Dear Mr. Barry Thom - NOAA Fisheries Regional Administrator - West Coast Regional Office:

We, the undersigned, recognize NOAA Fisheries as the nation's leader in setting science-based guidelines and policies for protecting seagrasses and their ecosystem services. We submit this set of recommendations for leadership actions on the part of NMFS to protect eelgrass (*Zostera marina*) on the West coast in the coming years. We furthermore urge state leaders in Washington, Oregon and California to robustly implement NMFS technical and policy guidance for protecting eelgrass in its regulatory, management and conservation activities.

Seagrasses are a valuable component of coastal and estuarine environments across the globe, providing numerous essential ecosystem services. Eelgrass (*Zostera marina*) is the dominant seagrass species in the U.S. and along the West coast, playing a vital role in our coastal habitats and economies[1-4]. Nonetheless, many eelgrass meadows along the West coast have been degraded or lost from human activities[5], placing pressure on managers to conserve and restore eelgrass meadows across the region.

Eelgrass meadows' ecosystem services are well-documented. They act as nursery habitat for many commercially and recreationally important species, including juvenile salmon, halibut, and Dungeness crab, and are host to a diverse array of invertebrates and bivalves (clams, mussels) that support the marine food web[6,7]. By rooting in the soft bottom of estuaries, meadows stabilize sediments and settle out suspended particles, thereby improving water clarity and quality[1,8]. Recent research along the West coast demonstrates that eelgrass also serves a key role in combating climate change and ocean acidification, by storing carbon in underlying sediments and decreasing surrounding seawater acidity[9-11]. These services, paired with eelgrass loss in estuaries along the West coast, led to the recognition of eelgrass meadows under the Magnuson-Stevens Act as a federally designated Essential Fish Habitat (EFH) for groundfish and salmon. The special significance of eelgrass has also led to their classification as a Habitat Area of Particular Concern (HAPC), which prioritizes areas for conservation actions. In California, NMFS's leadership has resulted in eelgrass protection through the California Eelgrass Mitigation Policy (CEMP), which was adapted from Southern California's Eelgrass Mitigation Policy and adopted statewide in 2014[12]. NOAA Fisheries also provides funding, research, and technical support for eelgrass through partnerships such as the Pacific Marine and Estuarine Fish Habitat Partnership along the West coast.

Although the CEMP provides strong protection to eelgrass meadows from coastal development, numerous stressors degrade and threaten meadows across the region. For example, eelgrass can be physically damaged through dredging, anchoring, aquaculture-related activities, or placement of other structures on the benthos[13,14]. As a light-sensitive species, eelgrass can also be shaded out by docks or other overlying structures[15]. Similarly, poor water quality from run-off and eutrophication can decrease light availability and lead to eelgrass loss[16,17]. Climate change stressors such as increased water temperature, marine disease prevalence, and sea level rise may also lead to further loss of eelgrass meadows, putting additional pressure on these already at-risk habitats[18-22]. Although these declines have not been ubiquitous, many bays have experienced eelgrass meadow loss and degradation in previous decades as a result of these stressors[23,24]. For example, eelgrass meadows in Morro Bay have currently declined from 139 ha to 6 ha since 2007 – representing a 90% net loss[24,25]. Some bays have been more variable, such as Humboldt

Bay, which has likely experienced relatively stable eelgrass coverage in past decades, but with high interannual variability in the high intertidal and low subtidal margins of the meadows[18]. However, our ability to document region and bay-wide eelgrass loss is hampered by lack of consistent data and monitoring[12,18].

Given the current threats to eelgrass habitat, there is an urgent need for leadership to enhance eelgrass meadow protection, monitoring, and restoration in order to preserve the many ecosystem services they provide.

Recommendations:

Many opportunities for NFMS to meet this need exist now, ranging from updating existing policy documents and supporting new legislation to developing alternative management strategies. A mixed portfolio of approaches will likely be necessary to improve eelgrass protection and management across the West coast. As such, we have prioritized and outlined key strategies below to guide state and federal leadership.

