

23 August 2019

Mayor Joe Benetti and  
Members of Coos Bay City Council  
C/O Mr. Roger Craddock  
City Manager, City of Coos Bay  
500 Central Avenue  
Coos Bay OR 97420

Dear Mayor Benetti and members of the Coos Bay City Council

I have been following and commenting on land use permit applications submitted by the Jordan Cove Energy Project and the Pacific Connector Pipeline to the City of Coos Bay, the City of North Bend and Coos County. I look forward to participating in the upcoming hearing before you on Tuesday August 27<sup>th</sup>.

I realize that the multi-faceted Jordan Cove Energy proposal has generated an extraordinary volume of correspondence and documents for you and the staff of the City to review. I have personally committed scores of hours thoroughly reviewing and commenting on the applicant's proposal that will be before you at the hearing on August 27th. I believe I am in a position to comment as I have dedicated my entire professional career to studying this estuary and supporting informed decisions related to estuaries and coastal regions.

As part of my review of NRI-4 dredging proposal that is before you, I have read and commented on the application, attended and commented during the planning commission deliberation of this application and have most recently reviewed the staff report provided for your review that is posted on the City of Coos Bay web site.

I am confused and dismayed by the number of exhibits attached to the staff report provided for the hearing on August 27. The 42 exhibits include a total of 451 pages of material. Hundreds of pages of the material in the exhibits have little if any direct nexus with the proposal to dredge NRI area 4; the only one of the four proposed NRIs in the jurisdictional boundaries of the City of Coos Bay.

At numerous land use hearings related to this project, the land use attorneys representing the applicant have insisted that testimony and decisions be strictly limited to the specific aspects of the permit application at hand. In this case the permit application at hand is related to dredging the margin of an area in the city of Coos Bay's jurisdiction that is currently zoned 52-NA. The application before you does not address other aspects of the Jordan Cove Project that will take place elsewhere.

Yet the 451 pages of exhibits provided in the staff report are replete with unrelated information such as grading plans for a park and ride sites in Hauser, dredge material disposal plans for the city of North Bend, mitigation work in Kentuck Slough and numerous other aspects of the proposed LNG terminal on the North Spit that have little or no bearing on the impacts or consequences of dredging a portion of the estuary in your jurisdiction.

Upon reviewing the staff report provided for your review and I find the staff analysis portion of the report prepared by the Land Council of Governments (LCOG) to be on point, well researched, and clearly presented. In contrast, I find that much of the content of the 42 exhibits attached to the staff report to lack a germane link to the decision before you.

I have previously submitted my analysis of the applicant's proposal during the public comment period prior to the planning commission deliberation of the proposal. My comments were included in the public record reviewed by the planning staff and the planning commission. My comments address 12 aspects of the applicant's proposal and reinforce the staff recommendation to deny the applicant's requests. My analysis is available to you on the City planning department web site but it is difficult to find and challenging to navigate the electronic format present there.

I was somewhat disappointed to learn that the analysis I prepared for the planning commission review was reduced to a single sentence in the staff report provided for your review. Because I believe the substance of my analysis is relevant but has been lost in the process that this application has taken, and because the format in which my comments are presented on the City of Coos Bay planning department web site make them difficult to find and difficult to navigate, I append the narrative portion of my analysis to this message on the hope that you will take a moment to consider it before you make a decision on this important permit application. The attached comments were submitted to the planning department in a timely manner and are part of the official record available to you. I hope that you consider them in your decision process.

Sincerely,

Michael Graybill  
63840 Fossil Point Road  
Coos Bay OR 97420  
542-294-8235

Cc  
Henry Hearley (LCOG)  
Roger Craddock (city of Coos Bay)  
Carolyn Johnson (city of Coos Bay)  
Jim Hossley (city of Coos Bay)

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

Carolyn Johnson, Community Development Administrator  
City of Coos Bay [cjohnson@coosbay.org](mailto:cjohnson@coosbay.org)

And

Henry Hearley, assistant planner [hhearley@lcog.org](mailto:hhearley@lcog.org)  
Jake Callister principal planner [jcallister@lcog.org](mailto:jcallister@lcog.org)  
Lane Council of Governments  
859 Willamette St #500,  
Eugene, OR 97401

March 22, 2019

To whom it may concern

In response to a public notice and request for comments, I attach comments on the application by Jordan Cove Energy Company to modify the Coos Bay Estuary management plan in order to secure various land use authorizations to expand the width of the deep draft navigation channel into a portion of the estuary presently designated for high level natural conservation purposes.

The Jordan Cove Energy Project L.P. has applied to the City for a Comprehensive Plan Map Amendment to the Coos Bay Estuary Management Plan to 1) change the designation of approximately 3.3 acres from 52-NA to DDNC-DA; 2) change text in the Comprehensive Plan to take a reasons exception to statewide planning goal 16 to authorize the proposed map amendment; 3) an Estuarine and Coastal Shoreline Uses and Activities Permit for "New and Maintenance Dredging" in the DDNC-DA Estuarine Zone; and 4) an Estuarine and Coastal Shoreline Uses and Activities Permit to allow an accessory temporary dredge transport pipeline in the 52-NA, 53-CA, 54-DA and 55-CA Estuarine Zones.

I am aware that the proposal before your city is centered on a portion of the work associated with only one of four proposed Navigation Reliability Improvement (NRI) dredge areas associated with the Jordan Cove Energy project. I understand that only one of the proposed dredge areas falls within the city of Coos Bay's jurisdictional boundaries (NRI-4) and that material dredged from the proposed NRI in your jurisdiction is planned to be transported out of your jurisdiction and disposed of in the jurisdiction of the City of North Bend. While your city's analysis and decision making may be inclined to address land use considerations related to a portion of one of the four proposed NRIs, be assured that estuarine ecosystem will need to address the impacts associated with all four of the proposed dredge areas, regardless of the political jurisdictions in which the proposed work will be conducted.

Your city is charged with implementing a portion of the Coos Bay Estuary Management Plan; a plan developed to support the coordinated conservation and development of the entire estuarine system. There is no doubt that the work associated with the Jordan Cove Project spans multiple jurisdictions. It

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

is my belief that the three jurisdictions charged with implementing the provisions of the Coos Bay Estuary Management Plan should be conducting their analysis and respective permit reviews in a coordinated manner.

As a participant and supporter of the CBEMP's development and implementation, I can assure you that the founders of the plan expected land use decisions related to estuary development to be coordinated by all the political jurisdictions fortunate enough to include a portion of the estuary within their boundaries. This proposal is a test case for Oregon's land use planning framework. The CBEMP was developed as a special area management plan to protect against a fragmented "death by a thousand cuts" decision making framework. This outcome can only be avoided through open coordination with the other jurisdictions also involved in reviewing other aspects of the activities proposed for your jurisdiction that also necessitates work in other jurisdictions also charged with implementing the provisions of the CBEMP.

The information and analysis that I have attached to this cover letter addresses all four of the NRIs proposed for the Coos Estuary by this applicant. The information provided to you by the applicant has treated all four NRI areas in a similar matter. I contest the applicant's "batch processing" approach to securing land use authorizations for the various NRIs because this approach ignores the unique attributes (and zoning designations) of each of the four locations. For this reason, and the other reasons outlined in the attached analysis and supporting exhibits, I hope you also find reasons to question the applicant's approach and to deny the applicant's requests.

Exhibit 12 is the staff analysis developed by Land Council Of Governments (LCOG) in support of the City of Coos Bay Planning department's analysis of the proposed NRI-4 land use requests. I am grateful to the LCOG and the City staff for making this report available for public review. The attached Adobe acrobat file version of the LCOG staff analysis identified as Exhibit 12 includes my own annotations, comments, and responses to the findings and analysis in the staff report. Please also consider these comments as my own in addition to the comments I have provided in the draft narrative that follows this cover letter.

Thank you for providing the opportunity to comment.  
Sincerely

Michael Graybill

63840 Fossil Point Road  
Coos Bay OR 97420  
mhodbill@gmail.com

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

**The following comments address land use application requests submitted by Jordan Cove Energy (the applicant) to the planning departments of Coos County and the City of Coos Bay. The applicant has requested various land use zoning changes in order to enable the Jordan Cove Energy Project to dredge four portions of the Coos Estuary referred to as “Navigation Reliability Improvements” or NRIs.**

**Comments specific to one or more of the NRIs will be identified as such. Comments directed specifically to NRI-4 are intended to address specific aspects of the application materials submitted to the City of Coos Bay Planning department. Comments directed specifically to NRIs 1-3 are intended to address specific aspects of the application materials submitted to the Coos County planning department. Comments that do not call out one or more specific NRI are intended to address the applications under review by both the Coos County and City of Coos Bay planning departments.**

**The applications related to the NRIs fail to address major issues associated with the proposed changes. Examples of some of the key findings addressed by my comments are summarized in the numbered list that follows. Additional analysis is provided in the narrative section that follows this summary list as well as annotated comments embedded in Exhibit 12 associated with these comments.**

1. The applicant has failed to address the cumulative impacts of multiple environmental stressors associated with the overall activities needed to render the NRIs of use.

2. The applicant’s assertions regarding the productivity of sub tidal habitats are inadequately substantiated.

The applications universally under estimate the scale of the likely impacts

The applications universally understate the duration of the likely impacts

3. Noise impacts associated with the proposed work not adequately addressed.

4. Impacts to diving waterfowl and other living resources dependent on portions of the estuary in the vicinity of the proposed NRIs are not considered but are a likely consequence of the proposed actions. Examples of impacted species include but are not limited to Surf Scoter, Pacific, Red-Throated, and Common Loon, Western, Red Necked, and Eared Grebe, Greater Scaup, Common Goldeneye, Brant Goose, Pacific herring, Dungeness crab, Eulachon and sand shrimp.

