A Petition for Rule Making(RCW34.05)
To Protect Zostera japanica from the Toxic Herbicide Imazamox and to List Zostera japanica on the Wa.Dept. of Fish And Wildlife

Priority Habitat Species List

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by

L.Hendricks
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Rob Ravanaugh
and
The Coalition to Protect Puget Sound

6 Feb.2014

LET THEM LIVE

Black Brant Feeding on Eelgrass,Zostera marina

Acknowledgements

We wish to acknowledge the contributions to the scientific knowledge about the importance of seagrasses and Zostera japanica to the health of our wetlands and marine ecosystems in Washington. All of these scientists provide us with objective scientific investigations that are peer reviewed and highly credible. Many others provided us with a better awareness of the risks and threats to eelgrasses from the cummulative affects of Imazamox on the living communities found in our tidal wetlands in Puget Sound,Grays Harbor,Willipa Bay and the Columbia Rv. Special thanks goes to those shellfish growers who alerted the publuc to the dangers of pesticide contamintion.These include Fritzi Cohen and Ross Barkhurst both prominant Pacific Co. residents and oyster growers.The list of scientist contributing with scientific papers includes,Douglas Buithuis,Fred Short, Deborah Shaffer,Jeff Gaeckle,James Caldy,Micheal Hannam,Lex Bouwman,Arthur Bensen,Patricia Gilbert,Ciska Overbeek,Marcin Pawloski,Jorge Herrera,Sando Mulsow,Rencheng Yu,and Mingjiang Zhou.Most notable among the state employees who contributed in many meaningful ways is Brian Reeves of the DNR.and the leadership of the Coalition to Protect Puget Sound and Laura Hendricks.

Contents

Zostera japanica,leaves & rhizoms
by Ross Barkhurst 2013

Ducktown Pacific Co.Wa.

1Feb.2014

Chair and Members
Wa.Fish & Wildlife Commission
1111Washington St.
Natural Res.Bldg.
Olympia,Wa.98504

Re:Petition For Rule Making

Greetings:

We now petiton the Wa.Fish & Wildlife Commission,under the provisions of RCW34.05, to adopt rules and regulations to protect eel grass.spp.from destruction from the harmful affects of imazamox and similar herbicides in Williap Bay and western WA.

Background

Washingtons eelgrass seagrass meadows, including Zostera Marina and Zostera Japanica, are highly beneficial to many species of wildlife,waterfowl,fish,benthic organisms,ESA species,water quality and invertebrates.There are numerous scientific papers, research and studies,both in the US.Asia,and Europe documenting the economic and biol.ogical importance of sea grasses to the environment.One study,in Florida,recently found that seagrass, including eelgrass,contributed approx.$1 billion to the estuary environment,wildlife and the commercail fisheries.

It is obvious to most residents of Wa.that seagrasses are a very important assest to our natural resources.Recognizing this both state,federal,and county laws are inforce to protect eelgrass spp.,including both z.Marina and Z.japanica.
In fact scientist have documented the fact that many of the beneficial contributions of Z.marina are in fact identical to zostera japanica and the same is found with zostera japanica to zostera marina.

Waterfowl feeding on Zostera japanica Willipa Bay 2013 R.Barkhurst

Basis for Petition

1. Both species of eelgrass are protected by county, state and federal laws. This protection includes Zostera marina and Zostera japonica.

2. According to scientific presentations at the Ecology June 2013 eelgrass meeting scientific reports and testimony, there is virtually no difference between the beneficial functions of both eelgrass species that occupy two different tideland levels. Important benefits that are well documented in scientific reports and testimony include: food resources for tens of thousands of migratory waterfowl, herring spawning medium, cover for salmon smolts and reduction of coastal erosion due to sea change. Affected species are ecologically important and their populations have not met their management goals in recent years.

In fact, a new peer reviewed study "Science and Management of the Introduced Seagrass Zostera japonica in North America" was published September 2013 that stated:
"This fractured management approach contradicts efforts to conserve and protect seagrass in other regions of the US and around the world. Science must play a critical role in the assessment of Z. japonica ecology and he immediate and long-term effects of management actions. The information and recommendations provided here can serve as a basis for providing scientific data in order to develop better informed management decisions and aid in defining a uniform management strategy for Z. japonica.

This peer reviewed study contains valuable scientific information that was ignored by the Weed Board in their denial of the Petitioners' petition.

3. There are no definitive Washington Department of Revenue records that support the shellfish industry's claim that Zostera japonica has reduced their revenues.

4. The listing of Zostera japonica and eradication efforts threatens the existence of Zostera marina. Not only does Zostera marina grow in close proximity, it also "can be

similar in appearance to non-native eelgrass (Zostera japonica) and the (Pierce) County wants to avoid unintended harm to native eelgrass (

5. Existing laws protecting eelgrass include the Shoreline Management Act and the Puget Sound Partnership required that eelgrass species be protected with a goal of increasing eelgrass by 20%. These protections did not specify the type of eelgrass, but all eelgrass was protected.

Zostera japanica low tide Pacific Co, Willipa Bay R.Barkhurst

Meyers Cove 2012

6. Numerous scientists as well as the Washington Department of Natural Resources (WDNR) have submitted various comment letters to the Weed Board voicing their concerns regarding eradication of Zostera japonica. The latest WDNR email dated November 20, 2013 listed a multitude of questions and serious concerns regarding eradication efforts by spraying Imazamox

7. The listing of Zostera japonica as a noxious weed was not supported by science, but evolved from the following political actions:

- With the assistance of Representative Brian Blake, Taylor Shellfish convinced the Director of WDF&W, Phil Anderson, to sign the letter dated March 2011 under his signature written by Bill Dewey/Taylor Shellfish to delete Zostera japonica from the priority habitat list (per public records) This action was the first step of the shellfish industry plan that would allow the State Weed Board to list Zostera japonica as a noxious weed and would pave the way for the shellfish industry application for a NPDES permit to spray Imaxamox for complete eradication in the entire State of Washington. No science was presented with this request.

- Issuance of the March 2011 letter from the Director of Washington Department of Fish and Wildlife (Phil Anderson) made it possible for the shellfish industry to petition the Noxious Weed Control Board to list Zostera japonica as a noxious weed in 2011 on commercially managed shellfish beds only.

- When the shellfish industry was successful in having the Weed Board list Zostera japonica as a noxious weed throughout Washington State, the Washington Department of Fish and Wildlife voiced their opposition.

Scientific documentation has been provided showing that Zostera japonica performed vital biological functions in Willapa Bay for tens of thousands of migratory waterfowl, invertebrates to salmon, herring and ESA listed green sturgeon. Despite the extensive scientific documentation and a call for further research, the Weed Board not only listed Zostera japonica as a noxious weed on commercial shellfish beds only in 2011, they accepted the proposal to list Zostera japonica as a noxious weed throughout the State in 2012 and denied any changes to this listing in 2013.

Dr.Shafer,Kaldy,and Gaeckle,after research and study provide the enlightened abstract:Science and Mgt.of the Introduced Seagrass Zostera japanica in North America:

Science and Management of the Introduced Seagrass *Zostera japonica* in North America

Deborah J. Shafer · James E. Kaldy · Jeffrey L. Gaeckle

Received: 7 January 2013 / Accepted: 13 September 2013

Abstract Healthy seagrass is considered a prime indicator of estuarine ecosystem function. On the Pacific coast of North America, at least two congeners of *Zostera* occur: native *Zostera marina*, and introduced, *Zostera japonica*. *Z. japonica* is considered "invasive" and therefore, ecologically and economically harmful by some, while others consider it benign or perhaps beneficial. *Z. japonica* does not appear on the Federal or the Oregon invasive species or noxious weed lists. However, the State of California lists it as both an invasive and noxious weed; Washington State recently listed it as a noxious weed. We describe the management dynamics in North America with respect to these congener species and highlight the science and policies behind these decisions. In recent years, management strategies at the state level have ranged from historical protection of *Z. japonica* as a priority habitat in Washington to eradication in California. Oregon and British Columbia, Canada appear to have no specific policies with regard to *Z. japonica*. This fractured management approach contradicts efforts to conserve and protect seagrass in other regions of the US and around the world. Science must play a critical role in the assessment of *Z. japonica* ecology and

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Published online: 08 October 2013

The 2010 Zostera japonica workshop: An overview

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On September 23 and 24, 2010, a workshop was hosted at the Friday Harbor Laboratories, University of Washington, San Juan Island, WA, to address the distribution and potential effects of a non-native seagrass in Washington State. The workshop was funded by the Washington State Department of Natural Resources and Washington Sea Grant and included participants from academia and state and federal agencies from the US and Canada. Two goals of the workshop were 1) to convene scientists and managers to discuss and synthesize the best available knowledge on Z. japonica, and 2) to identify research priorities that will enhance the current knowledge of Z. japonica and improve the management of seagrass in the region. Specific topics were assigned to selected participants and data were synthesized and presented during the workshop. Each presentation was followed by a discussion to clarify findings, incorporate overlooked data and identify data gaps for future research priorities. Presentation topics included: taxonomic history of Z. japonica in the Pacific Northwest, current regulatory status of Z. japonica in WA state, the effects Z. japonica on ecosystem structure and function, community and species level interactions involving Z. japonica, monitoring Z. japonica distribution and expansion, climate change effects on Z. japonica and the genetic variation within and among Z. japonica populations. As a result of the presentations, participants identified the following research priorities: continue to synthesize Z. japonica research literature, encourage citizen monitoring, investigate the effects Z. japonica has on community dynamics and ecosystem functions over a range of temporal and spatial scales, assess the economics of Z. japonica, and conduct additional genetic analyses to confirm its non-native status and its response to global climate change. Workshop findings were summarized in a document found at this link - http://www.dnr.wa.gov/Publications/aqr_zostera_study.pdf.

