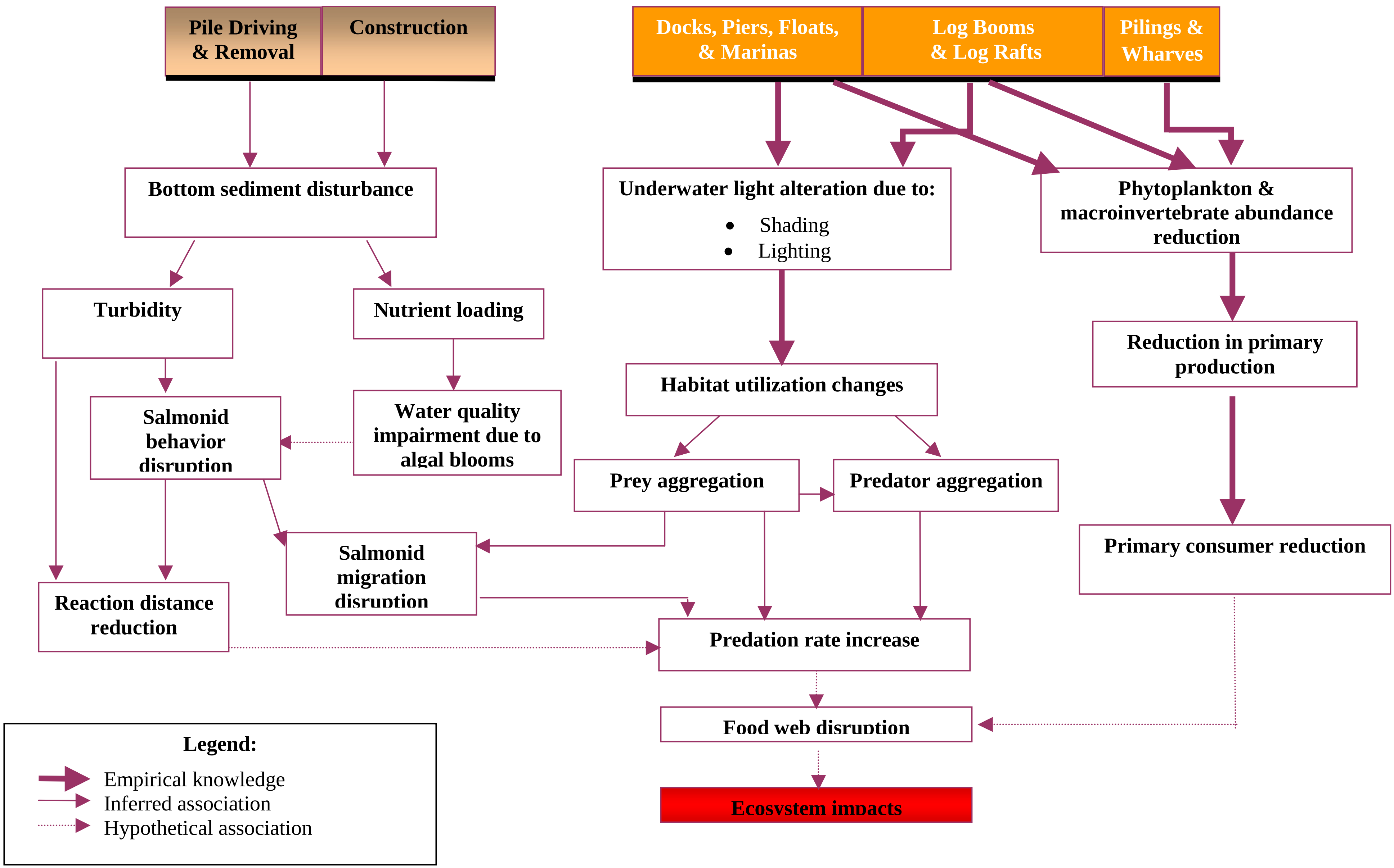

Figure 2. Impacts resulting from changes induced by on-, in-, and over-water structures and associated construction activities.

Behavior

- Ambient and artificial light have been reported to induce consistently different behavioral responses between species and ontogenetic stage, and the responses vary with the dispersal patterns of the species.