5. The applications do not adequately address the telegraphic effects of the proposed work on adjoining portions of the estuary including but not limited to increased wave impacts to adjacent sub tidal and intertidal shoreland habitats.

6. The applications do not adequately address the telegraphic impacts linked to Increased wave and hydrodynamic impacts to eelgrass and surf grass habitats adjacent to the NRI’s

7. The applications do not adequately address the specific dredging methods to be employed or the potential shore side impacts associated with mobilization and demobilization of dredging equipment.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

8. The applications do not adequately address the potential impacts of the dredging operations and dredged material transfer operations to Marine mammals including, California Sea Lions, Harbor Porpoises, Killer Whales and resident breeding population of Harbor Seals.

9. The proposed work does not appear to be necessary for the type of navigation proposed by the applicant.

10 The Public Benefits of the project are not adequately substantiated.

11 The applications do not address potential safety considerations resulting from modifying the hydrodynamic characteristics of the navigation channel. Expansion of the width of the navigation channel as a result of the construction of the NRI has potential to enhance the propagation of tidal and tsunami wave energy in the estuary posing a potential increased threat of harm to people and property in the estuary and impacts to living resources resulting from alterations of the salinity characteristics of the estuary.

12 No mitigation has been proposed to offset anticipated and likely impacts associated with the proposed work.

Dredging of the existing navigation channel would remove an estimated 580,000 to 700,000 cubic yards of material and would construct a temporary pipeline on the channel bottom for several miles to remove the dredged material. Following initial construction of the NRIs, maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years. (U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 3-6.)

Initial construction dredging and periodic maintenance dredging will directly and permanently remove benthic organisms, such as worms, clams, and shrimp, from the bottom of the bay. Crabs, shrimp, clams, oysters, and fish could become entrained in the operation of the dredging equipment.

The Coos Bay Estuary Management Plan requirements of Policy 5(I) implement and mimic the language of Statewide Planning Goal 16, Implementation Requirement 2:

“Dredging and/or filling shall be allowed only:

- a. If required for navigation or other water-dependent uses that require an estuarine location or if specifically allowed by the applicable management unit requirements of this goal; and,
- b. If a need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and
- c. If no feasible alternative upland locations exist; and,
- d. If adverse impacts are minimized.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

Other uses and activities which could alter the estuary shall only be allowed if the requirements in (b), (c), and (d) are met.”

**The proposed work will result in unacceptable cumulative impacts to estuarine habitats associated with the dredged material excavation, transfer and disposal operations. (see application exhibit 4 page 2)**

This commenter recognizes that the material to be dredged from the four NRIs in the jurisdictions of the City of Coos Bay and the unincorporated portions of Coos County lie within the area encompassed by the Coos Bay Estuary Management Plan (CBEMP). It should be noted that an additional land use authorization in the jurisdictional boundaries of the City of North Bend will also be needed before it will be possible to transfer the materials dredged from the NRI dredge areas to the proposed upland dredged material disposal areas designated “APCO 1” and “APCO 2”. Transfer of material dredged from the NRIs will require the installation of up to 5 pilings in an estuarine intertidal eelgrass bed in the city of North Bend near the APCO dredged material disposal area. Therefore, it is not possible to accomplish the sediment removal (dredging) work proposed in the NRIs in the absence of concurrence and land use approvals for aspects of the NRI dredging work taking place within the North Bend city limits. (See page 12 Exhibit 1 Draft Resource Report Supplement Navigation Reliability Improvements Jordan Cove Energy Project July 2017).

The applicant states the pilings will be installed at the North Bend dredged material transfer location on a temporary basis. There will doubtless be disturbance to the eelgrass during piling installation as well as piling removal. In materials provided to the Federal Energy Regulatory Commission and to the Oregon Department of State Lands, the applicant states that the material dredged from the NRI during expected triennial maintenance operations will also be spoiled at the APCO disposal site. No discussion is provided to determine if a piling supported pipeline system will also need to be installed at this location in order to transfer dredged material produced during maintenance operations to the APCO site.

If it becomes necessary to install and remove 4-5 temporary pilings each time the need arises to transfer material produced during maintenance dredging of the the NRI sites to the APCO sites, it is likely the eelgrass beds adjacent to the APCO dredged material transfer pipeline route will be exposed to repeated disturbances associated with repeated installation and removal of the “temporary” pilings necessary to elevate the dredge pipe above the eelgrass surface. The cumulative effects of the disturbance associated with regular, and repeated installation and removal of pilings in these eelgrass beds would likely result in long term decline and loss of eelgrass habitats in the vicinity of the proposed work.

**Placement and operation of dredged material transfer pipeline and associated booster pumps is imprecisely described rendering it impossible to provide an accurate assessment of the applicability of the proposed work to the various estuary zoning districts to be crossed by the dredged material transfer pipeline (see application exhibit 4 page 3)**

In a description of the operations associated with NRI Dredge Area #1 the applicant states that two sediment transfer booster pumps “*may*” be required to pump dredged material a distance of 8.2 miles from the excavation site to the APCO disposal area. The applicant further states the booster pumps will be located “as required” on a barge “*or*” on pile supported platforms. The applicant further states that materials associated with dredging “*if used*” will be removed. Because the methods to be employed are not clearly defined, it is difficult if not impossible to provide an objective assessment of the possible impacts associated with the work.

As a way to demonstrate why the applicant’s imprecise characterization of the operations precludes an objective analysis of the ecological impacts as well as the zoning implications of the proposed work, I offer a few illustrative, but not exhaustive examples:

1. The airborne noises generated by the construction and installation of a pile supported platform support for a booster pump will be different from the noise associated with mooring a barge supported booster pump.
2. During excavation and dredge material transfer operations, noise propagated into the water from dredge cutter heads and sediment transfer booster pumps mounted on floating, barge mounted supports can reasonably be expected to differ significantly from the noise propagated into the water from the same booster pumps supported above the water surface by a pile supported platform. The type of dredged material transfer pipeline used also has potential to influence the manner in which noises are propagated from the pipe. Thick walled plastic pipe is likely to have different acoustic characteristics than metallic pipe. Similarly, the noise associated with a suction cutter head dredge can reasonably be expected to be dissimilar to the noise associated with a clam shell type dredge or excavator type dredge. Other dredging operations requiring removal of bedrock in this estuary have necessitated the use of explosives to fracture the bedrock prior to removal from the estuary bottom. Certainly, dredging operations that necessitate the use of explosives will have acoustic characteristics that differ from other possible methods the applicant suggested might be used to construct the NRIs
3. The ecological consequences associated with the locations selected for individual booster pump installations are *very* place sensitive. In order to assess potential ecological and zoning implications of this proposal, the number, location, and methods used to install, operate, maintain and remove each of the pumping stations must be clearly specified. The applications provide no information regarding the specific number or proposed locations of the booster pump stations. For example, the proposed dredged material transfer pipeline route will cross sections of the estuary that support two important harbor seal haul out and pupping locations. In addition, resident harbor seals forage and mate in the waters of the estuary in the vicinity of the proposed NRIs.

The varied zoning districts within the Coos Bay Estuary Management Plan provide evidence that the resource values of varying locations within the bay are distinct and not homogeneous. This example is provided to demonstrate that placement of a booster pump immediately adjacent to



a seal pupping and haul out site will have different considerations and potential impacts than a similar pump placed at a distance from that same haul out site and pupping locations. Further, certain zoning districts within the CBEMP may impose limits on installation of pile supported structures but may place differing limits on mooring barges in that same zone. Prior to issuance of any authorizations or approvals, the planning departments should require the applicant to provide information with sufficient detail to enable the departments and other reviewers to conduct an analysis of the ecological and land use implications of the proposed activities.

The applications provide only a qualitative characterization of underwater and airborne sounds to be produced by the proposed work. No quantitative characterization of the nature of sounds (e.g. time of day, frequency, intensity, periodicity) produced by the proposed dredging operations is provided to enable an objective assessment of the potential impacts to resources in the vicinity of the proposed work. Much of the dredging and sediment handling work associated with the construction of the proposed NRIs will take place immediately adjacent to areas of the estuary zoned "NA" and "CA" which prioritize protection for living resources. These factors must be considered during review of these applications as they hold potential to conflict with the management objectives of the various zoning districts in the vicinity of the proposed activities. Provisions of Goal 15 and the Coos Bay Estuary Management plan require authorizing jurisdictions to confirm that the proposed work is compatible with the intended management objectives of adjoining zoning units. It is not possible to determine if the proposed work is compatible with the management objectives of the CA and NA zones because insufficient information has been provided in order to enable this type of determination to be made.

The applicants should be required to provide additional information regarding direct mortality impacts to listed fish and marine organisms from the proposed NRI dredging and sediment transfer activities in Coos Bay. The proposed hydraulic cutterhead dredge method will entrain juvenile fish, including threatened salmonids, as well as benthic organisms critical to salmon diets. Mechanical sediment removal methods employing excavators or clamshell dredges would not have the same fish entrainment impacts, but Jordan Cove has not specified the actual methods to be used. Therefore, it is not possible to evaluate the potential impacts of the proposed work.