Mach, Megan E., Sandy Wyllie-Echeverria, and Jennifer Rhode Ward. 2010. Distribution and potential effects of a non-native seagrass in Washington State: Zostera japonica workshop. Report for the Washington State Department of Natural Resources and Washington Sea Grant on the Zostera japonica Workshop, September 23-24, 2010, Friday Harbor Laboratories, University of Washington, Friday Harbor, Washington.

Chum salmon spawing on lower Nemah Rv.trib to Willipa Bay
Ross Barkhurst 2013

To: Washington State Weed Control Board

From: Ross Barkhurst

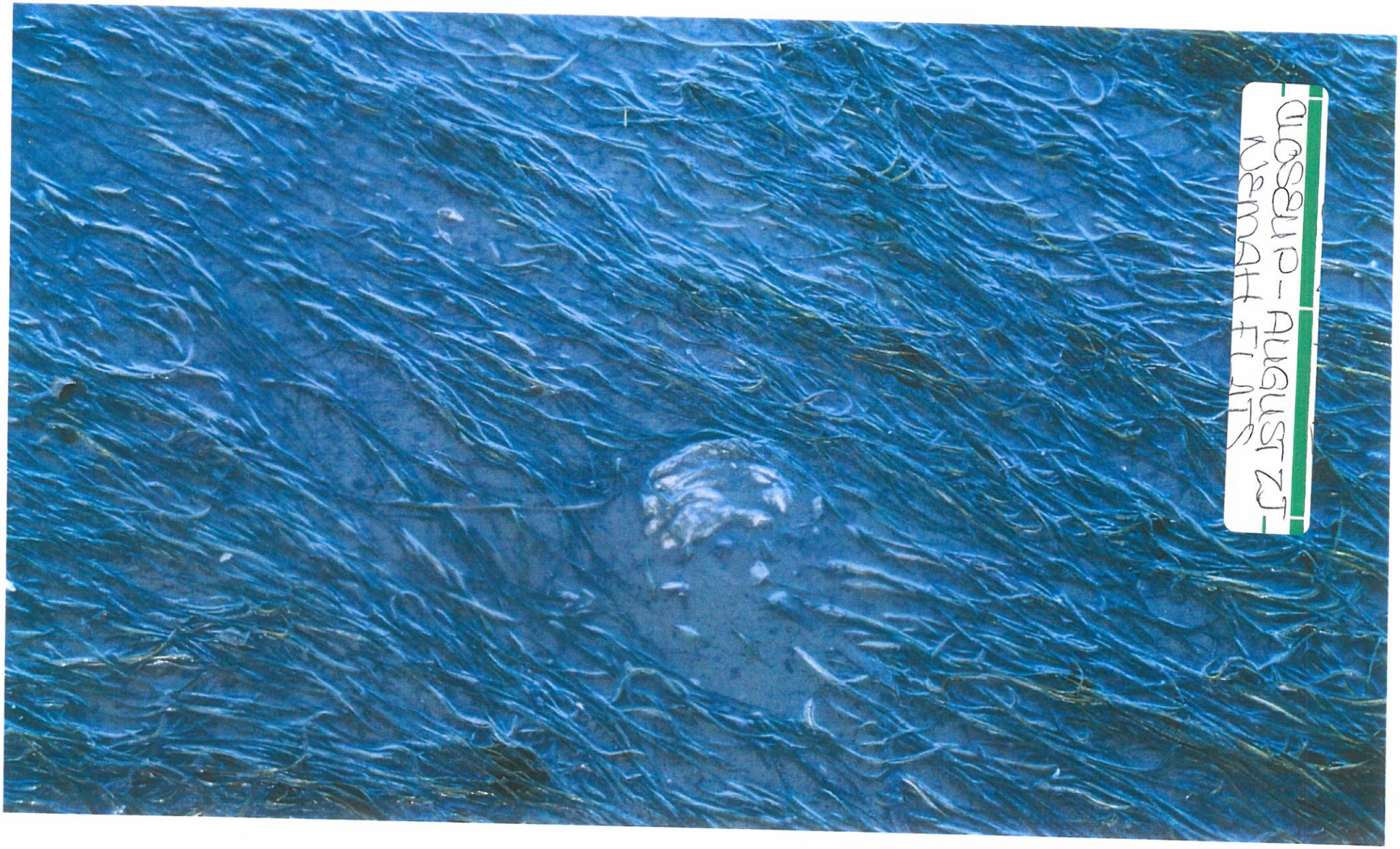
Subject: Executive Summary of Testimony for Nov 5, 2013

I am presenting new empirical data and facts which support my earlier testimony and that of the Washington Waterfowl Association. I have testified that "weed everywhere" and "commercial shellfish beds only" classifications for zostera japonica are ecologically unacceptable without acreage and location restrictions. I plan on showing the data, showing pictures, and answering questions in relaying my conclusions and recommendations. This likely cannot be adequately carried out under some of the limitations which have been relayed to me by your Executive Secretary. I will do my best and beg your forbearance.

New input for you includes;

1. An eelgrass map from Dumbald and Echeverria 2007.
2. The WDFW aerial waterfowl surveys of Willapa Bay for 2012/2013 migration season.
3. Pictures of waterfowl and zj interactions and evidence of heavy usage of zj.
4. Reference to a WRIA #24 sponsored study of salmonid smolt habitat preferences in Gray's Harbor, WA
5. A graph of chum salmon escapement numbers vs. time for Willapa Bay before during and after collateral damage to zj during the spray campaign on spartina. This was presented by WDFW in North of Falcon meetings for the public earlier this year. It shows failure to meet escapement goals seven out of the last eight years.

In summary these new facts further support the conclusion that without appropriate precautions and limitations the current classification of zj is ecologically unacceptable. It ensures management objectives cannot be met for at least six species in Willapa Bay and other marine areas. The classification will cause these problems whether spraying is allowed or not. Spraying will merely make bad things I will outline happen faster. The classification ensures the Shoreline Management Act will be violated in letter and intent.



Zostera japanica,Nemah Tidelands Esturary 2013 by Barkhurst

Zostera japonica: What is it and Where is it?

Dr. James Kaldy,
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2111 SE Marine Science Dr., Newport Oregon 97365

Seagrasses are flowering plants from the monocot order Alismatales that returned to the marine environment between 17 and 75 million years ago (1). Seagrasses form an ecological group, not a taxonomic group (2), and as a result they encompass a variety of species characterized by adaptations to the marine environment (e.g. salt tolerance, underwater pollination, clonal growth, specialized leaves, etc.). Seagrass communities provide important ecosystem services (e.g. 3- dimensional habitat, primary production, nutrient removal, Ocean Acidification amelioration) which can contribute $3500 to $19000 ha-1 y-1 (3, 4). Seagrass populations worldwide are experiencing declines at a rate of about 110 km2 y-1 and ~30% of seagrass areal extent has disappeared (3). The Pacific Northwest is one of a few places experiencing increased seagrass areal distribution and one of only two places known to have non-native seagrasses (5, 6). Six seagrass species occur in Washington State (7). The dominant species based on areal extent are the native Zostera marina L. and non-native Z. japonica Aschers. & Graebn. Early descriptions of Z. japonica in North America were confounded by taxonomic uncertainty, morphological plasticity and contradictory descriptions of leaf-tip morphology, a key diagnostic feature. Early synonymous identifications have included Z. nana, Z. noltii and Z. americana. Researchers (2, 8) have concluded that the genus Zostera should be divided into subgenera and that Z. japonica be recognized under the subgenus Zosterella. Currently, Z. japonica is the recognized nomenclature, although recent genetic analyses indicate more work is needed (9).

Z. japonica is believed to have been introduced to North America with oysters during the early 20th century. Harrison (10) cites personal communication with R. Scagel indicating that oysters may have been packed with eelgrass (species unknown), similar to the introduction of Sargassum muticum. The first large-scale introductions of Pacific oysters (Crassostrea gigas) from Miyagi Prefecture, Japan to Samish Bay in Puget Sound began in 1919 (11). In the early 1950's steps were taken to prevent accidental introduction of other organisms (12); consequently, it is likely that Z. japonica was introduced before the 1950's (13). The oyster- Z. japonica vector hypothesis is supported by genetic studies that indicate Z. japonica from British Columbia was strongly related to samples from Miyagi-Ishinomaki, Japan (14).

Within its native range, Z. japonica has an extremely broad latitudinal distribution, encompassing subtropical and temperate climates from southern Vietnam (~10° N latitude) to Kamchatka, Russia, (~50 ° N latitude) (15, 16). Currently, Z. japonica has been reported from the Eel River, Humboldt County, California (40.6° N) at the southern end of its distribution almost to Campbell River, British Columbia (49.9° N; 17, 18) to the North. The earliest known collections of Z. japonica were from September 1957 at "south-east end of Long Island" in Pacific County, WA (19). Additional samples were

collected from Padilla Bay, Boundary Bay and Yaquina Bay during the 1970's (20, 21). In 2002, Z. japonica was reported from Indian Island in Humboldt Bay, CA (22). Z. japonica has been reported from most estuaries in Oregon and Washington (23, 24). Genetic analyses indicate that Z. japonica can be separated into populations with warm water and cold water affinities (14).

In its native range, Z. japonica has been reported to grow as deep as 3-7 m (datum not specified), although it typically grows at depths < 1 m (25, 26). Within colonized PNW estuaries, Z. japonica exhibits a distribution pattern that tends to minimize interactions with the native Z. marina. Z. japonica is found primarily in mid- to upper- intertidal zones, and has not been observed growing sub-tidally. In California, Z. japonica has been reported to occur between +0.9 and +1.2 m Mean Lower Low Water (MLLW) (22). In Oregon, Z. japonica typically occurs between +1 to +3 m MLLW (27). In Willapa Bay, Washington, Z. japonica was documented between +0.1 to +1.5 m MLLW, while Z. marina was only found < +0.6 m MLLW (28). In contrast, Z. japonica in Puget Sound has been found as deep as 0 m MLLW (29). Reports from British Columbia indicate it generally occurs between +1 to +3 m MLLW (30, 31).