- Upon a stimulus, the progression of changes the fish eye must undergo from one state to another is influenced by the intensity of the introduced light to which the fish has been exposed.

- Changes in light in the underwater environment affect juvenile salmonid physiology and behavior. This is because there are threshold light intensities at which different juvenile salmonid behaviors occur.

Habitat Function

- Shading affects habitat function by creating visual barriers to migrating fish.

- Shading from pile-supported structures modifies the water temperature and wetland habitat, and depending on the amount of shading, algae and aquatic vegetation that occur beneath the structure are reduced or eliminated.

- The shade produced by a piling-supported pier promotes a loss of phytoplankton primary production. However, this may be compensated by the primary production of algae that grow on pilings, particularly in areas where the bottom depth is below the photic zone or presents unstable sediment conditions.

- Narrow residential piers may not significantly reduce phytoplankton primary production, but there is an inversely proportional reduction in production due to the reduction of light.

- The cumulative effects of even narrow residential piers are detrimental to the environment.

- Shade interacting with water clarity, sunlight, and fish vision is reportedly an important factor in attracting temperate lake fishes to overhead structures.

Data Gaps

No empirical data were found to support several of the processes depicted in Figure 2. Where empirical data are lacking, inferred and hypothetical associations have been drawn. The matrix of data availability in Appendix B shows where data exist under each of the categories of response studied in this white paper (i.e., predation, behavior, and habitat function).

Through this literature review, the following information needs have been identified (organized by the observed type of response).

Predation

- Is there a relationship between lighting and predation on juvenile salmonids?
- Do large or smallmouth bass gain an element of surprise by hovering in shaded areas under over-water structures?
- What is the relationship between reaction distance decline (due to turbidity) and fish predation rate?

Behavior

- Does lighting from shoreline development and associated over-water structures disrupt or delay juvenile salmonid migration? Would this disruption have an effect on predation on juvenile salmonids?
- What is the relationship between impacts on juvenile salmonid behavior resulting from light changes in the underwater environment and changes in predation rates?
- Do changes in light intensity modify the behavior of sockeye salmon fry? Would this behavior modification make them more vulnerable to predation?
- Do algal blooms originating from nutrient loading disrupt salmonid migration?

Habitat Function

- What are the cumulative impacts of over-water coverage on primary production in various lakes and reservoirs of eastern and western Washington?
- How does the design of structures (i.e., dimensions, materials, and location in relation to the sun path) influence organism responses? Do these responses vary among species or systems?

19.07.100 Shoreline areas.

D…..

4. Bulkheads and Shoreline Stabilization Structures.

a. Construction and maintenance of normal protective bulkhead common to single-family dwellings requires only a shoreline exemption permit; however, if the construction of the bulkhead is undertaken wholly or in part on lands covered by water, such construction shall comply with the SEPA Rules, Chapter 197-11 WAC.

b. Existing Primary Stuctures, including Single Family Residences: New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, should not be allowed unless there is conclusive evidence, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical analysis should evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization. New or enlarged erosion control structure shall not result in a net loss of shoreline ecological functions.

c. Single-family residences and Nonwater-Dependent Development: New structural stabilization measures in support of new nonwater-dependent development, including single-family residences, shall only be allowed when all of the conditions below apply:

i. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.
ii. Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
iii. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report, in compliance with MICC 19.07.110(D)(4)(k). The damage must be caused by natural processes, such as tidal action, currents, and waves.
iv. The erosion control structure will not result in a net loss of shoreline ecological functions.

d. New development should be located and designed to avoid the need for future shoreline stabilization to the extent feasible.

e. Bulkheads shall be located generally parallel to the natural shoreline. No filling may be allowed waterward of the ordinary high water mark, unless there has been severe and unusual erosion within one year immediately preceding the application for the bulkhead. In this event the city may allow the placement of the bulkhead to recover the dry land area lost by erosion.

f Publicly financed or subsidized shoreline erosion control measures shall not restrict appropriate public access to the shoreline except where such access is determined by the Code Official to be infeasible because of incompatible uses, safety, security, or harm to ecological functions. Where feasible, as determined by the Code Official, publicly financed or subsidized shoreline erosion control measures should incorporate ecological restoration and public access improvements into publicly financed or subsidized shoreline erosion control projects.