**Pacific Eulachon** (also known as candlefish) utilize Coos Bay and may be present in the estuary during NRI construction and maintenance operations. Eulachon typically spend three to five years in saltwater before returning to freshwater to spawn in late winter through mid-spring. Eulachon are a small fish that are rich in calories and important to marine and freshwater food webs, as well as commercial and recreational fisheries and indigenous people from Northern California to Alaska. The application does not adequately assess potential impacts to this species as a result of the dredge and fill operations proposed in Coos Bay.

Similarly, the peak period of non-breeding waterfowl use in the Coos Estuary is during the period between September and May. The period of peak waterfowl activity overlaps with the ODFW in water dredging work window. The applicant has stated its intention to conduct dredging operations during the in-water work window to minimize impacts to listed Coho salmon, but this will require work likely to

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

result in maximal disturbance to waterfowl and other species whose life cycles are focused on the bay during the September to May time period.

The lower portion of the estuary in the vicinity of NRI area 1 and NRI area 2 is a particularly important winter feeding area for Surf Scoters and other diving ducks. The species that frequent this portion of the estuary are benthic feeders and must dive from the surface and swim to the bottom of the estuary where they forage on clams and other benthic organisms. The distinct, localized distribution of diving ducks in the estuary is strongly correlated to the occurrence of bedrock benthic subtidal habitats known to occur in this portion of the estuary. It is highly likely that Surf Scoters foraging in the lower portions of the estuary are targeting sub tidal rock bottom habitats in the estuary as a preferred feeding area. The dredging work in NRI 1 and NRI 2 will involve removal of bedrock habitats in the immediate area of the greatest observed wintering resting and feeding aggregations of Surf Scoters and diving ducks in the Coos Estuary. Similar patterns of diving bird use of the lower estuary that are correlated with rock substrate sub tidal habitats also occur for other species including Red Necked, Western and Eared Grebes, Common, Red Throated and Pacific Loons, and Pigeon Guillemots.

Dredging the bedrock portions of the estuary in NRI areas 1-3 will result in the deepening of a sub tidal rock substrate that appears to be a preferred foraging habitat for multiple species of diving waterfowl. In addition to the direct displacement of waterfowl on the bay surface by dredging equipment and activities, the newly dredged bedrock areas will be fully defaunated thereby diminishing the limited portion of the estuary bottom being targeted by this species. Finally, even if the biota occupying the rock substrates to be impacted by the rock dredging activities, the recovered biota will be at a significantly deeper portion of the sub tidal zone of the estuary and will be more difficult to access by diving, benthic feeding birds.

Multiple marine mammal protection act covered species are present in the proposed area of work. Marine mammals, especially pinnipeds, are sensitive to noise disturbances. Jordan Cove proposes install steel piles for the dredge material transfer operations in North Bend as well as possible pilings to support booster pumps along the dredged material transfer pipeline route. Previous rock dredging work conducted by the US Army Corps of Engineers in the vicinity of NRI areas 1-3 employed an excavator mounted on a jack up barge to fracture bedrock sediments which were subsequently brought to the surface using a clamshell dredge. These materials were transferred to the disposal area via barges and scows. This prior experience suggests that excavators mounted on jack up barges have been previously employed to excavate bed rock materials in the vicinity of the NRIs in the lower portion of the estuary. the applicant makes no reference to the potential use of Jack up Barges as a dredging method. Should this method be required, the support legs and mooring points to position the Jack up Barge will likely result in bottom disturbances that are not address by the applications and will produce sounds not addressed by the application (For a recent review of the impacts of sound on marine mammals see [https://www.aquaticmammalsjournal.org/index.php?option=com\\_content&view=article&id=1886:marine-mammal-noise-exposure-criteria-updated-scientific-recommendations-for-residual-hearing-effects&catid=174&Itemid=326](https://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=1886:marine-mammal-noise-exposure-criteria-updated-scientific-recommendations-for-residual-hearing-effects&catid=174&Itemid=326)).

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

Benthic organisms that are vital to the natural dynamic processes and productivity of the Coos estuary reside in recognized high-quality, Natural Aquatic and Conservation Aquatic areas that would be permanently altered by the proposed action. In soft sediment dredging areas within the NRIs Dredging activities would also degrade the habitat of the native estuarine shrimp species including mud shrimp. Estuarine shrimp are especially sensitive to the kind of disturbance caused by the proposed dredged material transfer pipeline. Mud shrimp are already impacted by an introduced parasitic isopod called *Orthonoe griffenis* ([https://theworldlink.com/news/local/invader-kills-off-mud-shrimp/article\\_fa08c2d9-47e9-5cb6-83d3-6bad07ec3bdf.html](https://theworldlink.com/news/local/invader-kills-off-mud-shrimp/article_fa08c2d9-47e9-5cb6-83d3-6bad07ec3bdf.html)) Estuarine shrimp are filter feeders and are important components of the diet of juvenile Harbor seals, shorebirds and waterfowl. As a result, degrading habitat for shrimp could further diminish the ecological integrity of the estuarine system.

Oregon's Biocriteria standard is intended to assess the total impact to a biological community, including multiple stressors and cumulative effects. OAR 340-041-0011 provides that "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." DEQ's regulations define "without changes in the resident biological community" to mean "no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region". (OAR 340-041-0002). "Ecological integrity" means "the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat for the region." (OAR 340-041-0002). In this way, the Biocriteria standard complements the other environmental quality standards.

Based on all of the potential impacts to aquatic species, marine mammals, and fish associated with the proposed action, the applicants have failed to demonstrate that the project is consistent with the protection and conservation of Oregon's waters as required in statewide planning Goal 16. Therefore, the requested actions should be denied.

**The applicant has failed to address the cumulative impacts of multiple environmental stressors associated with the overall activities needed to render the NRIs of use.**

While the applicant suggests that all impacts would be temporary and localized, the significant re-shaping of Coos Bay and waterway and shoreland crossings from the dredged material transfer pipeline, together with ongoing maintenance operations and discharges, would result in permanent and/or chronic cumulative detrimental changes in the resident biological communities and fundamental circulation and salinity characteristics in the estuary.

The significant difference the proposed dredging here makes for navigation in Coos Bay is primarily that it introduces a whole new category of deep draft channel users (LNG tankers) that are more complex and hazardous than other forms of commercial navigation. The effects of operation should be considered because the application raises those effects on operation as the core purpose of the channel dredging.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

The utility of the proposed NRIs will only be fully realized if the proposed Jordan Cove Energy Project is built. Construction of the new LNG terminal will require dredging in a 17-acre portion of the estuary to connect the proposed LNG carrier berth to the existing Coos Bay Federal navigation channel. The full realization of the potential benefits being used by the applicant to justify the proposed work rely on the construction and operation of the proposed LNG terminal. Therefore, the impacts associated with the construction and operation of the terminal should also be considered a component of the impacts associated with the construction of the NRIs.

### **Applicants Fail to Demonstrate Public Benefits to Navigation from NRI Dredging**

According to the applications, the NRI dredging would not change allowable vessel dimensions, but would allow navigation of the Federal Navigation Channel at higher windspeeds. The applications state that, according to JCEP modeling, the navigation reliability improvements would increase the volume of LNG that might shipped by about 38,000 tonnes/ year if the proposed terminal is constructed as currently envisioned.

During oral testimony the applicant has repeatedly asserted that the proposed NRIs will make the use of the channel safer, more efficient, and more cost effective for all large merchant vessel types calling on the Coos estuary. Project proponents have provided testimony that vessel arrivals and departures can be delayed by a variety of conditions including; ocean wave height and swell direction, wind speed and direction, and visibility including fog, rain, darkness and mist. The applicant has stated that the NRIs would specifically enable vessel transits in the navigation channel that are limited by certain types of windy conditions. However, the applicant has not provided any empirical evidence or quantitative analysis to demonstrate what percentage of the total vessel transit delays are caused by exceedance of wind limitations imposed by the existing channel configuration. Reviewers are left with no objective means to judge what portion of all current transit delays would be removed as a result of construction of the NRIs.

The improvements proposed here are a response to a private need for channel dredging, not a public one. The applicants have not demonstrated that the NRI dredging will meaningfully improve navigation conditions for vessels other than the LNG carriers proposed by the applicants. LNG carriers are taller and longer than other vessels currently using this estuary making them more vulnerable to wind related navigation challenges. The application includes letters of support from the Coos Bay Pilots Association and Roseburg Forest Products that provide no quantitative analysis and rely heavily upon information from the applicant. City and County planning department reviews should consider the direct, personal, and financial interests at stake while reviewing the support letters provided by the applicant.

### **The proposed NRIs may reduce a navigation hazard but may not necessarily improve overall safety in the harbor.**

It is not clear that dredging the margins of the channel at the turns will improve safety for vessels transiting the channel. Pilots currently manage risk and achieve safe passage in the existing channel by limiting ship operations to conditions suitable for safe passage of vessels. Following the proposed NRI construction, pilots will make crossings using the same margins of safety as before; the difference is that

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

those margins could be achieved in higher wind conditions than before. While the turns resulting from the NRI dredging may be wider, they will be taken at higher wind speeds, resulting in the same margin of safety from the pilot's perspective.

It is not possible to determine if allowing bar crossings by LNG vessels under windier conditions would result in safer overall navigation. If wind is the primary factor among the suite of factors responsible for transit delays, construction of the NRIs may potentially serve to increase the potential number of large vessel transits possible in the Coos Estuary. However, if other factors such as ocean swell height, wind induced sea state and tides impose controlling limitations on large vessel transits into and out of the estuary, construction of the NRIs could have no impact whatsoever on transit delays or the overall annual vessel transit capacity of the navigation channel.