In places where Z. marina and Z. japonica co-occur there are three distinct vertical zonation patterns (32). In the disjunct zonation, the Z. japonica bed is separated from the Z. marina bed by unvegetated sediments. These areas are characterized by a steep intertidal slope and a narrow fringing Z. japonica bed. The overlapping zonation pattern is characterized by mixed beds or discrete patches of both species at the same intertidal elevation. Overlapping zonation has been observed at sites with gently sloping topography. The mosaic zonation pattern is characterized by micro- topographic relief creating small pools with Z. marina interspersed with Z. japonica on well-drained hummocks. Mosaic sites, which often co-occur with the overlapping zonation pattern, are characterized by broad, expansive intertidal flats with very little slope (32, 33) and are generally localized in larger estuarine systems such as Boundary Bay, Padilla Bay, and Willapa Bay.

Physiological studies indicate Z. japonica is both euryhaline and eurythermal, with a lethal chronic temperature threshold between 32-35 °C (34, 35). Assuming that transport vectors remain active, it is likely that, Z. japonica will continue to spread to the south until it reaches systems that regularly exceed its environmental tolerances (36, 37). Additionally, rising water temperatures expected to occur with global climate change may facilitate the northern expansion of Z. japonica. Consequently, it is likely that the distributional range of Z. japonica along the Pacific Coast of North America will continue to expand.

The Science and Management of *Zostera japonica* in Washington: Forum for State Agencies, June 18-19, 2013

ZOSTERA JAPONICA SCIENTIFIC PANEL

Fred Short, DNR

The Forum was held to improve state agency understanding of Zostera japonica science and management in Washington State. The scientific panel reviewed and evaluated the science presentations at the Forum, assembled a list of scientific references on Z japonica in relation to its status in Washington State, and determined future research needs and priorities. A fact sheet was developed to address all the Z. japonica issues that emerged from the Forum. The information is categorized and rated regarding its degree of scientific documentation, including peer-reviewed literature, grey literature, and observational information.

The fact sheet summarizes the current state of Z japonica science, one of the primary objectives of the Forum. In summary, the findings of the Science Panel demonstrate that scientific information is extremely limited concerning the ecological or economic effects of Z japonica on the State of Washington's ecosystem resources or commercial activities. In the Panel's assessment of what is known about the ecosystem services provided by Z japonica, the available scientific information documents a large number of positive ecological effects (12 that support natural resources and functions vs. 2 that have negative impacts, and 3 with no impact). The Panel's assessment of the economic effects of Z japonica documents a majority of negative impacts (5 that negatively impact livelihoods and socioeconomic services vs. 1 with a positive effect and 1 with no effect). Considerable further research is needed to understand the ecological and economic effects of Z japonica and the poten¬al consequences of proposed management strategies to either protect or control it.

Panel of scientists:

Dr. Mary O'Connor, U British Columbia

Dr. Brett Dumbauld, Oregon State/US Department of Agriculture

Dr. Debra Shafer, Corps of Engineers, Mississippi

Dr. Renee Takesue, USGS

Interactions between Z. japonica and Z. marina

Dr. Michael P. Hannam
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The few studies of the interactions between Zostera marina and Zostera japonica suggest a complex, context-dependent relationship. The relative intertidal zonation of these two species varies from site to site, and remains a subject of study. In studies which distinguished biotic interactions from abiotic influences, competition has been evident, and the effects of Z. marina on Z. japonica appear more consistent than the reciprocal.

An examination of Puget Sound-wide monitoring data suggests that co-occurrence of Z. marina and Z. japonica is most likely at gently sloped beaches with smooth depth profiles (Hannam, 2013). The same study found that Z. marina occurs at higher elevations in the Puget Sound at sites where Z. japonica was observed.

Harrison (1982) grew Z. marina and Z. japonica separately in mesocosm under different simulated tidal regimes, and seasonal light regimes. Both species had higher leaf elongation rates in simulated subtidal conditions, than when exposed during a low tide. When continuously submerged, both species had similar leaf elongation rates in simulated spring light and temperature conditions, but Z. marina outgrew Z. japonica in warmer, brighter conditions with longer day length. When exposed during low tides, leaf growth was similar between the two species.

In a study in Roberts Bank, British Columbia Nomme and Harrison (1991a) examined morphological traits of Z. marina and Z. japonica at depths where each species occurred in monocultures and at a depth where both species co-occurred. Z. japonica shoot density remained low throughout the growing season where it was observed growing with Z. marina, but increased exponentially, before decreasing late in the season, where growing monospecifically. Z. marina shoot density did not differ between monospecific and mixed stands. Multivariate analysis of morphological traits of each species detected differences between elevation zones on some, but not all, dates of the study. This study did not distinguish between effects of tidal elevation per se and the biotic effect of co-occurring with a congener.

In a different study at Roberts Bank, Nomme and Harrison (1991b) found progressively reduced Z. japonica shoot density where Z. japonica was transplanted to deeper depths in monoculture. Both species grew longer leaves at deeper sites, but Z. marina shoot densities were unaffected by transplant elevation.

Manipulative studies of Z. marina and Z. japonica have consistently found Z. japonica to be competitively suppressed by Z. marina presence, although the mechanisms remain unclear. Hahn (2003b) transplanted sods from existing mixed-species and monospecific stands to tidal elevations in the Z. japonica zone, the Z. marina zone, and their overlapping zone. Z. japonica shoot densities were reduced by approximately 50% at all elevations where growing with Z. marina. Bando

(2006) conducted a replacement transplant experiment, using individual shoots of Z. marina and Z. japonica at a set density. Z. japonica biomass per individual was reduced by 96% in mixed transplants versus monoculture. Hannam (2013) conducted an additive experiment, transplanting arrays or shoots of each species in monocultures and with its congener onto intertidal mounds and pools. Z. marina density and biomass were profoundly decreased on mounds, but unaffected by Z. japonica. Z. japonica was, suppressed by Z. marina presence, more so in pools than on mounds.

Manipulative studies have sometimes detected competitive effects of Z. japonica on Z. marina. Merrill (1995) found an increase in Z. marina shoot elongation in response to clipping Z. japonica shoots. Hahn (2003b) Z. marina found that shoot densities were lower in mixed plots than in monocultures, but only in the deeper elevations. Merrill (1995) found an increase in Z. marina shoot elongation in response to clipping Z. japonica shoots. Bando (2006) reported reduced Z. marina above-ground biomass per individual in response to Z. japonica transplantation, but the graphically presented data in the paper contradict this conclusion, showing greater Z. marina biomass per individual in two-species plots. Hannam (2013) found decreased branching and rhizome elongation in Z. marina transplanted into Z. japonica in tide pools, but not on intertidal mounds.

Z. japonica has been quicker to recolonize experimentally disturbed sites whenever studies have addressed this (Hahn, 2003a; Bando, 2006). Such a finding is congruent with observations that Z. japonica devotes more to sexual reproduction than does Z. marina, and that Z. japonica is quick to recolonize disturbed areas (Park et al., 2011). Z. marina recolonization often proceeds at a slower pace, and may be more reliant on rhizome expansion than seed rain (Boese et al., 2009).

Where Z. marina and Z. japonica co-occur, they compete. Z. marina appears to be the dominant competitor, and Z. japonica's competitive effects on Z. marina are not evident at sites where abiotic conditions stress Z. marina. Z. japonica's dispersal and colonization abilities should allow it to coexist with Z. marina and thrive where disturbance is common. Some studies suggest that Z. japonica could facilitate Z. marina survival at higher tidal elevations, but this hypothesis remains largely untested.

Dr.Douglas Bulthuis,WDOE Padilla Bay National Esturaine Res. is an objective advocate for ecosytem protection and provides us with his research:

Ecosystem functions of the non-native eelgrass, Zostera japonica, in the Pacific Northwest

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Eelgrasses and other seagrasses provide several ecosystem functions in coastal and estuarine environments throughout the world and in the Pacific Northwest (PNW)[2, 11, 21, 23, 24, 35, 37, 47]. The combined value of these functions and services has been valued in economic terms at more than $45,000 per acre per year[9]. Much of the research on these ecosystems functions has been conducted on the eelgrass, Zostera marina, and two other seagrasses[12]. In this talk I have selected a few of the ecosystem functions and will describe these functions in Z. marina and other seagrasses, present any studies indicating these functions in Z. japonica, and discuss the possible role of Z. japonica in providing these functions in the PNW.

A high rate of productivity is one of the ecosystem functions often listed and valued for seagrasses[35, 37]. Rates of productivity vary widely but can be similar to intensive agriculture, mangroves, marsh plants and some forests per unit area[12]. Annual mean above ground growth rates for Z. japonica in the PNW and in Asia and are in the range of 0.9 to 1.7 g dry weight m^{-2} [2 25, 27, 31, 32, 36, 42, 48]. These rates are in the range of rates for Z. marina, although in the lower part of the range, and similar to estimates of annual production for macroalgae and coral reefs[12]. Thus, one ecosystem function of Z. japonica in the PNW is moderate rates of productivity. Many of the other ecosystem functions will be proportional to the productivity of Z. japonica.

