



October 6, 2025

California Air Resources Board
Carbon Capture, Removal, Utilization, and Storage
1001 I Street
Sacramento, CA 95814

RE: Information Solicitation to Advise Implementation of the Carbon Capture, Removal, Utilization, and Storage Program: Senate Bill 905

The San Diego Unified Port District (District) appreciates the opportunity to provide input on the California Air Resources Board's (CARB) solicitation regarding the implementation of Senate Bill 905 (SB 905). While SB 905 establishes a crucial framework for evaluating carbon capture, removal, utilization, and storage (CCRUS), the statute and program materials currently overlook the significant role of marine and coastal "blue carbon" ecosystems. California's kelp forests, eelgrass beds, tidal wetlands, and shellfish habitats are proven carbon sinks that sequester carbon, in some cases at rates many times greater than terrestrial forests, while also delivering co-benefits such as shoreline protection, biodiversity support, water quality enhancement, and resilience to climate change (Duarte et al, 2005).

The District is a public corporation and regional government entity created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay and is entrusted to manage the diverse waterfront uses on these lands in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries, and recreation, as well as aligning with its mission to enhance and protect the environment. As a part of its' environmental responsibilities, the District oversees the protection, conservation, and enhancement of the San Diego Bay's natural resources, including management of endangered species and sensitive wetland habitats. The Bay supports over 300 species of marine and coastal birds, over 640 species of marine invertebrates, over 100 species of marine fishes, over 45 species of algae, over 2,500 acres of eelgrass beds, and more.

Coastal communities like San Diego Bay have an opportunity to limit and reduce atmospheric carbon through the blue economy and nature-based solutions. The District leverages its growing portfolio of ecological opportunity areas and nature-based solution projects to protect the tidelands and support state and local climate planning efforts through projects like shellfish and seaweed aquaculture, engineered artificial reef structures, wetlands restoration and several other projects through our Blue Economy Incubator. These types of projects drive innovation, bolster the local economy, improve ecosystem health, and attenuate the effects of climate change.

Just as SB905 rightly recognizes the importance of engineered carbon removal, we urge CARB to ensure that natural, ocean-based climate solutions are explicitly included within the CCRUS Program. Integrating blue carbon into this framework will not only diversify the state's carbon management portfolio but also strengthen community resilience and ecosystem health while advancing California's leadership in nature-based climate solutions.

The following comments address specific questions from the solicitation where additional context and recommendations, particularly related to blue carbon and marine carbon solutions, are most relevant:



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1. In addition to the terms defined in statute, are there other key terms that should be defined? Please provide any proposed definitions with applicable citations.

The District recommends that CARB add clear definitions for **Blue Carbon**, **Marine Carbon Dioxide Removal (mCDR)**, and **Nature-Based Solutions** to ensure that ocean-based climate solutions are fully integrated into the CCRUS program.

- Blue Carbon: Carbon captured and stored in coastal and marine ecosystems such as tidal wetlands, mangroves, seagrasses, kelp forests, and shellfish reefs. These ecosystems sequester carbon in both biomass and sediments, often at rates significantly higher than terrestrial forests, and can store carbon for centuries to millennia if protected or restored. (Duarte et al, 2005; Nellemann et al, 2009; Howard et al, 2017)
- Marine Carbon Dioxide Removal (mCDR): A suite of ocean-based approaches that enhance the ocean's natural capacity to absorb and store atmospheric carbon dioxide. These approaches include, but are not limited to, protection and restoration of coastal blue carbon habitats, seaweed cultivation and sinking, ocean alkalinity enhancement, and other methods currently under research and development. mCDR solutions can provide durable carbon sequestration while also offering co-benefits such as biodiversity enhancement, shoreline protection, and water quality improvements (National Academies of Sciences, Engineering, and Medicine, 2022)
- Nature-Based Solutions: Sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to build more resilient communities (FEMA, 2020).

3. Are there any project categories missing from this list?

The list of project categories provided in the solicitation omits a critical set of nature-based, ocean-based solutions: Blue Carbon and Marine Carbon Dioxide Removal (mCDR) projects. We recommend that CARB explicitly include the following project category:

- Blue Carbon and Marine Carbon Dioxide Removal Projects: Activities that protect, restore, or enhance the capacity of marine and coastal ecosystems to sequester and store carbon. This includes tidal wetlands, eelgrass beds, kelp forests, mangroves, salt marshes, and shellfish reefs, as well as emerging mCDR approaches such as large-scale seaweed cultivation for sequestration, ocean alkalinity enhancement, and other scientifically vetted marine carbon strategies.