Review of this application requires a coordinated process to address the entire suite of land use applications related to the construction and maintenance of all 4 NRIs. The applicant has made it clear that in order to attain the asserted navigation reliability improvements it will be necessary to construct all four of the proposed NRIs. This application only seeks land use authorization to construct a portion of the total NRIs. Reviewers should recognize that the navigation benefits asserted by the applicant will not be attainable unless all four NRIs are constructed. As a result, the request for land use approval of a subset of the total number of NRIs addressed by this application will not attain the improvements sought by the applicant. No individual jurisdiction (City of North Bend, City of Coos Bay, Coos County) will have authority to authorize construction and maintenance of all 4 NRIs. The only rational way to objectively evaluate the environmental, economic, and social consequences of the proposed work is to consider the proposal to construct and maintain all 4 NRI as a single proposal. This type of coordinated decision making is the fundamental objective of the Coos Bay Estuary Management Plan and is a requirement of Goal 2 of Oregon's statewide planning program.

Inherent in the purpose of the project, however, is that the proposed NRI dredging will more readily accommodate new and extensive LNG carrier vessel traffic. Vessel routing from the open ocean over the bar, up the estuary to the proposed LNG marine slip is a hazardous maneuver that will impair navigation for all other users under the best circumstances. The locations and extent of NRI and channel dredging in the Coos Bay estuary has immediate and direct implications for vessels transiting the navigation channel. Aside from the turns that are the subject of the NRI dredging, the navigation channel contains numerous important turns and components also having very little room for error. For example, the entrance and first river bend, as well as the entrance to the marine slip, require precise maneuvers and pose hazards that will not be addressed by the construction of the NRIs. In spite of these and other considerations, The US Coast Guard captain of the Port overseeing navigation safety has determined that the navigation channel in the Coos Estuary is suitable for LNG marine traffic as it currently exists. (Exhibit 11).

Earthquake and/or tsunami response during or following dredging operations is not addressed in the applications, imposing an additional public safety and navigation liability of the project. During initial construction, anchored dredges and dredged material transfer pipelines deployed through the bay would be at risk during a tsunami or earthquake event, potentially posing an additional hazard to others

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

in the form of drifting debris and impairment to search and rescue operations. Following construction, the expanded channel width and depth will enable tsunami wave trains to propagate more freely in the estuary potentially exposing people and properties to greater risk of inundation and harm.

CBEMP Policy 5 pertains estuarine fill and removal as follows:

I. Local government shall support dredge and/or fill only if such activities are allowed in the respective management unit, and:

- a. The activity is required for navigation or other water-dependent use that requires an estuarine location or, in the case of fill for non-water-dependent uses, is needed for a public use and would satisfy a public need that outweighs harm to navigation, fishing, and recreation, as per ORS 541.625(4) and an exception has been taken in this Plan to allow such fill.
- b. A need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights.
- c. No feasible alternative upland locations exist; and
- d. Adverse impacts are minimized.
- e. Effects may be mitigated by creation, restoration, or enhancement of another area to ensure that the integrity of the estuarine ecosystem is maintained.
- f. The activity is consistent with the objectives of the Estuarine Resources Goal and with other requirements of state and federal law, specifically the conditions in ORS 541.615 and Section 404 of the Federal Water Pollution Control Act (P.L.92-500).<sup>359</sup>

**The applicant has failed to demonstrate the need for the project as required by CBEMP Policy #5 (b) of the CBEMP**

The applicant asserts that the proposed activity, (e.g. dredging one 3.3-acre area in NRI dredge area 4 in the city of Coos Bay or three NRI Dredge areas in Coos County), is required for navigation. The stated purpose of the proposed action is to improve reliability and efficiency of navigation for existing deep draft vessels by reducing the existing navigation constraints at the key turns ("Dredge Areas") in the Federal Navigation Channel (Exhibit 10 PDF page number 114). However, in a Letter of Recommendation prepared by US Coast Guard Captain W. R. Timmons dated 10 May 2018 (Exhibit 11) The captain of the Port sector Columbia River states:

*"Based on a comprehensive review of Jordan Cove's WSA, and after consultation with State and Local port stakeholders, I recommend that the Coos Bay Channel Be considered suitable for LNG marine traffic".*

Captain Timmons' analysis is a supplement to his previous Letter of Recommendation (LOR) dated May 10, 2018, that conveyed his recommendation on the suitability of the Coos Bay Ship Channel for liquefied natural gas (LNG) marine traffic associated with the Jordan Cove LNG (JCLNG) export terminal

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

project Coos Bay, Oregon. It documents the processes followed in analyzing JCLNG's Waterway Suitability Assessment (WSA) and the suitability of the waterway for LNG marine traffic.

The Captain of the Port's letters of recommendations and determinations of waterway suitability appear to refute the applicant's assertion that the proposed NRIs are needed. No reference is made to the need to excavate the proposed Navigation Reliability Improvements in the Letter of Recommendation or the attached materials included with the Coast Guard letter of Recommendation (Exhibit 11). The planning commissions should find that that applicant has not substantiated a need to exceed the recommendations of the USCG Captain of the Port's assessment that the current configuration of the navigation channel is suitable for deep draft vessel traffic including LNG marine traffic.

**The applicant has failed to adequately demonstrate the cumulative impacts of proposed NRI construction and maintenance will result in a substantial Public benefit as required by CBEMP Policy #5 (b) and Statewide planning Goal 16.**

The applicant has stated that the proposed work will provide a public benefit. The Port of Coos Bay and the US Army Corps of Engineers are public agencies with longstanding and widely recognized status as public entities that work in this estuary to support navigation proposals that serve public purposes. The purpose underlying the initial creation of the Port of Coos Bay in 1909 was described by G.B. Case in his review of the history of the Port of Coos Bay. Case states: *"Improvement of the channels in the bay beyond project specifications was the immediate result of the formation of a new organization in the area, the Port of Coos Bay."* (See pages 54 and 55 in Chase, G.B. "The history of the Port of Coos Bay 1852-1952 University of Oregon, December 1983). The Port of Coos Bay and the US Army Corps of Engineers are the primary partners in the Coos Estuary who have maintained the federal navigation channel and advocated for navigation projects having public benefits since Congress recognized it as a Federal Navigation Project in the 1880's. If there is a public benefit to this project, it is not clear why the applicant and sole proponent of the NRI proposal is a private party and why neither of the traditional public entities charged with implementing navigation improvement projects in the public's interest are leading the effort to create and maintain the NRIs. Jordan Cove is the sole entity identified as advancing the NRI project and is the sole party identified as bearing the cost to construct and maintain the NRIs. That Jordan Cove Energy, a private entity, is the project applicant and that Jordan Cove alone has expressed an intent to singularly bear responsibility for the construction and maintenance of the proposed NRIs, raises questions related to the existence of any bona fide public benefits of the project.

At the request of the Port of Coos Bay, the US Army Corps of Engineers is currently evaluating a proposal to deepen and widen the federal navigation channel the scope of which will exceed and subsume all of the "navigation reliability improvements" that are the subject of the present application. As of early 2019, the applicant has provided over \$4 million and has committed an additional \$3.5 million dollars via an agreement with the Port of Coos Bay to support 2019 costs associated with preparation of the EIS for the Federal Navigation Channel Expansion Project.

The applicant's decision to propose the development of the NRIs concurrently with the work being conducted by the Port of Coos Bay and the US Army Corps of Engineers has generated a huge workload for city and county and state governments and has placed a large, additional burden on members of the public interested in participating in the decision-making process. In addition to the FERC EIS, and the

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

USACE EIS, the DSL wetland fill and removal program, and DEQ Clean Water Act 401 water quality certification permit programs that are reviewing the Jordan Cove proposal, there are no less than 5 city and county land use permits and public hearings in play at this time. Any one of the aforementioned state or federal permit process outcomes hold potential to fundamentally change the scope of the project rendering the proposed zoning authorizations being considered by the land use hearings associated with the NRIs moot or redundant.

Oregon land use Goal 16 establishes priorities for management of estuarine resources as follows.

The general priorities (from highest to lowest) for management and use of estuarine resources as implemented through the management unit designation and permissible use requirements listed below shall be:

1. Uses which maintain the integrity of the estuarine ecosystem;
2. Water-dependent uses requiring estuarine location, as consistent with the overall Oregon Estuary Classification;
3. Water-related uses which do not degrade or reduce the natural estuarine resources and values;
4. Nondependent, nonrelated uses which do not alter, reduce or degrade estuarine resources and values.

**The applicant fails to acknowledge, describe or evaluate the impacts to multiple fundamental habitats and estuarine processes that maintain the integrity of this estuary that could be altered by the proposed land use changes.**

Notable among the habitats and processes that provide the foundational support required to maintain the integrity of the estuary include processes and habitats essential to sustaining the existing natural resource-based economies in this community.

As an illustrative example: the annual ex-vessel commercial Dungeness crab landings in Oregon are valued at over \$300 million dollars. Ex vessel commercial crab landings in Coos Bay alone are worth \$30 million dollars. Each year, tens of millions of pea-sized larval Dungeness crabs enter this estuary every year to feed and metamorphose from planktonic organisms suspended in the water column to tiny “first instars” that begin life as crawling crabs that, in three years’ time, become the adult, market sized crabs that support the most valuable commercial and recreational fishery in Oregon. (Exhibit 7).