Eelgrass and seagrass productivity supports higher trophic levels primarily through the detritus pathway[23, 34, 50]. Leaves and plant parts break off, are enriched by bacteria and fungi and become food/energy for mico- and meso- organisms which, in turn support higher trophic levels such as juvenile fish and crabs[24, 45]. Z. japonica in the PNW also contributes to the detrital food chain with the leaf productivity[27, 48]. Z. japonica decomposes at a faster rate than Z. marina and thus may enter the detrital food chain at different rates and timing than the native eelgrass[22]. In addition to the detrital pathway, Z. japonica is consumed directly by native fauna in the PNW such as the isopod Idotea and the waterfowl Black Brant[1, 49]. In a study in Padilla Bay herbivory of both species of eelgrass by isopods, caprellids, and other grazers accounted for a significant proportion of the eelgrass productivity in the bay[49]. Thus, Z. japonica is a source of food for estuarine and marine species in the PNW, both via the detrital pathway and via direct herbivory.

Some of the organic production of seagrasses is exported to other systems such as adjacent salt marshes, sandy beaches, or to deep waters off shore from seagrass beds or to the more distant deep sea[26, 34, 35, 46]. The presence and use of eelgrass detritus in deep channels has been documented in Washington in the San Juan Channel[5]. Z. japonica would be expected to contribute to this export of organic matter in proportion to its biomass and productivity.

Recently the role of seagrasses in carbon sequestration has been reported[13, 19]. Some seagrasses, such as Posidonia species develop large mats of organic matter that become buried in the sediments[13]. Thus soil organic matter is the major mechanism of sequestration of carbon by seagrasses[19]. However, Z. japonica is much more likely to be consumed directly or indirectly or exported than for organic material to accumulate in the sediments. Thus, Z. japonica is unlikely to be a major contributor to this ecosystem function in the PNW.

Another group of ecosystem functions of seagrasses that are valued revolves around the increased structure that eelgrasses and seagrass leaves provide to the system in comparison to intertidal flats without macro-vegetation[30, 38]. These ecosystem functions include substrate for epiphytes, attenuation of waves and currents, settling and trapping of suspended material, retention of water on the flats during ebbing tide, and habitat for marine and estuarine fauna.

Leaves provide substrate for epiphytes[3, 37]. Numerous grazers feed on these epiphytes[43, 49]. Epiphyte growth and grazer utilization have been reported for Z. japonica in Asia and in the PNW[15, 30, 49]. These contribute to the overall secondary productivity of the ecosystem as well as provide suitable food for specific grazers. In the PNW, epiphyte growth has been documented on Z. japonica, and Z. japonica would be expected to provide this function, albeit on narrower leaves and higher in the intertidal than Z. marina[49].

Leaves of seagrasses slow down water movement and reduce currents and waves. These processes have been studied and quantified in several seagrass species but much remains unknown[16, 17, 18, 20, 28, 53]. In the PNW, one study measured water movement 32% greater in plots where Z. japonica had been removed[51]. Thus Z. japonica reduced currents and would be expected to reduce currents and wave energy in the PNW[16]. The amount of reduction will vary with the density and height of Z. japonica as well as with the current and wave environment[28].

As currents are reduced, suspended material in the water settles and remains in eelgrass beds. This function is also dependent on density, height, and other morphometric characteristics of the seagrasses[28]. As particulate material is trapped the level of the sediment surface may increase. This function of trapping of sediments may be a beneficial function or a detrimental function depending on location and desired use of the flats. A study in Willapa Bay reported colonization by Z. japonica of areas where ghost shrimp Neotrypaea californiensis were controlled resulting in a higher sediment level in areas where Z. japonica developed[14]. In the PNW Z. japonica traps suspended material which in turn contributes to greater water clarity.

The increased structure of seagrass leaves retards water movement off intertidal flats. This holds water on seagrass covered tide flats longer than on flats without seagrasses[39]. Desiccation during low tide is a strong factor in determining the suitability of intertidal habitats for a wide variety of fauna and flora. Thus, the retention of water on intertidal flats can make habitat suitable for a wide range of organisms that otherwise could not live there. In the PNW this phenomenon of retarding water flow off of intertidal flats has been observed by oyster and Manila clam growers and reported for Z. japonica[41].

Seagrass roots and rhizomes also help to stabilize the sediment. When the wasting disease caused decline of Z. marina in most parts of the north Atlantic, sediments

that had been stable for many years were eroded away[52]. Z. japonica would be expected to have a similar role. However, Z. japonica does not have as robust a rhizome system as Z. marina and inter-annual variations in density and presence of Z. japonica may make this function less likely for Z. japonica in the PNW.

Oxygen is produced by seagrasses as they photosynthesize. Some of this oxygen moves out of the plant and dissolves into the water column[4]. During the night seagrasses respire and absorb oxygen from the water. In productive eelgrass systems the net movement of oxygen will be into the water. At a time when low oxygen in the water is of concern, this function of eelgrasses, including Z. japonica may be considered a beneficial function. In Padilla Bay, the oxygen concentration can reach over 200% saturation during bright days in spring and summer[7, 10]. The water with 200% saturation has been in contact with both Z. marina and Z. japonica and the contribution of Z. japonica is expected to be comparable to its distribution and rate of productivity[6, 7]. Some of the oxygen produced in photosynthesis moves down the eelgrasses and into the sediments around the roots and rhizomes[33]. Thus sediments in the rhizosphere are oxygenated whereas sediments without eelgrasses may be less aerobic or even anaerobic. Again, Z. japonica may be expected to oxygenate sediments in proportion to its productivity.

Seagrasses are able to absorb nutrients from both the water and the sediments and move these nutrients from leaves to roots/rhizomes and vice versa[40]. The net effect of this movement of nutrients will vary with time, season and location. During the warmer months of higher growth, nutrient demand is higher and eelgrass communities may absorb enough nutrients to measurably reduce the concentration in the water. In Padilla Bay, nitrate concentrations decreased up to 10 fold in a single tidal cycle when water flowed over eelgrass beds of both Z. marina and Z. japonica[7, 8]. Similarly, in Yaquina Bay, Oregon, Z. japonica habitats were net sinks for nitrate, ammonium, and dissolved reactive phosphate[29]. Thus, in the PNW, Z. japonica is likely to lower the concentration of nutrients in the water during the growing season. Nutrient concentrations in the sediment are also altered as Z. japonica changes the sediment bacteria involved in nitrogen cycling[44].

Another ecosystem function of seagrasses deals with pH of the water. As eelgrasses photosynthesize they remove CO_2 from the water. In doing so, they increase the pH, decreasing the acidity of the water. What role this may have on the larger water column is not known. But for animals living within the Z. japonica canopy, this may be an important mechanism for keeping the water at a pH suitable for growth. In Padilla Bay water flowing off both species of eelgrasses had substantially higher pH when flowing off the eelgrass beds than the bulk water from the Salish Sea flowing onto the eelgrass beds (Bulthuis, unpublished data). Similar to the consideration for oxygen production, the role of Z. japonica in providing this function will be in proportion to its productivity.

Thus, Z. japonica provides a variety of ecosystem functions in the Pacific Northwest similar to that provided by native eelgrass, Z. marina, and other seagrasses.

Recognizing that many residents of Washington are unaware of the pending threats to eelgrass the Coalition to Protect Puget Sound Sound from the use of the toxic persticide Imazamox provides the following news release:

Contact:
Laura Hendricks
(253) 509-4987

The Coalition To Protect Puget Sound Habitat has filed an administrative Rule-Making to Amend Petition with the Governors Office requesting that Jay Inslee take the necessary action to direct the State Weed Board to initiate rule-making to delete Zostera japonica (Japanese Eelgrass) as a Class C Noxious Weed. Despite objections from numerous scientists, citizens, Washington Department of Fish and Wildlife and the Department of Natural Resources, the Weed Board's Class C Noxious Weed listing includes all Washington waters including Puget Sound.

Zostera japonica was listed as a noxious weed at the request of large corporate shellfish growers demanding that they be allowed to eradicate Zostera japonica in Washington waters without limits. The State Weed Control Board ignored the significant ecological benefits that outweigh industry's unsupported claims that Z. japonica reduces their revenues and expansion. The shellfish industry is now requesting that Ecology issue NPDES permits to spray the pesticide Imazamox in Washington waters as early as this April with the public comment period ending February 15. Sierra Club has encouraged citizens to voice their opposition to this proposed spraying as well as the shellfish industry proposed spraying of Imidicloprid, a known bee killer .

As outlined in this appeal, the Coalition has stated that the Weed Board should not be allowed to violate existing county, state and federal laws that afford protection for both non-native and native eelgrass. The proposed eradication documents clearly show that adjacent native eelgrass will also be damaged or eliminated. Food sources for hundreds of thousands of migratory waterfowl, cover for salmon smolts, vegetation that supports invertebrates and herring spawn medium will also be collateral damage.

The Governor should require a cumulative analysis on this issue since: A new peer reviewed study outlines the need for a non-political analysis of Zostera japonica, a new peer reviewed study documents shellfish aquaculture increases nutrient production in estuaries and harmful algal blooms, seagrasses/eelgrass may reduce effects of sea change and acidification, a new State SHB Pierce County aquaculture ruling required a cumulative impacts analysis and toxins are already a serious concern with Washington shellfish. One State Agency nor Ecology should be allowed to ignore environmental and human health concerns at the demand of one industry.

State of Washington
DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA

February 8, 2011

The Honorable Brian Blake
Chair, House Agriculture and
Natural Resources Committee
105 Modular Building F
Post Office Box 40600
Olympia, Washington 98504-0600

Re: Japanese Eelgrass, *Zostera japonica*

Dear Chair Blake:

This letter is intended to address the Washington Department of Fish and Wildlife's (Department) policy regarding the listing of the Japanese eelgrass, *Zostera japonica*, as priority habitat needing protection. We understand that the Washington State shellfish industry has been negatively impacted by this eelgrass because it occupies the same habitat that shellfish growers need to culture shellfish. This competition for space has caused some growers to lose access to valuable shellfish grounds and, therefore, they have lost, and continue to lose, economic opportunities.