g. New development on steep slopes or bluffs shall be set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure, as demonstrated by a geotechnical analysis, in compliance with MICC 19.07.110(D)(4)(k). New development that would require shoreline stabilization which causes significant impacts to adjacent or down-current properties and shoreline areas should not be allowed.

h. New structural stabilization measures in support of water-dependent development shall only be allowed when all of the conditions below apply:

i. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.
ii. Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
iii. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report, in compliance with MICC 19.07.110(D)(4)(k).
iv. The erosion control structure will not result in a net loss of shoreline ecological functions.

i. New structural stabilization measures to protect projects for the restoration of ecological functions or hazardous substance remediation projects pursuant to RCW 70.105D shall only be allowed when all of the conditions below apply:

i. Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
ii. The erosion control structure will not result in a net loss of shoreline ecological functions.

j. An existing shoreline stabilization structure may be replaced with a similar structure if there is a demonstrated need to protect principal uses or structures from erosion caused by currents, tidal action, or waves, and when the following conditions apply:

i. The replacement structure should be designed, located, sized, and constructed to assure no net loss of ecological functions.
ii. Replacement walls or bulkheads may be located immediately in front of and abutting an existing bulkhead only if the residence was occupied prior to January 1, 1992 and there are overriding safety or environmental concerns In such cases, no filling shall be allowed waterward of the ordinary high water mark.
iii. Soft shoreline stabilization measures that provide restoration of shoreline ecological functions may be permitted waterward of the ordinary high-water mark.
iv. For purposes of this section standards on shoreline stabilization measures, "replacement" means the construction of a new structure to perform a shoreline stabilization function of an existing structure which can no longer adequately serve its purpose. Additions to or increases in size of existing shoreline stabilization measures shall be considered new structures.

k. Geotechnical reports pursuant to this section that address the need to prevent potential damage to a primary structure shall address the necessity for shoreline stabilization by estimating time frames and rates of erosion and report on the urgency associated with the specific situation. As a general matter, hard armoring solutions should not be authorized except when a report confirms that there is a significant possibility that such a structure will be damaged within three years as a result of shoreline erosion in the absence of such hard armoring measures, or where waiting until the need is that immediate, would foreclose the opportunity to use measures that avoid impacts on ecological functions. Thus, where the geotechnical report confirms a need to prevent potential damage to a primary structure, but the need is not as immediate as the three years, that report may still be used to justify more immediate authorization to protect against erosion using soft measures.

l. When any structural shoreline stabilization measures are demonstrated to be necessary, pursuant to above provisions, the following shall apply:

i. Limit the size of stabilization measures to the minimum necessary. Use measures designed to assure no net loss of shoreline ecological functions. Soft approaches shall be used unless demonstrated not to be sufficient to protect primary structures, dwellings, and businesses.

ii. Ensure that publicly financed or subsidized shoreline erosion control measures do not restrict appropriate public access to the shoreline except where such access is determined to be infeasible because of incompatible uses, safety, security, or harm to ecological functions. See public access provisions; WAC 173-26-221(4). Where feasible, incorporate ecological restoration and public access improvements into the project.

iii. Mitigate new erosion control measures, including replacement structures, on feeder bluffs or other actions that affect beach sediment-producing areas to avoid and, if that is not possible, to minimize adverse impacts to sediment conveyance systems. Where sediment conveyance systems cross jurisdictional boundaries, local governments should coordinate shoreline management efforts. If beach erosion is threatening existing development, local governments should adopt master program provisions for a beach management district or other institutional mechanism to provide comprehensive mitigation for the adverse impacts of erosion control measures.

m. Breakwaters, jetties, groins, and weirs. Breakwaters, jetties, groins, and weirs located waterward of the ordinary high-water mark shall be allowed only where necessary to support water-dependent uses, public access, shoreline stabilization, or other specific public purpose. Breakwaters, jetties, groins, weirs, and similar structures should require a conditional use permit, except for those structures installed to protect or restore ecological functions, such as woody debris installed in streams. Breakwaters, jetties, groins, and weirs shall be designed to protect critical areas and shall provide for mitigation according to the sequence defined in WAC 173-26-201 (2)(e).