The Coos Bay region is also renowned for its recreational Dungeness crab fishery. Estimates from the 2007-2011 period found a minimum of 10,661 to a maximum of 15,023 crabbing trips were made in Coos Bay from April to October per year. Crabbing in Coos Bay is one of the most valuable recreational opportunities in the region and draws considerable number of people to the estuary from local and out of area locations. The commercial and recreational Dungeness crab fishery is of considerable economic significance especially for the community of Charleston.

It is understandable that, in the interest of obtaining the permits, the applicant; a midstream energy company, has hired expert consultants to obtain any permits needed to develop the Jordan Cove LNG



Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

export facility. These teams of “experts” contracted to secure the necessary permits, somehow managed to “overlook” the importance of the estuarine habitats for larval and juvenile Dungeness crabs and other fundamental processes taking place in the areas to be impacted by the NRI dredge work. In this example, the recruitment of Dungeness crabs is intimately tied to the most valuable fishery in Oregon. It is unconscionable that the applicant failed to recognize a need to mention such an important, and well documented process known to occur in the vicinity of the proposed work. It appears Dungeness crab recruitment was not mentioned because it didn’t happen to be referenced in a land use zoning ordinance that hasn’t been updated in over 40 years. The applicant’s blatant omission of evidence related to the ecological values and processes in this estuary is the aspect of the applicant’s approach that is the greatest, and most egregious shortcoming of the application.

#### **Cumulative impacts of multiple environmental stressors**

Estuaries are the most biologically productive ecosystems on earth but they are not beyond ecosystem collapse or major regime shifts

([https://www.researchgate.net/publication/258614033\\_Regime\\_shifts\\_in\\_muddy\\_estuaries\\_tidal\\_response\\_to\\_river\\_deepening\\_and\\_canalization](https://www.researchgate.net/publication/258614033_Regime_shifts_in_muddy_estuaries_tidal_response_to_river_deepening_and_canalization)). There is bona-fide cause for concern that the cumulative impacts of historic, present day, and anticipated unavoidable natural and cultural stressors pose very real threats to the processes that maintain integrity, health, and continued viability of the Coos Estuarine ecosystem. Unexplained species disappearances, nonnative species introductions, and the occurrence of harmful algal blooms in this and other estuaries and coastal systems are examples of regime shifts having potentially deleterious consequences. A very active area of ecological research related to estuaries deals with better understanding “tipping points” in systems with multiple quasi stable states. (Exhibit 8).

The proposal to construct the proposed NRIs should not be considered in isolation. The sole basis to justify the need to construct the NRIs is in order to accommodate large vessels associated with the proposed construction of the JCEP export terminal. Although only individual elements of the overall Jordan Cove Energy Project may fall within the aegis of any one local jurisdiction’s land use program, including but not limited to the current proposals for the NRI dredging work, it must be considered that these NRIs will not be needed unless the related proposal to dredge 17 acres of intertidal and sub tidal habitats to create a navigation access channel is also approved. Thus, although the City of Coos Bay may be reviewing a permit application limited to one NRI comprising 3 acres within the portion of the CBEMP that falls within its jurisdiction, the actual scope of the work proposed must include consideration that approval of the land use requests by this applicant are connected to and will require significant direct alteration of over 30 acres of estuarine habitats within the area covered by the CBEMP that contribute to maintaining the integrity of the estuarine ecosystem.

Oregon’s Goal 16 requires uses that maintain the integrity of the ecosystem shall be given priority over other uses. The natural aquatic and conservation aquatic habitats in the Coos Estuary have been previously recognized as necessary in order to maintain the integrity of the estuarine ecosystem. The applicant has proposed a water dependent activity which, while a bona fide use of the estuary, must be subservient to uses that maintain the integrity of the ecosystem. In this case the CBEMP has determined that the best use of the portions of estuary bearing the NA and CA zoning areas is to support important ecosystem functions essential to the maintenance of ecosystem functions.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

**The applicants assertion that the sub tidal habitats to be impacted by the construction and maintenance of the NRIs are low productivity habitats is false and unsubstantiated**

The applicant has repeatedly characterized the sub tidal areas to be impacted by the proposed NRI dredging work as relatively low value by comparing these habitats to Intertidal marsh habitats. The physical, chemical and biological processes in an estuary are intricately interconnected. Despite the dated nature of the scientific research available at the time the CBEMP's development, research finds available at that time clearly established the interconnected and interdependent nature of estuarine habitats in estuaries. It is a well-established fact that ALL the habitats in an estuary are interconnected high-performance habitats (Exhibit 9). Estuaries in Oregon are small compared to many other regions in this state, but people familiar with these systems universally recognize them as high-performance systems having no parallel.

I offer an automotive analogy that might help to clarify. Estuarine habitats might best be compared to the "formula one" racers or "fuel dragsters" of the automotive world. To carry the analogy forward, the relative Salt marsh vs sub tidal habitat estuarine habitat productivity characterizations that the applicants have offered is not unlike trying to compare the relative values of a top tier stock car to those of a top tier formula race car. Both have value and both are outstanding performers in their class, but it is inappropriate to state that one is more valuable (i.e. more productive) than the other. Different classes of estuarine habitats, like differing classes of race vehicles, each operate in totally different contexts and their performance characteristics must, by necessity, be measured by different metrics.

The applicant has pointed out that Salt marshes are highly productive intertidal estuarine habitats, but it is a false premise compare the relative worth of a deep-water sub tidal habitat using the standards used to measure the worth (productivity) of an intertidal salt marsh. The salt marshes and deep-water habitats of the Coos Estuary are two distinct but interconnected high performance components of a highly productive system. No consultant on this planet will ever convince me that the deep-water habitats of this estuary that are the subject of the NRI zone change application are "low value" because they aren't as productive as a salt marsh. Over 45 years ago, the authors of the resource reports that served as the foundation for the CBEMP clearly recognized the tremendous productivity and complex interdependence of estuarine habitats. Today we understand those linkages and the remarkable productivity of these habitats even more clearly than when the CBEMP was developed in the final quarter of the last century (Exhibit 3 Page 2).

Even though the Coos Estuary is the second largest estuary in our state, (Exhibit 3 Page 2) it is still quite small in human terms. Oregon's complex, small-area systems are vulnerable to high consequence alterations in performance by natural events as well as development projects having relatively small spatial "footprints". A few acres of habitat impact in this estuary holds potential to have large scale ecological consequences. These systems are so complex, and our state of understanding is so feeble that it is not possible to anticipate how a relatively small alteration will shift the biophysical processes in the estuary. In spite of this uncertainty and the current state of understanding it is assured that every element of the current system is contributing to and influencing the function and integrity of the entire system as a whole.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

This application has proposed to shift the balance of uses in this system yet again by moving a substantial portion of the remaining unaltered habitats in this already highly altered estuarine system from the most highly protected, low-impact zoning designation in the estuary to the most intensive, high-disturbance zoning designation. In the case of NRI-4 in the City of Coos Bay, the proposed change represents the second diminution of the spatial extent of estuary zone 52-NA. The area was previously reduced in spatial extent to accommodate an extension of the airport runway. The overall proposal being advanced by the project applicant will require a third diminution of zone 52-NA in order to undertake dredging work designed to mitigate for impacts to eelgrass communities resulting from the excavation of a 17-acre portion of the estuarine shoreline of the bay side of the north spit under the jurisdiction of Coos County. If the proposed NRI-4 application is approved a clear pattern of erosion of the spatial extent of one of the largest Natural Aquatic zones in the estuary will be established calling to question the fundamental relevance of the most highly protected zoning designation in this estuary.

The applicant has proposed no mitigation for the impacts associated with the proposed work. Even though the applicant proposes to convert an aggregate total of 25 acres of sub tidal habitat currently bearing a CA or NA designation to a DDNC-DA designation, no proposal has been made to identify a similar area of the estuary currently bearing the DDNC-DA designation and convert it to CA or NA status. Such an action would at least infer an acknowledgement of the value of the habitat functions to be lost as a result of the construction and maintenance work in zones currently designated for the highest levels of protection.

If the governing bodies responsible for ruling on the NRI land use authorizations associated with the proposed NRIs choose to issue a permit for the proposed work, the issuing agency/ies should consider including a condition in the permit requiring the applicant mitigate for the loss of estuarine functions in the proposed NRIs by identifying a similar habitat area currently within the DDNC-DA zone and proposing it be rezoned from DDNC-DA to CA or NA.

**The applicant has not adequately characterized or evaluate the probable telegraphic impacts of the proposed work. The analysis of impacts should be based on verifiable factual information in order to assess the likely consequences of the proposed work on other Aquatic and shoreland zoning districts in the estuary.**

The alterations proposed within the “footprint” of the proposed NRI dredging work will have telegraphic impacts that will influence the physical and biotic processes in adjacent areas and beyond. I offer the following illustrative example to demonstrate this point:

The soft sediment environments of an estuary are deposited in response to physical, chemical, and biological processes. Important first order physical forces defining the bathymetry and distribution and delivery of sediments in the Coos Estuary are; Ocean derived tidal currents, wind waves and fresh water inputs.