Zostera japonica is a non-native in Washington. Given this, and given the negative economic impact this aquatic plant is having on the shellfish industry, the Department will exclude *Zostera japonica* in our listing as priority habitat needing protection.

The management tool we will use to implement this change of policy is the Department's Priority Habitats and Species (PHS) list. The PHS list is developed and used by the Department and used by other state, federal and county governments as a guide for identifying habitats and species needing protection. Effective March 1, 2011, the PHS list will include the following amendments:

- On pages 169, 170 and 171, each mention of the word eelgrass will have a corresponding footnote stating: "This reference to eelgrass excludes *Zostera japonica*."
- On page 176, the word "native" will be inserted before the word "eelgrass."

We are hopeful this action will address concerns associated with the Department's current policy regarding the protection of *Zostera japonica*.

Please contact me at (360) 902-2720, or Lisa Veneroso at (360) 902-2836, if you would like to discuss our plan as outlined in this letter in more detail.

Sincerely,

Philip Anderson
Director

cc: Lisa Veneroso

The DAD for WDFW provides the concerns of the Dept about spraying imazamox and listing Japanese eelgrass as a Class C Noxious weed on Oct 25th 201

Washington State Noxious Weed Control Board
Post Office Box 42560
Olympia, Washington 98504

Dear Board Members:

Thank you for the opportunity to provide comments on the proposed listing of Japanese eelgrass (Zostera japonica) as a Class C noxious weed in Washington State in areas beyond commercial shellfish beds. The Washington Department of Fish and Wildlife (WDFW) is strongly opposed to this proposal due to potential adverse impacts to aquatic resources within the state's marine waters and does not believe that the listing is warranted to maintain viable commercial shellfish operations.

Last year, WDFW cautiously supported coastal shellfish grower concerns regarding the potential negative impact of Z. japonica on commercial shellfish production within Willapa Bay. We recommended that the noxious weed listing be limited to Willapa Bay and exclude Puget Sound. Ultimately, the Board approved a Class C listing for Z. japonica throughout the marine waters of the state for commercial shellfish beds. The current proposal seeks to further expand this listing to include all marine waters of the state regardless of commercial shellfish operations.

The Department is strongly concerned that the current proposal, given its significantly increased geographic extent, could result in substantial impacts to those species of birds and fish that utilize eelgrass for feeding, rearing, and as physical habitat. Additionally, we are concerned that implementation of a statewide Class C listing for Z. japonica would significantly increase the potential for adverse impacts to native eelgrass (Zostera marina). These impacts could occur either through misidentification of Z. marina as Z. japonica or treatment effects extending beyond the area targeted for control, whether through mechanical or chemical methods. As the Board is aware, native eelgrass provides extensive year-round ecological benefits without substantial consequences to shellfish growers.

As we indicated in our previous letter, the Department would caution the Board to not draw broader conclusions about Z. japonica from work only done within Willapa Bay. The shellfish/eelgrass control interactive results were equivocal and of extremely short duration. Further, there is an additive affect with ghost shrimp control, done as part of the aquaculture, which can further exasperate the Z. japonica colonization. Finally, the Willapa Bay ecosystem continues to be in a vegetative flux after many years of Spartina control. The mudflat system is still rather dynamic from removal and changes associated with Spartina invasion and control; the vegetative community in general has changed from the community that existed prior to Spartina colonization. The Z. japonica colonization trajectories reported for Willapa Bay are not

After more political pressures and threats the WDFW provides a different point of view that basically tells all that its not OK to spray Imazamox on eelgrass in Puget Sound but OK to spray in Willipa Bay!This confused and inconsistent change was obviously brought about by Dir.Anderson,AD Vernroso,and Rep.Blake and the shellfish industry.
We wonder why the eelgrass.spp.,in Willipa Bay is less important than eelgrass in Puget Sound?

November 1, 2011

Washington State Noxious Weed Control Board
Post Office Box 42560
Olympia, Washington 98504

Dear Board Members:

Thank you for the opportunity to provide comment on the proposed listing of Japanese eelgrass (*Zostera japonica*) as a Class C noxious weed. The Washington Department of Fish and Wildlife (WDFW) is cautiously supportive of the proposal to list *Z. japonica* as a Class C noxious weed in commercial shellfish beds in Pacific County. However, WDFW strongly opposes the listing of *Z. japonica* as a Class C noxious weed within Puget Sound.

WDFW respects coastal shellfish grower concerns regarding the potential negative impact of *Z. japonica* on commercial shellfish production. Despite the positive benefits of this eelgrass species on birds and forage fishes, we believe limited control of Japanese eelgrass in commercial shellfish beds in Willapa Bay can aid shellfish growers without having large-scale consequences to fish and wildlife resources. Associated with our support for the limited Class C listing, WDFW strongly encourages the compliance and effectiveness of monitoring programs to ensure that native eelgrass (*Z. marina*) is not mistakenly identified and chemically or mechanically killed. As the Board is aware, native eelgrass provides extensive year-round ecological benefit without substantial consequences to shellfish growers.

The Department would caution the Board to not draw broader conclusions about *Z. japonica* from work only done within Willapa Bay. The shellfish/eelgrass control interactive results were equivocal and of extremely short duration. Further, there is an additive affect with ghost shrimp control, done as part of the aquaculture, which can further exasperate the *Z. japonica* colonization. Finally, the Willapa Bay ecosystem continues to be in a vegetative flux after many years of *Spartina* control. The mudflat system is still rather dynamic from removal and changes associated with *Spartina* invasion and control; the vegetative community in general has changed from prior to *Spartina* colonization. The *Z. japonica* colonization trajectories reported for Willapa Bay are not consistent with expansion rates reported in North Puget Sound. In Padilla Bay the *Z. Japonica* has been reported to show significant downward trends within the last twenty years. Again, it would be incorrect to expand the Willapa Bay information throughout Washington.

WDFW strongly opposes the listing of *Z. japonica* as a noxious weed in Puget Sound. Chinook and chum salmon, steelhead trout, and three species of rockfish are listed under the Endangered Species Act in Puget Sound. All but steelhead juvenile life history stages of these species are widely known to use eelgrass as cover from predation, as migration corridors, and to seek food resources. The State Noxious Weed Board correctly identifies overlap between *Z. japonica* and *Z. marina* growing areas, and the lack of differential use of these eelgrass species by listed fish species. Because *Z. japonica* and *Z. marina* growing areas can overlap by more than sixty percent in Puget Sound, their identification, uncertain even among experts, and their similar ecological value utilized by listed fish species, Japanese eelgrass cannot be chemically or mechanically treated without negative consequences to fish and wildlife resources. *Z. japonica* has been shown to facilitate colonization of the ecologically important *Z. marina*, which has declined throughout Puget Sound, and is in need of restoration and protection.

The importance of *Z. japonica* to wintering waterfowl has been well documented. This eelgrass determines the carrying capacity for several waterfowl species in Puget Sound. Species such as widgeon serve as a bio-control, or limit the existence of *Z. japonica*, through complete utilization. The removal of *Z. japonica* can have other indirect consequences to agriculture and impacts to the health of Puget Sound, through shifting ecological dynamics of wintering birds. In short, the broad scale removal of *Z japonica* can have immediate negative ecological consequences.

WDFW suggests that the Board take a precautionary approach in the listing of *Z. japonica* as a Class C noxious weed. The Department encourages the Board to limit the listing of Japanese eelgrass as a Class C noxious weed to commercial shellfish growing areas of Pacific County. Chemical or mechanical treatment areas should be monitored for effects on *Z. marina*. Pilot studies of control/removal of *Z. japonica* in limited areas within Willapa Bay could provide useful insight without causing widespread harm to ecological resources. The potential impacts to native eelgrass are of great concern to WDFW, subsequently the Department would ask the Board to modify the Class C listing proposal as presented to only apply to Willapa Bay.

Sincerely,

Greg Schirato
Deputy Assistant Director

Blain Reeves, DNR Shellfish Mgrs gives voice to the DNRs concerns about spraying on shellfish in his review of the Dept. of Draft EIS on 20 Nov 2013

From: REEVES, BLAIN (DNR)
Sent: Wednesday, November 20, 2013 12:17 PM
To: Lubliner, Nathan (ECY)
Cc: Carman, Randy E (DFW)
Subject: Discussion follow up
Attachments: 1-Summary-ImazamoxPDEIS_DNR_AAMT.DOCX

Nathan,

Thank you for the opportunity to review the *Draft Environmental Impact Statement: Management of Zostera japonica on Commercial Clam Beds in Willapa Bay, WA -Preliminary Draft for Internal Review* October 21, 2013 (referred to in the ensuing comments as the Draft EIS).

The Department of Natural Resources (DNR) Aquatic Lands Program (Aquatics) manages state owned aquatic land in Willapa Bay. DNR Aquatics is concerned with managing the seagrass *Zostera japonica* population in these areas through spraying of the herbicide Imazamox. These concerns include the non-target effects Imazamox may have on other species, and effects on adjacent tidal and subtidal lands. Particularly distressing are the expected impacts to populations of the native seagrass, *Zostera marina*, defined as a state critical habitat. However, the single most important concern for DNR Aquatics is the potential precedent setting effect on future actions the information in this EIS may be used to support. In the future, if a permit is sought for application of Imazamox on *Z. japonica* in areas that would expand the footprint of existing shellfish farms, or in areas beyond Willapa Bay commercial shellfish farms, or for raising the noxious weed classification of *Z. japonica*, the information contained in the final version of this EIS will likely be cited.