1) Update and expand implementation of the California Eelgrass Mitigation Policy (CEMP) in California

The California Eelgrass Mitigation Policy (CEMP) has proved a valuable blueprint and technical resource for project applicants in California to avoid harming eelgrass, or to implement effective mitigation for the unavoidable loss of eelgrass. NMFS has initiated its scheduled review of the CEMP, which is an opportunity to learn from implemented projects and update the document to improve clarity that will lead to better long-term outcomes for eelgrass. The CEMP calls for no-net-loss of eelgrass habitat function. We urge NMFS to undertake a robust review of the CEMP and we stand ready to provide technical assistance to this process. We further urge NMFS to consider including the monitoring and mitigation of *potential* eelgrass habitat, and to support the framework development this will require. Given continued eelgrass loss, we also ask NMFS to push for inclusion of net gain in ecological services via mitigation, as has been suggested in Washington[26,27].

2) Establish statewide mitigation policies for Oregon and Washington

Oregon and Washington currently lack specific and robust technical guidance for compensatory mitigation, and policies modeled after the CEMP should be developed and adopted as soon as possible. At present, compensatory eelgrass mitigation in Oregon is guided by the Aquatic Resource Mitigation Framework within the Department of State Lands. In Washington, it is guided by the Department of Natural Resources. Unlike California, eelgrass mitigation in Oregon and Washington occurs on an *ad hoc* basis, depending on the project being permitted. In many cases, this leads to mitigation occurring out-of-kind (restoration of a non-eelgrass habitat to compensate for damage to eelgrass elsewhere) or out-of-place. The regulatory frameworks for eelgrass mitigation in these states lack the comprehensive, technical guidance provided by the CEMP, leading to inconsistent and disparate approaches to monitoring and mitigation, making overarching conservation and restoration efforts more challenging.

3) Establish regional standardized seagrass monitoring programs with publicly accessible methodologies and data

While the CEMP provides a protocol to conduct standardized monitoring, it is only implemented if activities occur that could damage eelgrass habitat, in an effort to maintain compliance with the “no-net-loss” policy. Thus, eelgrass monitoring following the CEMP protocol is limited to specific geographic locations only before and after times of known potentially harmful activities such as coastal development and subsequent mitigation. This limited approach does not provide comprehensive baseline spatial and temporal data related to eelgrass health or distribution. Understanding trends in eelgrass damage and recovery is further impeded when there are unknown stressors including unpermitted coastal development, anchoring, mooring, climate change impacts and marine disasters. The resulting irregular and infrequent eelgrass monitoring has led to disjointed or completely unavailable eelgrass extent data in many areas, some of which contain large, expansive meadows[12,28]. Nevertheless, past mitigation monitoring highlights the importance of the few sites currently providing persistent monitoring data to inform how the eelgrass health metrics vary across a given estuary and between years – demonstrating the potential value and impact of standardized monitoring[29]. We therefore urge the establishment of statewide standardized monitoring programs for *all* eelgrass habitat - not just habitats where we believe potential damage may occur. Ideally, such a monitoring program should allow for flexibility in project-specific needs. For example, monitoring using areal imagery can be accurate and cost effective in some meadows, while ineffective in others. Additionally, monitoring programs should call for both synthesis of existing data and standardized basic distribution monitoring like that outlined in the CEMP or Humboldt Bay Eelgrass Management Plan[12,18].

4) Plan for eelgrass persistence in state and regional climate planning

In addition to these specific recommendations above, we ask NMFS and other agencies to implement and grow opportunities to protect and restore existing eelgrass as well as plan for its persistence under sea level rise and other climate change scenarios. Specifically, inclusion of eelgrass in ocean acidification and climate action plans using the best available science should be pursued whenever possible. We support the California Ocean Protection Council’s leadership in its 2020-2025 strategic plan commitment to “work with partners to preserve the existing, known 15,000 acres of seagrass beds and create an additional 1,000 acres by 2025”[30]. Like OPC’s strategic plan, Oregon’s Ocean Acidification and Hypoxia plan and Washington state's climate resilience plan also provide strong guidance and should be expanded upon as these plans take action within their respective regions[31,32]. Rigorous eelgrass restoration and conservation efforts within programs such as Living Shorelines and the Southern Resident Killer Whale (SRKW) recovery plan should also be supported. For instance, the SRKW recovery plan explicitly calls for the protection of eelgrass given its importance as salmon and forage fish habitat[33].Similarly, Living Shorelines projects have promoted eelgrass’ ability to protect our shorelines from flooding and erosion while also supporting biodiversity - a model we encourage continued support for in the future[1].

Eelgrass meadows support valuable ecological and economic resources along the West coast, meriting their protection and careful consideration in future management under increasing climate change pressure. With your leadership, we can ensure that the wildlife and human communities these meadows support will thrive into the future.

Sincerely,

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