The sheltered margins of an estuary can be thought of as energy dissipation “machines”. Mobile suspended and bedload sediments derived from ocean and terrestrial sources are introduced to the estuarine basin where they encounter lower energy levels than their sources. Suspended sediments

reaching the calmest, most sheltered off channel areas settle out of the water column and build up along the shoreline. In time, the sediment surface builds up to a sufficient level to support marsh vegetation which, in turn, accelerates the sediment accretion rates in this habitat. But the sediment accumulation in the shallowest portions of the estuary would not be possible in the absence of the adjacent slightly lower elevation tideflats that serve to dissipate the wind and wave energy of the adjoining water. In this fashion, shallow water benthic habitats are derived from and protected by the adjoining deeper water sediment platform below it. This energy dissipation dynamic continues into deeper and deeper portions of the estuary including the soft substrate sub tidal areas adjacent to the tideflats in the vicinity of the proposed NRIs.

In this way, the naturally occurring topography and distribution of the sediments in the Coos and other estuaries are a manifestation of the long-term average influences of the physical forces acting upon them. A proposal to cut away the margin of a sub tidal soft sediment horizon as will take place by the construction of the NRIs 3 and 4 will have the effect of exposing the sediments adjoining the work to higher physical forces that would have been dissipated by the area within the dredging footprint. Through time the disequilibrium conditions created by the NRI sediment removal will telegraph across the sediments adjoining the dredged area. The sediments newly exposed to the new physical conditions created by the dredging will respond at rates which depend on the nature of the sediment type (e.g. cohesive or non-cohesive) as well as the levels of physical forcing experienced in the vicinity of the dredging (e.g. enhanced tidal currents and wind waves, vessel displacement wakes and prop wash).

When the Coos Bay channel entrance was initially dredged in the 1800's the deepening of the channel entrance and the construction of the jetty structures diminished the wave energy dampening and dissipation characteristics of the ocean entrance and allowed larger, higher energy wave forces to enter the lower portion of the estuary. Following the construction of the South Jetty in 1924-28, the open water and shoreline areas in the Fossil Point area of the bay experienced intensified wave energy that resulted in sediment resuspension and shoreline erosion in the lower portion of the estuary. G. B. Case (1983 pages 78-79) characterized the change as follows:

*"Soon after the South Jetty reached a length where its effects began to be felt, in 1926, strong ocean swells appeared inside the bay, a phenomenon which had not previously occurred at Coos Bay. From a practical standpoint the swells inside the bay created a navigational problem of considerable importance. Before the South Jetty funneled swells into the bay, shipping could depend only on the water depth varying only with the tides; now that was complicated by the swells which might subtract as much as five feet from the channel depth as they passed under a vessel. At Pigeon Point Reef this meant that a loaded vessel might be dashed against the rocky bottom by wave action. To the bend in the middle of the cut and the rock bottom (at Pigeon Point) were now added the swells which began to appear after the South Jetty was in progress. "*

The aforementioned illustrative example demonstrates that channel modifications carry with them the potential to produce telegraphic effects in the estuary miles distant from the location of the actual work. Because the proposed Navigation Reliability Improvements will expand the dimensions of the channel, it will diminish the energy dampening characteristics of the channel enabling higher energy forcing to propagate upstream and over the adjoining sediments of the Natural Aquatic and Conservation Aquatic

zones. Expanding the width and depth of the channel thalweg will serve to decrease the frictional characteristics of the water flowing in the channel enabling larger volumes of tide water to propagate in the estuary. This larger volume of water will have a greater capacity to resuspend unconsolidated sediments that were previously deposited in the lower energy conditions the preceded the channel widening. The scale of proposed channel modification is related to the scale of the telegraphic impacts and the rate at which sediment resuspension and redistribution occur in response to the modification. High rates of sediment resuspension hold potential to impact benthic communities of organisms and suspended sediment concentrations (turbidity and total suspended solids).

As another example, channel morphology changes linked to NRI dredging will permanently alter the manner in which tides and tsunamis propagate within the estuary. The permanent physical changes to the channel associated with the NRIs holds significant public health and safety impairment consequences that should be considered during the review of these applications. It is important for reviewers assure that the proposed dredging will not jeopardize public health and safety or expose the public to heightened risk exposure.

Sediment processes in response to disturbance play out at varying rates in estuaries. Research has demonstrated that a single storm event can be responsible for delivering as much as 60% of the total annual sediment and nutrient load from the watershed into the adjoining waterways. (Jennifer Tank, 2019 Ruth Patrick Award recipient plenary award acceptance presentation; American Society of Limnology and Oceanography meeting, San Juan Puerto Rico 25 February, 2019). Similarly, the sediment pulse associated with hydraulic mining during the California gold rush resulted in a dramatic acceleration of sediment accumulation and marsh progradation in the San Francisco Bay estuary.

In contrast to the aforementioned high rates of sediment flux, the surface elevations of the tide flats in the Haynes inlet and North Slough of the Coos Estuary are still responding to the construction of the causeways that traverse the mouths of these inlets decades after the causeways were constructed. As another locally relevant example of decade scale sediment responses to estuarine habitat alteration, the tidal channel and adjoining tideflats in the remaining tidally influenced portions of the Pony Slough Inlet are still responding to the fill placed in the upper reaches of Pony slough and at the entrance to the inlet. This response is clearly visible on the aerial photo of Pony Slough in the North Bend City Council Chambers.

These examples demonstrate that the spatial scale of telegraphic impacts and rate at which habitats respond to dredging and filling activities is both scale and location dependent. First order physical hydrologic processes will unquestionably change conditions experienced by sediments adjoining the proposed NRI dredge sites. Prior work in this estuary demonstrates that some but not all of the impacts of the proposed dredging work will be centered on habitats within and immediately adjacent to the proposed NRI dredging locations. However, it is also reasonable to expect that some impacts associated with the construction and maintenance of the proposed NRI's will be felt at locations in the estuary outside the immediate area of the proposed work.

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

Reviewers of these applications should also consider the consequences that the proposed NRI dredging will have on the available sediment pool as well as the potential sediment supply in the regions of the estuary that will be the subject of sediment removal. For example, the sediments that comprise the mostly sandy and silty sediment pool in the 52 NA tract to be impacted by the proposed construction and maintenance of NRI-4 was likely derived by a combination of aeolian deposition and redistribution of ocean derived dune sands and upland an ocean derived bedload sand transport from the channel bottom. A smaller fraction of the existing sediment pool in area 52-NA may have been the result of suspended sediment deposition processes but the generally coarse grained characteristics of the sediments in this area suggest that deposition of suspended sediments is a less significant contribution to the total sediment volume in this portion of the estuary.

Removing sediment from the portion of the estuary in the vicinity of the 52 NA Zone by constructing and maintaining NRI-4 will diminish the total pool of sediments in this portion of the estuary that presently support the sub tidal intertidal and shoreland areas in this portion of the estuary. In order to understand the long term consequences this sediment removal may have on the adjoining habitats it is necessary to consider the likely sources of sediments that necessitate the need for post construction maintenance dredging as well as the likely sources of sediment inputs to this area that might potentially offset the losses associated with initial construction and maintenance dredging sediment removal processes associated with the NRI.

The two most likely sources of new sandy sediment inputs to the sediment pool in the 52-NA region of the estuary are bedload sediments from the channel bottom and erosion of the Pleistocene dune formation on the shore segment adjacent to area 52-NA. The two most likely sources of sandy sediments that necessitate the regular dredging associated with the maintenance of NRI -4 are bedload sediments in the navigation channel or sandy sediments derived from the residual sediment pool in area 52-NA.

Maintenance dredging activities in the existing federal navigation channel can reasonably be considered as diminishing the potential sediment source available to supply new sediments to Area 52-NA. Construction of houses and other developments on the shoreline Pleistocene dune segment will place a premium on reducing erosion of the sand bluff adjoining Area 52-NA. These protective actions will also diminish the potential for this as a source of new sediments to the Area 52-NA sediment pool.

Because there are no significant stream or river systems draining into Area 52-NA and because ongoing maintenance dredging and shoreline protection efforts are serving to diminish the two most likely contemporary sediment supply sources to Area 52-NA it is reasonable to consider that the sediment supply supporting the estuarine functions in Area 52-NA is highly limited. Construction of the airport runway extension blocked off a tidal channel that connected Area 52 NA to the tideflat sediment pool lying north of the Airport. This connection and supply source no longer exists.

Construction of NRI-4 will eat into the sediment pool of Area 52-NA that was deposited by physical processes that either no longer exist or are significantly diminished. Should the sediments to be removed through maintenance dredging of NRI-4 be derived from the stored sediment pool in Area 52-NA it will have the long-term effect of progressively diminishing the sediment pool in area 52-NA over

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

time, progressively lowering the entire sediment platform in this “sediment starved” portion of the estuary. This process will play out over a decadal time scale and may not be perceptible in the absence of careful analysis but this does not overcome that this process is highly likely to be exacerbated as a result of the construction and maintenance of the proposed NRI that adjoins Area 52-NA.

This analysis demonstrates that telegraphic impacts to zoning districts that adjoin the proposed work can be expected to occur with a reasonably high level of certainty. The applicant has not provided any evidence to examine the potential impacts of the proposed work on the sediment processes that define the habitat structure in the adjoining portions of the estuary.