For these reasons it is important that the proposed application is clearly defined, the evidence of economic and ecological concerns are sufficiently detailed, information sources are appropriately referenced, and the research results and studies presented withstand rigorous review. As the Draft EIS is currently written, DNR does not believe these standards have been met and has several issues of concern. Specific comments and edits are indicated in the attached Microsoft Word document in highlighted comments and track changes format (see above). I am not providing tracked changes beyond chapter 1 because the subsequent chapter comments are essentially repeats. General concerns are summarized as follows:

1) The areas under consideration to be permitted for spraying should be clearly stated. Currently, it is unclear what areas this permit is seeking coverage for. Is it existing areas of commercial shellfish aquaculture in Willapa Bay? Current areas of just clam aquaculture? Areas currently in Manila clam aquaculture only? Areas that are merely platted for shellfish aquaculture? Areas that are potentially good shellfish growing areas? What evidence is needed to consider a parcel of property or footprint within a parcel permissible to manage *Z. japonica* by spraying Imazamox? Does it have to have been historically farmed? Historically farmed with clams? Historically farmed for a minimum time period?

2) The economic evidence that indicates *Z. japonica* has impacted the commercial shellfish industry should be explicitly identified. Anecdotal evidence should be clearly identified as such. Any anecdotal claims that farmed areas have been abandoned because of *Z. japonica* growth, should be distinguished from any documented abandoned farms, and further separated from areas of planned expansion. Estimates of future economic losses that may result from inability to expand shellfish farming should be distinct from estimates of loss from historically farmed clam beds that have been abandoned as a result of *Z. japonica* presence. If only the economic impacts to farming Manila clams are strictly being considered, perhaps the permit should be restricted

21

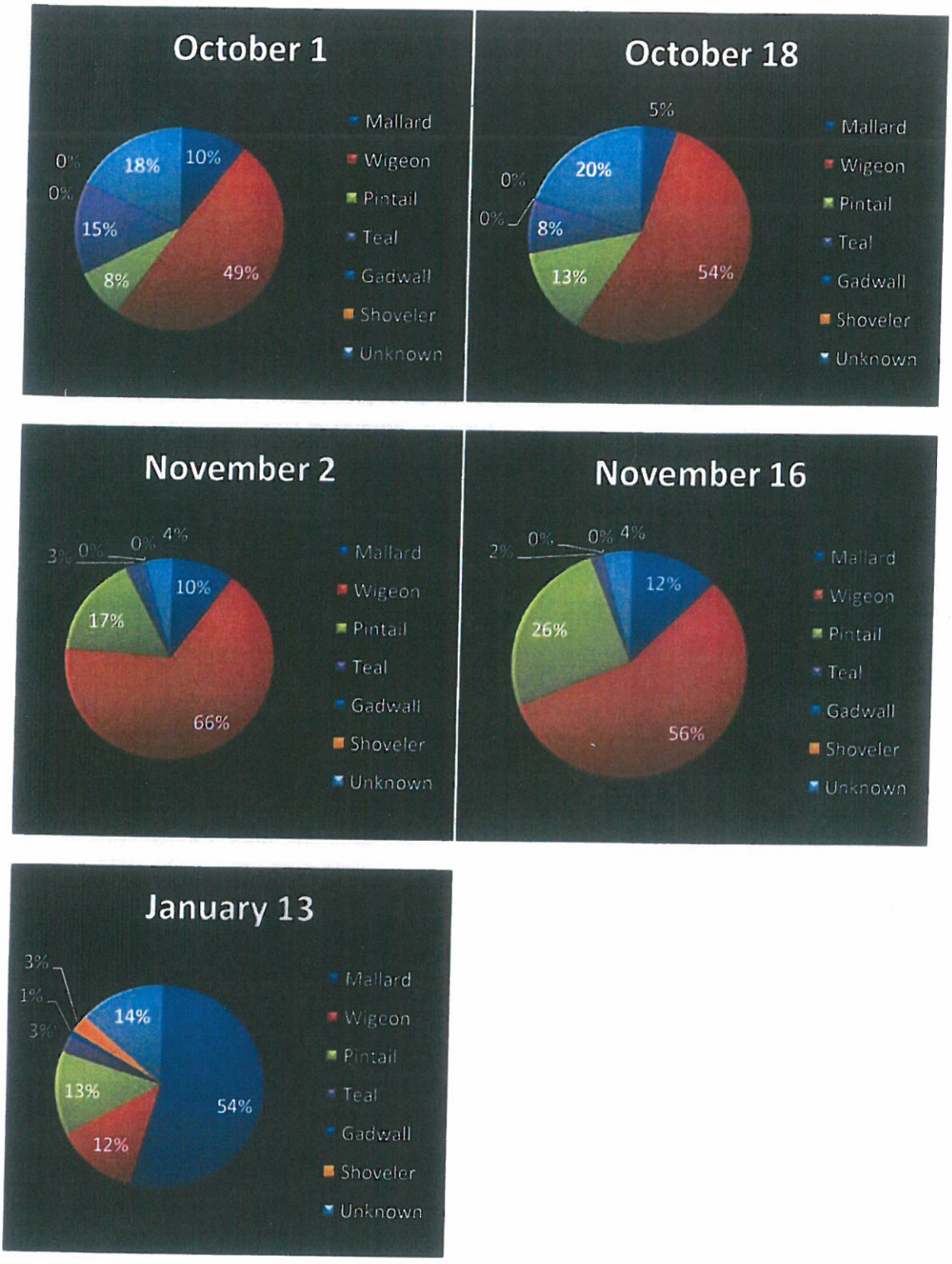

Figure 1. Species composition of dabbling ducks observed during Willapa Bay waterfowl survey flights, October 2012–January 2013.

to use on only commercial Manila clam beds (that appears to be the case but not crystal clear in the draft permit).

3) The Draft EIS states under section 2.9.1 Cumulative Impacts states that "*The SEPA Rules specifically define only direct and indirect impacts, as follows: those effects resulting from growth caused by a proposal (direct impacts), and the likelihood that the present proposal will serve as a precedent for future actions (indirect impacts)*" then follows with a statement that there is no information that other proposed actions are dependent on this proposed application therefore, no evaluation of cumulative impacts under SEPA is required. DNR staff disagree with this interpretation certainly serve as a precedent for further actions Information presented in this Draft EIS will be cited in support of any requests to local governments to spray *Z. japonica* in non-shellfish farming areas. Cumulative impacts should be addressed in this Draft EIS.

4) Scientifically unsubstantiated claims of ecological impacts from *Z. japonica* should be eliminated. The attached edited word document reflects this and has struck all irrelevant, questionable claims of *Z. japonica's* detrimental effects on ecology. The scientific robustness of claims and citations should be indicated. It goes without saying that information coming from peer reviewed published scientific journal articles should be clearly distinguished from anecdotal observations and personal communication, but there should also be a separate category for grey literature: agency technical reports, consulting company white papers, internet web sites or unpublished study results are not as rigorously reviewed by qualified scientists. While all sources provide valuable information, there is a difference in the weight of the evidence and uncertainty from a given source.

5) Certain terms in the Draft EIS need clarification (examples follow):

   a. In several places in the document the term "eradicate" is used in reference to how Imazamox will be used to manage Z. japonica. in other sections, it is acknowledged that eradication will not be possible. The term should not be used in reference to how Imazamox will be used to control Z. japonica if it is not accurate. repeat application etc

   b. It is recommended that the authors pay careful consideration to terminology used in this Draft EIS to avoid appearance of bias. The attached draft document highlights a number of words and phrases and recommends deletion and replacement with more objective language (e.g. replace infest, with colonize).

Thank you again for the opportunity to comment on this Draft EIS and for meeting and discussing the draft permit in person today. DNR Aquatics remains interested in participating in the collection and evaluation of information relevant to the sustainable management of aquatic lands throughout the state.

Regards,

Blain Reeves
Assistant Division Manager –
Science, Shellfish and Invasive Species Management
Aquatic Resources Division
Washington State Department of Natural Resources
(360) 902-1731
blain.reeves@dnr.wa.gov
www.dnr.wa.gov

Conclusions

- SEagrasses,icluding Zostera marina and Zostera japanica are very beneficial aquatic plants that contribute to the food chain,biologiscal diversity,species richness,and economic values as demonstrated by numerous peer reviewed papers.

- Eelgrasses spp.are protected by Fed.and State Laws and policies.

- Both species of eelgrass are now a risk from the use of Imazamox in our tidal estuaries,bays,and rivers.

- Zostera japanica and Z.marina contribute similar,if not identical benefits to waterfowl,invertebrates,salmon,crabs,and water quality.

- Recent case law,Shorelines Hearing Board,requires protection of eelgrass and the qualification of the cummulative impacts on the environment of shellfish operations.(13-016c Jan.2014)

- Further,that the actions of Dir.Anderson and AD Venoroso acting under the Dir.of Taylor Shellfish,and Rep.Blake resulted in the letter of Feb.8th,2011 that enabled the Noxious Weed Board to list Zostera japanica as a Class C weed in Wa. This action by Anderson was the direct result of threats from Rep.Blake to reduce legislative funding to the WDFW.Andersons acted contrary to the mission of WDFW to protect wildlife and wildlife habitat(including eelgrass.spp.)

- Studies and waterfowl surveys done by the WDFW that up to 120,000 ducks and geese and 6,000 brant use eelgrass as a primary food source in Willipa Bay.Up to 300,000 ducks and geese feed on eelgrass to some extent in Puget Sound.(WDFW)

- Smolting juv.salmon use the eelgrass meadows during a part of their life cycle as do some ESA species.