California is uniquely positioned to lead in this area. The state's extensive coastline, kelp forests, and eelgrass meadows represent some of the most powerful natural carbon sinks available. These ecosystems provide durable carbon sequestration while also offering multiple co-benefits, including biodiversity support, shoreline stabilization, improved water quality, and resilience to sea level rise.

By adding Blue Carbon and mCDR as a distinct project category under SB 905 implementation, CARB can ensure that the CCRUS Program reflects the full suite of carbon management strategies available to the state and aligns with global best practices in integrating nature-based and engineered climate solutions.



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4. Are there suggestions for further description of these categories, or ways to group categories?

The current list of project categories provides a strong foundation for identifying a wide range of carbon management approaches, and the District recommends building on this by organizing the categories to emphasize natural carbon removal processes first, with carbon capture technologies positioned as a complementary second.

Specifically, the District recommends considering the following grouping structure:

- Protection and Restoration of Natural Systems – including blue carbon, mCDR, and other nature-based solutions that protect existing ecosystems, restore degraded habitats, and implement attenuation activities that enhance long-term carbon sequestration.
- Engineered and Technological Solutions – including carbon capture from large emitters, direct air capture, bioenergy with carbon capture and storage, and utilization pathways.

This structure highlights California's commitment to maximizing the potential of natural climate solutions while advancing innovation in engineered carbon management.

12. Are there examples of existing regulatory monitoring efforts being conducted in other sectors/sources that may be instructive for SB 905?

The District and U.S. Navy have jointly monitored the extent and health of seagrass (*Zostera sp.*) in San Diego Bay approximately every three years since the 1990s. In 2021, the District began assessing the carbon sequestration and storage potential of the Bay's seagrass beds, evaluation of the bicarbonate pathway, and development of a carbon budget, which was completed in summer 2025. These monitoring reports and studies are available on the District's website: <https://www.portofsandiego.org/environment/environmental-conservation/monitoring-reports>

24. Is there a potential role for carbon removal using climate-smart agriculture practices under the SB 905 framework?

Climate-smart agriculture practices can play a key role in decarbonizing the farming sector and, according to the USDA's 2024 Strategic Plan for Aquaculture Economic Development, aquaculture development exists at "the intersection of climate-smart food production, public-private partnerships, blue economy, community resilience and health, workforce development, working waterfronts, urban and rural development, and seafood supply chains." Moreover, shellfish and seaweed aquaculture should be considered under the CCRUS framework, as these organisms sequester carbon while delivering vital ecosystem services such as water filtration, shoreline protection, and biodiversity enhancement.



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25. Are there certain carbon capture, removal, utilization, and storage project type methodologies that should be prioritized based on existing science, existing methodologies, or implementation experience?

Alongside other carbon capture systems, natural sequestration methodologies should be prioritized due to the availability of several well-established approaches and the lengthy timeline of development and monitoring. However, the variety of methodologies can pose a barrier to certification and credit sales, as baseline studies must remain consistent with the chosen methodology throughout the project's duration. Developing a standardized methodology is therefore a critical first step. The District's carbon storage and sequestration assessment of San Diego Bay's seagrass beds utilized Verra's VM0033 methodology, which focuses on tidal wetlands and seagrass ecosystems. The District recommends the usage of this methodology as well as other nature-based sequestration methodologies.

26. Should CARB consider adopting project type specific protocols or defining more widely applicable standards, or a combination of both? If CARB were to define key standards applicable to all methodologies as opposed to individual methodologies based on specific technology or storage, what could those look like (i.e. recommendations on existing standards), and would that approach help to scale and innovate in this space faster than development of individual protocols?

The District recommends considering the tradeoffs associated with adopting project type specific protocols. If project specific protocols are adopted, they may build trust in the integrity of each project and any credits generated. However, there is a possibility that developing these project-specific protocols could constrict the development of projects by creating a rigid compliance regime that draws out the timeline of these projects, reduces the potential for multi-use projects and potential co-benefits, and ultimately can make these projects cost prohibitive. The District recommends CARB thoroughly review the lifecycle of these projects and look to remove potential bottle necks and compliance cost drivers while still maintaining transparency and accountability.

Thank you for the opportunity to provide feedback. Please let us know if you would like to discuss any of our comments in more detail.

Sincerely,

A handwritten signature in black ink that reads "Heather Carroll".

Heather Carroll
Director, Environmental Conservation



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