**The applicant has used research findings to support its assertion that impacts to the habitats and organisms in the vicinity of the proposed NRIs will be temporary in nature. However, this research is not applicable to the circumstances associated with the proposed work.**

The Natural Aquatic and Conservation Aquatic districts in the area of the proposed NRIs were designated following the first ever estuary wide review of natural resource information about the Coos Estuary. The primary work leading to the characterization of the various zoning districts embodied in the CBEMP was compiled in the mid 1970’s. These works are included as Exhibits 1-3 of these comments. The 1978-1979 analysis of the natural resources of the Coos Bay Estuary compiled by Cyndi Roye (Exhibit 3) was specifically commissioned to inform the establishment of the zoning districts that are, to this day, memorialized in the CBEMP. The title of the document is; *“Technical assistance to local planning staffs in fulfilling the requirements of the LCDRC estuarine resources goal.”* Roye’s report stands as the first ever attempt to create a compendium of existing information related to the physical and biological characteristics of the Coos Estuary.

The Roye 1978-79 document provided herein as Exhibit 3 represents a significant work that provides an accurate compilation of best available information pertaining to the Coos Estuary at the time the Coos Bay Estuary Management Plan was being developed. Importantly, the document provides an objective analysis of the biological characteristics of various locations throughout Coos estuary and includes recommendations on how various locations should be designated to fit within the then recently adopted Objectives and management units of Statewide planning goal 16.

Exhibit 3 provides detailed bibliographic information to some of the literature cited in the Coos Bay Estuary Management Plan. Of note in that regard is the work by “Jefferts 1977” which is frequently cited in the applicant’s NRI land use applications. The applicant frequently cites Jefferts’s work to substantiate the applicant’s assertion that disturbances to the benthic communities within the footprint of the NRI dredge areas will be temporary and therefore do not warrant mitigation or further consideration in the context of a land use compatibility analysis.

The full citation for “Jefferts 1977” cited by the applicant is as follows: Jefferts, K. 1977 *The vertical distribution of infauna: a comparison of dredged and undredged areas in Coos Bay Oregon*: The citation is a 45 page-long thesis manuscript submitted in partial fulfillment of a M.S. degree at Oregon State

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

University. The only habitat types addressed by Jefferts involved unconsolidated soft bottom sediments.

At the time Jefferts' work was conducted, large areas of the Coos estuary were classified as polluted. Roye noted that the species composition of both dredged and undredged areas were reflective of biological community assemblages expected to be found in polluted areas. In addition, Roye and others describe the existence of other physical disturbances such as grounding by log rafts and burial by mill effluents and waste products as factors influencing species composition of undredged areas (see Exhibits 2 and 3).

Roye suggests (Exhibit 3 page 21) that the findings of Jefferts 1977 and others may reflect the fact that that the "undredged" habitats that Jefferts used as the basis of his comparison to the "dredged" habitats each supported benthic infaunal species communities characteristic of polluted areas. Because Jefferts' work did not control for other factors such as pollution that might have been responsible for his observed results, his findings should be regarded as inconclusive and certainly insufficient to be used as the singular work to substantiate the applicant's repeated assertion that biological communities in the NRI dredged areas will recover from the dredging activities within a period of a year and therefore impacts of the work should be considered temporary.

Although "Jefferts 1977" is one of the only documents cited in the CBEMP, its applicability to the work proposed in NRI areas 3 and 4 may only be marginally applicable because NRI areas 3 and 4 are not exposed to the same highly polluted and poor water quality conditions that occurred at the time Jefferts conducted his work in the Coos Estuary. The benthic communities in the vicinity of NRI Dredge areas 3 and 4 are likely more biologically diverse and likely to contain species with different life history characteristics than the pollutant disturbance benthic biological communities that Jefferts examined. The recovery trajectories of diverse, undisturbed benthic communities may be substantially different than the less species rich communities capable of surviving in polluted, poor water quality conditions and regular physical disturbances such as smothering by log rafts or pulp mill effluents.

Further, the applicant's citation of Jefferts 1977 should be fully rejected as an indefensible basis for its assertion that the sub tidal habitats in NRI areas 1 and 2 will recover rapidly following initial and maintenance dredging work. The sub tidal benthic habitats to be impacted by the proposed dredging work in NRI 1 and 2 are primarily bedrock (Exhibit 6 Table 1). Jefferts' study never considered bedrock habitats. In the absence of any other data to substantiate the rate at which biota associated with bedrock habitats will recover following dredging, or respond to periodic disturbance associated with maintenance dredging, the applicant's assertion that the bedrock habitats to be impacted by dredging work in NRI 1 and 2 will rapidly recover is wholly unsupported by any type of evidence.

The ecology of a keystone species of the biological community associated with the bedrock habits in the vicinity of NRI dredge areas 1 and 2 has been described in an elegant PhD dissertation by John William Evans in 1966. Evan's doctoral dissertation is entitled "*The ecology of the Rock-Boring clam Penitella penita (Conrad 1837)*". Evans conducted a series of experiments at various locations in southern Oregon. The primary field site for his work was the intertidal rock flats that adjoin the sub tidal rock bottom habitats in the vicinity of NRI dredge areas 1 and 2 in the Coos Estuary.



The group of animals which live buried in hard marine substrates is known as the endolithic community. Rock-boring bivalves are primarily responsible for initiating and maintaining the community because they excavate most of the burrows into which the other members will move after the borers' death. (Exhibit 4 page 1). The scope of the Evan's work included the following topics: (1) an analysis of the factors controlling valve and burrow morphology; (2) an analysis of growth and burrowing rates in rocks of different hardness; (3) a description of the sexual cycle, larval life and settlement; and (4) a discussion of the general ecology of the endolithic community.

In this document, the following terminology is used to describe the fauna of hard marine bottoms: Animals living on the surface of rock occupy the epilithion, those partially embedded occupy the mesolithion, and those wholly embedded occupy the endolithion. The endolithic community is that of animals inhabiting the endolithion. The boring activity of *P. penita* is primarily responsible for developing the endolithion as a possible habitat. The conical holes drilled by this animal form dwellings for a large number of nestling animals which move into the empty burrows after the pholads' death. (Exhibit 4 Pages 86-87).

Rock boring clams attach themselves in crevices which they may enlarge by movements of the valves. At Fossil Point *Penitella penita* is the most numerous and most widely distributed rock borer along the eastern Pacific coast (Exhibit 4 Page 87). *Penitella gabbi*, *Zirfaea pilsbryi*, and *Penitella turnerae* were also found quite commonly at Fossil Point. Together, these three species made up about 10 per cent of the living pholads in the lower bench at Fossil Point. Another species, *Nettastomella rostrata* was found, but only rarely. (Exhibit 4 page 9)

The vertical distribution of *P. penita* is also broad. In the area of Coos Bay, Oregon, it is found as high as + 3 feet in the hard substrate intertidal zone and extends down into the subtidal zone. Kofoed (1927) reported that *Pholadidea penita* (*Penitella penita*) were dredged in rocks at a depth of 50 fathoms in San Francisco Bay. (Exhibit 4 page 3). Therefore, it is highly likely that the subtidal rock substrates in NRI dredge areas 1 and 2 also support populations of *P. penita*.

Pholads including *P. penita*, being filter feeders, derive their food from the overlying water. (Exhibit 4 Page 87). As a result, it is necessary for the animal's siphons to maintain a connection to the overlying waters. Examples of barnacles completely occluding burrow entrances were also found. The enclosed pholad was of course dead. It is not known whether the barnacle covered the entrance hole before or after the death of the clam. Animals can survive sand burial for at least 5 months and anaerobic conditions for unknown periods of time. Growth during these periods however is inhibited. (page 80)

Growth in most mollusks may be indeterminate. However, growth of *Penitella penita* certainly terminates abruptly with the change from the active rock boring phase to the adult condition. Once a callum on the shell is deposited, boring movements are impossible and growth ceases. Normally sexual maturity in mollusks is reached quite early and reproduction continues throughout the remainder of the life span. In *Penitella penita* gonad maturation coincides with the end of the burrowing growth period. For the most part, active animals involved in boring rock are sexually immature. Nothing is known of the physiological trigger that sets off the apparently irreversible metamorphosis, (Exhibit 4 Page 103) Once

metamorphosis has begun, the animal transitions from the drilling phase of its lifecycle to the post drilling phase. This metamorphosis is an irreversible process. (Exhibit 4 Page 78)

Evans suggested that rock hardness and other environmental factors as well as possible population level genetic factors play a role in determining the age of first reproduction of *P. penita*. The fact that the new shell deposited by South Jetty animals translocated to Fossil Point was thinner than normal, and that the shell deposited by Fossil Point animals translocated to the South Jetty was thicker than normal, suggests that the morphological differences are acquired due to environmental differences. He concluded that *P. Penita* can reach adult size within 3 years. (Exhibit 4 page 72).

Little is known about the relationship of *P. penita* to other members of the endo-, epi-, and mesolithic communities. The importance of various predators and nestlers as causes of death and the sequence of organisms that inhabit the vacated burrows was not known at the time Evans conducted his work. It is likely that the endo-, epi- and mesolithic communities in the vicinity of the lower bay contribute to the suite of organisms being targeted by the diving birds that seasonally aggregate near and forage over the sub tidal portions of the estuary having rock substrates.

A single square meter of rock substrate is capable of supporting in excess of 1,000 adult sized rock boring clams (Page 96). At Fossil Point the empty burrows eventually become filled with sand and mud, vertical burrows filling more quickly than horizontal burrows. Most of the silt-filled burrows are occupied by a terebellid worm, *Thelepus sp.*, and its commensal scale worm, *Halosydna brevisetosa*. *Thelepus* appears to extract CaCO<sub>3</sub> from the pholad valves and deposit at least part of it as a chalky layer on the inside of its parchment burrow. The valves of the dead pholad are gradually dissolved completely. (Page 88) The empty burrows left after the death of pholads are filled by a number of nestling animals, which make up the remainder of the endolithic community

The utilization efficiency by pholad clams of freshly exposed rock for 12, 16, and 20 months at Fossil Point increased at most depths with increased duration of rock exposure. (Page 97) This suggests that additional settlement and growth by rock boring clams on freshly exposed substrates continues for a period of at least 20 months following exposure to newly exposed rock.