- Shellfish contamination by heavy metals has caused the PRC and the European Union to place embagros on WA.shellfish sales

- The Wa.Dept.of Ecology considers the waters of Willipa Bay and Commencement Bay to be a "toxic soup"ie Cohen v.WDOE

- Willipa Bay has not yet recovered from the afftect of herbicide glyphospate.(WDFW Schriato)

The specific And desired policy/rule we request be changed is to return the listing of Zostera japanica,Japanese eelgrass, to the status as a priority habitat needing protection. Priority Habitat List(PHL)used by the WDFW and other state,county federal,and tribal governments as a guide for identifying habitat needing urgent protection as in eelgrass spec..Therefore on pages 169,170,and 171 each mention of eelgrass,a footnote stating that the references to eelgrass includes Zostera japanica.On pages 176 the sentence will include that the inclusion of Zostera japanica will insure consistancy and conformity with both federal and state policy for protection as in the SMA and the Clean WAter Act.Further, that the WDFW will enforce the policy of protecting and enforcing to the full extent of state law.Further the WDFW will develope rules to prevent removal or willful destruction of eelgrass spp.from the waters of the state under Title 77 et al.

This policy/rule change will insure that other state agencies, the shellfish growers in general,and wildlife enthusiasts will all work cooperatively to insure that the seagrasses of the STATE are fully recognized for their importance to a diverse and viable biotic aquatic community that insures the highest marine water quality free from chemical pollutants. This,in the context of the best available science free from politcal pressure inflicted by the shellfish growers and the harmful enfluences of the Dir.,(Anderson)and the AD.(Vernoroso)

The Commission must remind the Director that ethical conservation conduct by the Dir.and his staff is essential to leadership and good scientific decision making.

The process of petiton for rule making that only allows for three minutes for public discussion is unfair and arbitrary under the provisons of RCW 34.05.This RCW does not in any way limit my presentation time to just three minutes.Therfore I request at least 20 minutes to fully appraise you of the complexities, life cycle and many benefits to be derived by protecting eelgrass spp.including Zostera japanica.

We request that the WDFW Commission write rules to reinstate Zostera japancia to the WDFW priority habitat list thereby giving this valuable species the same protection as Z.marina.This then brings the WDFW in compliance with the SMA,the Clean Water Act, and Wa.state seagrass policy to increase eelgrass spp.by 20%.

Sincerely,

Rob Kavanaugh

Rob Kavanaugh,Laura Hendricks,F.Cohen, ~~Ross Barkhurst~~ W. WEILER
and the Coalition to Protect Puget Sound

Dr. Douglas Bulthuis, Department of Ecology, Padilla Bay National Estuarine Research Reserve, Mount Vernon, Washington

Dr. Jeff Gaeckle, Department of Natural Resources, Nearshore Habitat Program

Dr. Michael Hannam, University of Washington, College of the Environment, UW Botanic Gardens, Seattle, Washington

Dr. Jim Kaldy, US Environmental Protection Agency, Western Ecology Division, Newport, Oregon

Dr. Kim Patten, Washington State University, Long Beach Research and Extension Unit, Long Beach, Washington

Dr. Jennifer Ruesink, University of Washington, Department of Biology, Seattle, Washington

Dr. Fred Short, Department of Natural Resources, Nearshore Habitat Program, Olympia, Washington

The report may be cited as:

Bulthuis, Douglas A. 2013. Science presentation abstracts. Presented at The Science and Management of Zostera japonica in Washington: A Meeting for State Agencies, June 18-19, 2013, Lacey, Washington. Washington State Department of Ecology, Padilla Bay National Estuarine Research Reserve: Mount Vernon, Washington. 42 pp. Padilla Bay National Estuarine Research Reserve Technical Report No. 36.

ATCH A

ATCH A

COALITION
To Protect Puget Sound Habitat

P.O. Box 228
Vaughn, WA 98394
coalitiontoprotectpugetsoundhabitat.com

Hand Delivered

January 27, 2014

Governor Jay Inslee
Office of the Governor
416 Sid Snyder Avenue SW, Suite 200
P.O. Box 40002
Olympia, WA 98504-0002

Re: Appeal of the Washington State Noxious Weed Control Board Denial of Rule-Making to Amend Petition Filed by the Coalition to Protect Puget Sound Habitat and Robert Kavanaugh

Dear Governor Inslee:

As provided in RCW 34.05.330(3), the Coalition To Protect Puget Sound Habitat and Robert Kavanaugh (collectively, Petitioners) respectfully appeal the decision of the Washington State Noxious Weed Control Board (Weed Board) to deny Petitioners' petition for rule-making to amend (Exhibit A-Petition for Rule-Making to Amend). With this appeal, Petitioners request that the Governor review the Weed Board denial (Exhibit B1-Rule Making Order, B2-Concise Explanatory Statement, B3-Halpern 9/26/13 email, B4-Halpern 12/31/13 email) and direct the Weed Board to initiate rule-making to amend proceedings.

A. Background

Pursuant to the Administrative Procedures Act, RCW 34.05.330, on April 18, 2103, Petitioners filed a petition with the Weed Board as permitted by RCW 34.05.330(1), to seek the amendment of an existing rule, WAC 16-750-015 State Noxious Weed List – Class C Noxious Weeds. The Petitioners sought to amend this rule by deleting Zostera japonica (Japanese Eelgrass) as a Class C Noxious Weed. The State Noxious Weed List, as set forth in rule, provides the basis for noxious weed control efforts by county noxious weed control boards, weed districts, the WSNWCB and the WSDA, under the authority of Chapter 17.10 RCW. The weed list is revised annually and the 2014 noxious weed list goes into effect on January 30. 2014.

Initially in 2011, the Weed Board listed Zostera japonica as a noxious weed in commercially managed shellfish beds only. Due to shellfish industry lobbying, that limitation was dropped in 2012 and Zostera japonica was listed as a noxious weed throughout Washington State.

P.O. Box 228
Vaughn, WA 98394
coalitiontoprotectpugetsoundhabitat.com

On September 26, 2013, the Weed Board notified the Coalition that "the proposal to delete the Class C listing of Japanese eelgrass did not pass, but they did move forward the proposal to reinstate the 2012 language that limited recognition of its noxious weed status to commercially managed shellfish beds only (Exhibit B3). On December 31, 2013, the Weed Board formally notified all parties that they "decided to leave the Japanese eelgrass listing as a Class C noxious weed" (Exhibit B4). The Rule-Making Order was filed December 30, 2013 and becomes effective 31 days after filing (Exhibit B1).

B. Basis for Petitioners' Amendment

As outlined in detail in the Petitioners petition (Exhibit A), supplemental information (Exhibit C) and the following documentation:

1. Both species of eelgrass are protected by county, state and federal laws. This protection includes Zostera marina and Zostera japonica.

2. According to scientific presentations at the Ecology June 2013 eelgrass meeting (Exhibit D), scientific reports and testimony, there is virtually no difference between the beneficial functions of both eelgrass species that occupy two different tideland levels. Important benefits that are well documented in scientific reports and testimony include: food resources for tens of thousands of migratory waterfowl, herring spawning medium, cover for salmon smolts and reduction of coastal erosion due to sea change. Affected species are ecologically important and their populations have not met their management goals in recent years.

In fact, a new peer reviewed study "Science and Management of the Introduced Seagrass Zostera japonica in North America" (Exhibit E) was published September 2013 that stated:
"This fractured management approach contradicts efforts to conserve and protect seagrass in other regions of the US and around the world. Science must play a critical role in the assessment of Z. japonica ecology and he immediate and long-term effects of management actions. The information and recommendations provided here can serve as a basis for providing scientific data in order to develop better informed management decisions and aid in defining a uniform management strategy for Z. japonica.

This peer reviewed study contains valuable scientific information that was ignored by the Weed Board in their denial of the Petitioners' petition.

3. There are no definitive Washington Department of Revenue records that support the shellfish industry's claim that Zostera japonica has reduced their revenues.

4. The listing of Zostera japonica and eradication efforts threatens the existence of Zostera marina. Not only does Zostera marina grow in close proximity, it also "can be

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similar in appearance to non-native eelgrass (Zostera japonica) and the (Pierce) County wants to avoid unintended harm to native eelgrass (Exhibit I, page 3).

5. Existing laws protecting eelgrass include the Shoreline Management Act and the Puget Sound Partnership required that eelgrass species be protected with a goal of increasing eelgrass by 20%. These protections did not specify the type of eelgrass, but all eelgrass was protected.

6. Numerous scientists as well as the Washington Department of Natural Resources (WDNR) have submitted various comment letters to the Weed Board voicing their concerns regarding eradication of Zostera japonica. The latest WDNR email dated November 20, 2013 listed a multitude of questions and serious concerns regarding eradication efforts by spraying Imazamox (Exhibit F).

7. The listing of Zostera japonica as a noxious weed was not supported by science, but evolved from the following political actions:

- With the assistance of Representative Brian Blake, Taylor Shellfish convinced the Director of WDF&W, Phil Anderson, to sign the letter dated March 2011 under his signature written by Bill Dewey/Taylor Shellfish to delete Zostera japonica from the priority habitat list (per public records & Exhibit G). This action was the first step of the shellfish industry plan that would allow the State Weed Board to list Zostera japonica as a noxious weed and would pave the way for the shellfish industry application for a NPDES permit to spray Imaxamox for complete eradication in the entire State of Washington. No science was presented with this request.

- Issuance of the March 2011 letter from the Director of Washington Department of Fish and Wildlife (Phil Anderson) made it possible for the shellfish industry to petition the Noxious Weed Control Board to list Zostera japonica as a noxious weed in 2011 on commercially managed shellfish beds only.

- When the shellfish industry was successful in having the Weed Board list Zostera japonica as a noxious weed throughout Washington State, the Washington Department of Fish and Wildlife voiced their opposition (Exhibits H1 &H2).

Scientific documentation has been provided to the Weed Board that Zostera japonica performed vital biological functions in Willapa Bay for tens of thousands of migratory waterfowl, invertebrates to salmon, herring and ESA listed green sturgeon. Despite the extensive scientific documentation and a call for further research, the Weed Board not only listed Zostera japonica as a noxious weed on commercial shellfish beds only in 2011, they accepted the proposal to list Zostera japonica as a noxious weed throughout the State in 2012 and denied any changes to this listing in 2013.

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Further shellfish lobbying, not supported by independent science, resulted in the following additional actions despite opposition from counties and other state agencies:

- Issuance of the Washington Department of Ecology shoreline master programs 2013 guidance that states: "Due to its non-native, invasive characteristics, Z. japonica should not be protected as "critical saltwater habitat" as defined in the shoreline master program guidelines (WAC 173-26-241 (2) (c))"

- Notification to Pierce County in 2013 by shellfish industry attorneys that Pierce County's decision to protect Zostera japonica in their county permits was a violation of state law (Exhibit I-pages 3, 4)

- Notification of the proposed Washington Department of Ecology NPDES permit to allow the spraying of the pesticide Imazamox in all Washington waters, including Puget Sound. This action is being completed now with a public comment period ending February 15 (Exhibit J). Willapa Bay is already referred to as a "chemical soup" by the Washington Attorney general in the Cohen/Moby Dick vs Washington State November 9, 2012 motion for summary judgment.

Even the peer reviewed study "Science and Management of the Introduced Seagrass Zostera japonica in North America" and the authors Deborah J. Shafer • James E. Kaldy • Jeffrey L. Gaeckle recognized the political influence in Washington State in the eradication of Zostera japonica as stated on page 10 of their study (Exhibit E):

"Washington State has recently undergone a reversal in seagrass protection policy. Historically, Washington State agencies protected both Z. marina and Z. japonica as seagrass habitat (WAC 220-110-250, Washington State Register order 94-23-058 filed by WDFW) and WAC 173-26-221. The apparent intention of these policies was to protect both Zostera congeners. As reflected in the policy of no net loss of Zostera spp., resource agencies in Washington State view Z. japonica as providing similarly important ecological functions as are provided by Z. marina. Neither WDNR nor WDFW see an immediate negative effect from the spread of Z. japonica… Therefore, it is improbable that Z. japonica will be classified as a noxious weed or placed on the monitor list even though it is an invasive exotic species. (Pawlak 1994) As of March 2011, WDFW announced it would only protect Z. marina habitat under the WDFW Priority Habitats and Species List while explicitly excluding Z. japonica (http://www.caseinlet.org/uploads/Blake2.8.11Zosterajaponica.pdf); a move that may be inconsistent with the current wording of WAC 220-110-250 from 1994. In June 2013, the WDFW proposed to change the language of WAC 220-110-250 to specifically exclude Z. japonica (Washington Department of Ecology 2013). This management reversal appears to have been a political concession to shellfish growers who have rallied support against the legal protection of Z. japonica (Banse2011).The shellfish industry is largely exempt from regulation by WDFW

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regardless of impact to either native or non-native seagrass (R. Carman, WDFW, pers. comm.). However, the industry is subject to "no net loss" provisions of Shoreline Management Plans and regulation by the USACE (M. Goehring, WDNR, pers. comm.).Consequently, failure of state agencies to protect Z. japonica habitat may be inconsistent with existing Washington State Administrative codes. In early 2012, the Washington State Noxious Weed Control Board (NWCB) identified Z. japonica as a class C noxious weed on commercially managed shellfish beds only (WAC 16-75-015, Table 1). Late in 2012, the Washington NWCB accepted a proposal to list Z. japonica as a noxious weed throughout the State."

C. Washington State Noxious Weed Control Board Denial

To deny a petition, the Weed Board must state its reasons for the denial and specifically address the concerns stated in the petition. The Weed Board only stated in an email dated September 26, 2013 from Alison Halpren (Exhibit B3) that:

"Your proposal did not pass, as the Noxious Weed Committee and the State Weed Board felt that this species does meet the criteria of a noxious weed in that it is non-native, invasive, and difficult to control. However, they did move forward the proposal to reinstate the 2012 language that limited recognition of its noxious weed status to commercially managed shellfish beds only." The hearing in on November 5 in Wenatchee and I will be sending out an email with further details shortly."

Petitioners' received an email of the final decision included in the Weed Board Concise Explanatory Statement that did not even mention the Petitioner' Petition (Exhibit B2):

"Regarding the proposal to reinstate the 2012 listing language of Japanese eelgrass, Zostera japonica (i.e., Class C on commercially managed shellfish beds only):
The WSNWCB did not adopt the proposal, which was submitted by the Thurston County Noxious Weed Control Board, to reinstate the 2012 listing language of Japanese eelgrass for 2014. With this being the third year Japanese eelgrass has been included in the noxious weed listing process, the WSNWCB feels better informed about this species than it was prior to 2011. The WSNWCB read through the testimony carefully and considered the oral testimony that was presented at the November 5 public hearing and unanimously felt that the current Class C noxious listing of Japanese eelgrass is still appropriate.
The issue of Japanese eelgrass is complex, as are its ecological functions and interactions. As has been mentioned in previous years, this species appears to have positive, negative, neutral, and yet-to-be-determined ecological impacts. However, despite any beneficial characteristics, Japanese eelgrass still meets the criteria of a noxious weed as defined by RCW 10.10.010. It is currently accepted by the scientific community that, based on peer-reviewed research, Japanese eelgrass is: 1) a nonnative species; 2) its distribution in Washington is expanding; and 3) it reproduces quickly through seed production. It is also causing substantial economic losses to the shellfish industry. As is the case with many aquatic plants, Japanese eelgrass is very difficult to control. It is also converting

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valuable native, upper intertidal mudflats and sandflats into heavily vegetated areas. Its expansion may be providing some beneficial ecological functions, for example by providing a food source for migratory waterfowl and habitat for some benthic invertebrate species. Nonetheless, it should be noted that it is transforming and displacing native upper tideland habitat that has unique values of its own. The WSNWCB does not require the control of Class C noxious weeds, although county weed boards have the option of requiring control in their counties. The noxious weed status does not exempt the control of Japanese eelgrass from existing regulations and there are still no herbicide options at this time. While Japanese eelgrass and the native eelgrass can occur in distinct bands in the intertidal zone, there are tidelands where the species are mixed. County noxious weed boards are advised to consider these limitations should they choose to require control of Japanese eelgrass. The Class C listing allows the WSNWCB to educate the public about the complexities of Japanese eelgrass, including the impacts it's having on the shellfish industry and how it differs from the valuable native eelgrass, Zostera marina."

- **Weed Board Statements did not specifically address the concerns in the Petitioners' Petition and where not supported by scientific studies or documentation**

1. The Petitioners' assert that the Weed Board did not specifically address the concerns stated in the Petitioners' Petition and thus is in violation of RCW 34.05.330 (1i) and (1ii).

2. Petitioners' agree that Zostera japonica is a nonnative species, but so are the oysters and clams that are primarily grown in Washington State that are the heart of this issue. The Weed Board's decision simplifies a complex issue by basing their decision on Zostera japonica distribution and reproduction and un-supported economic losses to the shellfish industry.

These Weed Board statements are contrary to findings in the peer reviewed study (Exhibit E) and the extensive citations as well as the independent presentations at the June 2013 Ecology eelgrass workshop (Exhibit D).

3. Petitioners' disagree that the county weed boards have the option of requiring control in their counties and there are still no herbicide options at this time. Ecology is requiring that no protection is afforded Zostera japonica in their guidelines to counties and have initiated the process to issue NPDES spray permits (Exhibit J).

4. The Weed Board ruling was arbitrary and capricious and not founded on scientific evidence.

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- **Cumulative Impacts Must Be Addressed, Not Rule-Making in Isolation**

The Weed Boards decision to list Zostera japonica was made in complete isolation and disregards a multitude of far reaching ecological effects on Washington plant and animal species. Petitioners' request provides you with an opportunity to demonstrate error in the Weed Boards decision and their unwillingness to recognize a total regulatory framework that was intended to protect Washington State's fragile marine ecosystem. The Weed Board decision making process and the Washington Department of Ecology support does not take into account the adverse effects of listing a species and the long term eradication effects on a natural environment. Both WDF&W and WDNR pointed out cumulative impact concerns and where ignored.

At the same time the Weed Board has initiated rule-making to allow eradication of Zostera japonica, Washington decision makers are examining the benefits of seagrasses to reduce impacts of climate change and acidification, especially for shellfish (Exhibit K). The recent Shorelines Hearings Board decision to overturn a Pierce County 5 acre geoduck permit cited the need for an analysis of cumulative impacts including those to eelgrass (Exhibit L). With the new nutrient study documenting that shellfish increase nutrient production in estuaries and harmful algal blooms (Exhibit M), shellfish aquaculture can no longer accurately assert that they improve water quality.

All of these factors should be considered when determining rule-making actions that affect an entire marine ecosystem for the long term.

D. Conclusion

The overall health of Washington State's aquatic environment is of utmost importance to citizens and our economic future. It is essential that state agency actions are for the public good and the long term effects are carefully evaluated. Washington State is already dealing with toxins found in Washington shellfish that have now been banned in both the European Union and China. The attached documentation proves that the Noxious Weed Listing of Zostera japonica was intended to serve as the catalyst to open the door for more toxic spraying in Washington marine waters, to the benefit of only the shellfish industry. With so much as stake, all stakeholders should be important when evaluating the effects on the environment and human health.

Petitioners respectfully appeal the Washington State Noxious Weed Control Board decision denying Petitioners' Rule-Making to Amend Petition and request that you take the necessary action to promptly initiate rulemaking proceedings in accordance with RCW 34.05.320 to amend WAC 16-750-015 so as to delete reference to Zostera japonica (Japanese eelgrass) in its entirety.

Very truly yours,
Coalition To Protect Puget Sound Habitat
and Rob Kavanaugh

Laura Hendricks

Willipa Bay Wigeon + Eelgrass meadows 2013
Rob Kavenaugh