The applicant has suggested that in the initial time following construction, maintenance dredging of the proposed NRIs will be necessary every 1-3 years. (Exhibit 5 page 51). After this initial post construction maintenance dredging phase, the applicant suggests it may be possible to decrease the frequency of maintenance dredging. The applicant has proposed to "overdredge" rock substrates encountered in both vertical and horizontal directions in NRIs 1-3 in order to facilitate subsequent maintenance dredging by suction dredges (Exhibit 6 Page 10). Overdredging decreases the likelihood that the drag arm suction heads of a hopper dredge will be damaged by an encounter with the rock substrate.

The applicant's proposed post construction NRI maintenance dredging schedule provides important insight into the potential impacts of the dredging work on the substrate and the biological communities in the proposed NRI dredge areas:

1. The volumes of maintenance dredging required following initial construction suggests that sediment inflow rates into the NRI dredging "footprint" will be greater in the years immediately

following initial excavation of the NRIs. It is likely that a primary sediment source responsible for the increased rate of post construction sediment influx will be from the Natural Aquatic and Conservation Aquatic Zones immediately adjoining the newly constructed NRIs. The volumes of material to be dredged from the NRIs following initial construction can reasonably be considered a proxy for the telegraphic disturbance of the protected habitats adjacent to the proposed NRI dredge areas.

As previously described, it is likely that the telegraphic disturbance of the adjoining protected estuarine habitat zones associated with the NRI dredging will continue for years and possibly decades following construction of the NRIs but at a slower rate. This diminished rate of disturbance to the adjacent conserved areas is evidenced by the applicant's suggestion that the frequency of post construction "maintenance" dredging of the NRIs will diminish following the initial, higher frequency post construction dredging phase.

2. The proposed over dredging in the areas where rock is encountered and the reference to maintenance dredging using hopper suction dredges suggests the applicant expects the post dredging substrate in bedrock areas of NRI dredge areas 1-3 to become covered with sand following completion of the initial dredging. This will have the effect of changing the substrate surface in the NRI areas from rock to sand. The applicant has not addressed this fundamental impact in the analysis provided in the application, even though changing the substrate in the NRIs from sand to rock will have profound and permanent consequences for the impacted biota.

These abovementioned observations provide evidence to refute the applicant's assertion that impacts to habitats within the NRI dredge areas will recovery rapidly following dredging activities and will therefore be temporary in nature and acceptable overall.

The underlying rationale that led to the area SW of the N. Bend airport being designated as "52-NA" estuary zone is found in Roye's 1978-1979 report to the Coos County planning department. Roye's recommendation for the bay subsystem habitats in the vicinity of NRI 4 states:

*"The large flats southwest of the North Bend Airport and the Jordan Cove area should be considered major tracts and protected accordingly (LCDC 1977)." (Exhibit 3 page 59)*

The current "52-Natural Aquatic" zoning in this portion of the estuary is a clear reflection of Roye's recommendation. The current application represents the second proposal to diminish the area of this "major tract". A previous proposal involved the extension of the N Bend airport runway into this tract. Approval of the runway extension resulted in a diminishment of the total area of the bay designated as Natural Aquatic. The current application will further diminish the Natural Aquatic area and potential ecological value of this same tract; a tract that was identified as a high value area with natural resource values worthy of the highest level of protection as long ago as 1978.

The applicant has centered the analysis to support the proposed code and map changes based on a demonstration that changing the NA designation to Deep Draft Navigation will be compatible with the adjoining Deep Draft Zone. While I do not dispute that a compatibility analysis of this aspect of the proposed action is warranted, I assert that the burden of proof also rests on the applicant is to

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

substantiate why it is acceptable to remove the priority protective status of a portion of the estuary identified as having resource values worthy of the highest level of protection. The applicant has failed to provide evidence to substantiate known and anticipated impacts that the proposed actions will have on protected status portions of the estuary.

The applicant has advanced a rationale that it is acceptable to diminish the area of the protected sub tidal regions of the bay bearing Conservation Aquatic and Natural Aquatic designations on the basis that the proposed changes represent a small portion of the total sub tidal habitats in the estuary. This argument is insufficient because each of the sub tidal habitats has unique characteristics that cannot responsibly be compared to other sub tidal regions of the estuary.

As illustrative example, Baldwin et al 1977 states "The rocky intertidal habitat below Fossil Point in Barview is also a unique habitat with respect to the rest of Coos Bay, and should be considered environmentally sensitive. It is more similar to rocky habitats found on Cape Arago than within an estuary, because of its exposure to ocean swells." (Exhibit 2 Page 28) Thus, impacts to estuarine habitats in this region should not be considered as a tiny percentage of the total area of sub tidal habitats because the rocky sub tidal habitats in the vicinity of NRI dredge area 1 are only found in a very limited region of the estuary.

The navigation reliability improvements land use applications that are in review by the city of Coos Bay and Coos County planning departments will significantly alter a total of about 25 acres of sub tidal habitats. This total does not include an additional the 20 odd acres of intertidal that will be dredged from the shore of the estuary to connect the ship berthing area to the navigation channel. I think most anyone would agree that changing the zoning on 22 acres of farmland in Marion or Harney counties, might have a relatively small impact on the total of land dedicated to this use. But when I consider that the aggregate area of all the sub tidal bedrock habitats in all 23 Oregon estuaries may not even encompass an area of 150 acres, and further consider that the current proposal holds potential to permanently impact 10 or 15 acres of this total, I trust (hope) that reviewers of these land use applications might also share my concern that a decision of this magnitude should be avoided if at all possible and only considered with an abundance of caution and only if the action driving the need to impact these habitats at this scale is absolutely essential and thoroughly vetted.

The applicant has not demonstrated a robust need to justify the scale of impacts that the proposed work holds for sub tidal bedrock habitats. The applicant's approach to treat all 4 NRI dredge areas that each occupy distinct areas of the estuary collectively because each location has the shared characteristics of being at a bend in the adjoining navigation channel is cavalier at best and demonstrates a profound lack of interest on behalf of the applicant in conducting a robust characterization of potential ecological consequences of the proposed work.

During my career and 40-year tenure as a resident of this community, I have seen any number of economic development/estuary modification proposals come and go. Virtually all of the proposals originate with some promise of expanded economic activity/prosperity that is offered up to justify one form or another of impact to or alteration of the estuary. An unfortunately large fraction of the projects attempted in this estuary have failed deliver the hoped-for economic benefits. Sadly, in this estuary,

Proposal: Modify the Estuary Management Plan to permit dredging in a Natural Aquatic zone  
Comments of Michael Graybill to the City of Coos Bay Community Development Department  
Applicant: Jordan Cove Energy Company  
March 20, 2019

there is an embarrassingly large list of projects that were deemed consistent with the estuary management plan, were duly permitted by the appropriate agencies, and constructed (estuary impacts and all) only to fail for economic reasons and never deliver the hoped-for benefits. As evidence to illustrate this observation I offer examples on the North spit that include the "Anadromous Inc. Salmon ranching operation, the Port of Coos Bay's "Tee Dock" and the Port of Coos Bay's "Barge Slip"

This estuary is pock marked by economic ventures that produced wetland impacts but never penciled. I'm upset by this proposal because there is an abundance of evidence to suggest that this project is a high-risk economic venture that carries with it a large, long lasting and potentially high consequence "ecological footprint". The bedrock that this company is proposing to dredge in NRI 1 and NRI 2 are marine fossil bearing deposits from the Miocene-Pliocene boundary making them somewhere between 8 and 13 million years old. Once this bedrock is dredged from the bottom of this estuary, it will be gone forever. So too will the fossil rich paleontological record that is embedded in the bedrock of the marine sediments to be dredged be destroyed. Once bedrock is removed, it cannot be replaced.

Elsewhere, the applicant has stated the proposed facility will have a project lifespan of around 30 years. I seriously question this estimate but even if true, the 5.7 million cubic yards of sediment that the applicant plans to stack on the shoreline of the north spit and the 580,000 to 700,000 cubic yards of bedrock and sand it plans to dredge from the 4 NRIs and stack on the dredged spoils from a long forgotten project already piled on APCO site next to the Hwy 101 bridge, will persist in this landscape for centuries following the closure of this plant.

This proposal holds so many downside consequences for this ecosystem and the community that depends on it that I feel compelled to offer this analysis to you on the hope that it will serve to discourage you from approving a poorly articulated, inadequately substantiated proposal that is in the wrong place at the wrong time.

I genuinely fear that this estuary and the community that depends on its biological productivity may not be able to handle the truly frightening specter of Ocean acidification, eutrophication, and other stressors; let alone yet one more 5.7 million cubic yard dredging "insult" that, if developed, may well be followed by the 18 million cubic yard dredging proposal being advanced by the port of Coos Bay with the near total financial support to the Jordan Cove proponents.

Thank you again for providing me with the opportunity to comment on the proposed applications. I await and opportunity to comment during the forthcoming rebuttal process.

Kind Regards

Michael Graybill  
63840 Fossil Point Road  
Coos Bay OR 97420