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Committee Secretary
Standing Committee on Agriculture and Water Resources
PO Box 6021
Parliament House
Canberra ACT 2600

Dear Committee Secretary,

Thank you for the opportunity to contribute to the parliamentary inquiry into Australia's aquaculture sector.

The Nature Conservancy is one of the world's largest conservation organisations, working around the world to conserve the lands and waters on which all life depends. Founded in 1951, we work in 70 countries across 6 continents. Since establishing a program in Australia in 2002, The Nature Conservancy has collaborated with farmers, fishers, governments, Indigenous groups, corporations and local communities to balance the needs of people and nature to support some of the most pressing conservation issues across the country. This includes contributing to achieving many of our international obligations, from restoring endangered ecosystems, building the protected area estate and using natural solutions to tackle climate change.

Through our Oceans Program in Australia, we're working to repair critical coastal habitats and develop sustainable aquaculture methods that benefit both people and nature. Our work is strongly guided by evidence-based decision-making underpinned by empirical research, information to guide policy, and collaborative industry partnerships.

Below we address the terms of reference of the inquiry:

- The nature and current status of the aquaculture sector;
- Opportunities and barriers to the expansion of the aquaculture sector including ability to access capital and investment;
- Opportunities to streamline and increase the effectiveness of the current regulatory frameworks that govern aquaculture activities in Australia; and,
- The ability for businesses to access and commercialise new innovations to expand aquaculture.

The Nature Conservancy is a global leader in developing solutions to sustainable aquaculture and we would welcome the opportunity to provide further information on our work to help guide the development of a more sustainable aquaculture sector in Australia.

Yours Sincerely

Chris Gillies
Oceans Program Director
The Nature Conservancy Australia

The nature and current status of the aquaculture sector

We encourage the committee to engage with Industry, state and territory Government authorities, and representatives of Indigenous communities to understand the nature and current status of the aquaculture sector in Australia.

Opportunities and barriers to the expansion of the aquaculture sector including ability to access capital and investment

Our global appetite for seafood is growing at unprecedented speed. With rapid expansion in the aquaculture sector and nearly 10 billion people expected to be living on our planet by 2050, we are at a critical inflection point. Providing enough food without jeopardizing the environment is one of the greatest challenges facing our planet – food production now accounts for nearly one quarter of global greenhouse gas emissions, and 70 and 80 percent of freshwater usage and habitat degradation respectively – and growth in aquaculture that harms the environment will only create a new set of problems.

As the largest marine fixed infrastructure sector, marine aquaculture has resulted in significant impacts on marine ecosystems in the coastal zone, the area most critical for biodiversity in our oceans. Specific impacts include:

- Habitat degradation
- Associated greenhouse gas emissions
- Release of waste and creation of water pollution
- Socio-economic challenges such as boom and bust market cycles, and a lack of security to disease and extreme weather events.

But when done in the right way and in the right places, aquaculture can be a highly sustainable source of food, helping to meet the needs of a growing global population, addressing inequalities in access to food and nutrition, and create economic opportunities and jobs. The current state of science demonstrates that, if done responsibly, aquaculture can be a resource-efficient food production system, requiring less feed, freshwater, land, and producing fewer GHG emissions per kilogram of production than other animal agriculture production systems. Additionally, new research led by TNC suggests certain types of aquaculture and aquaculture practices could also deliver environmental benefits, such as the provision of habitat for impacted fish species, which could foster the resilience of coastal ecosystems.

In our opinion the greatest potential for combining financial returns with improved environmental sustainability rests with developing aquaculture in several key areas:

1. bivalve and seaweed aquaculture systems;
2. offshore finfish aquaculture systems; and
3. in-land finfish recirculating aquaculture systems (RAS).

We believe Australia can become a global leader in sustainable aquaculture, if it directs investment and new policies toward strengthening the suitability of the industry through several targeted actions. These include:

- 1. Incentivise and reward businesses that incorporate the principles of *Restorative Aquaculture* into business as usual production systems.**

Restorative aquaculture is analogous to Regenerative Food Systems, Regenerative Agriculture, and Regenerative Aquaculture, meaning that whether on land or at sea- the food production system is designed to provide environmental benefits, thereby restoring habitat and protecting biodiversity. These benefits can be delivered alongside the production of food and with low or net zero GHG emissions.

All forms of aquaculture have the capacity to deliver Restorative Aquaculture and Australia's bivalve shellfish and

seaweed systems are amongst those with the highest global potential to deliver outcomes through this approach¹.

Ranching and seafloor aquaculture, such as the creation of new reefs in an aquaculture setting to grow shellfish and bivalves, and removal of overabundant species from the wild which are then farmed (particularly urchins) can help to address environmental problems by better enabling the recovery of ecosystem services while also providing habitat and supporting natural spawning of recreationally targeted fish species.

Aquaculture operators in Australia have shown considerable interest in the premise of restorative aquaculture and anecdotally validate the positive environmental outcomes that can be supported by their activities. Supporting industry to more deeply engage with this approach, and associated R&D and monitoring, is a key next step in the sustainable development of this sector.

TNC's collaborative global assessment of restorative aquaculture opportunity² provides data at the scale of ecoregions that could be the basis for further assessment and planning for the sustainable development of aquaculture in areas where growth is needed, such as northern Australia.

Increased access to international markets for aquaculture species that deliver the dual benefits of food and restorative outcomes could support operators in achieving greater economic value from their operations, and increase their resilience to economic, disease and environmental shocks through maintaining a more diverse production system. For example, greater investment and growth in native oysters species, harvesting and farming of native urchins from urchin barrens, greater seaweed production, would likely lead to improved environmental outcome for our coastal environments, such as through water quality and enhanced habitat at the same time as spreading production across various markets (i.e. farming of a range of oyster species) buffering operators from the risk of species specific diseases, such as Pacific Oyster Mortality Syndrome. The capacity for aquaculture to deliver environmental outcomes at a meaningful ecological scale is partially restricted by a lack of accessible markets and the ability of the sector to meet supply requirements.

Australia's aquaculture industry has a role to play in reducing Australia's greenhouse gas emissions, sequestering carbon and supporting climate adaptation throughout the supply chain. Providing incentives and additional income streams to support restorative aquaculture can help the industry meet net zero targets by 2050, whilst also aligning with the Commonwealth Government's recent declaration to the High Level Panel for a Sustainable Ocean Economy to establish a sustainable ocean economy plan for 100% of Australia's coastal zone by 2025³.

2. Support eNGOs and the finance sector to establish innovative financial mechanisms such as sustainable aquaculture investment funds, blue bonds and blended finance to advance investment in sustainable aquaculture.

The Nature Conservancy is a leader in impact investments that deliver water, food and energy security alongside landscape- and seascape-scale conservation, having mobilized more than US\$1.3 billion in impact capital globally since 2014. TNC is advancing the world's first conservation-focused aquaculture investment fund⁴. The Blue Revolution Fund will accelerate investment interest for business models that can improve the environmental performance of the sector, with a focus on restorative bivalves and seaweed, offshore aquaculture, and aquaculture in RAS as well as supporting new aquaculture technologies that can reduce environmental impacts. In doing so, it will use the investment made to demonstrate how sustainable aquaculture could be transformative at a global scale.

The capacity of impact investment to support sustainable or restorative aquaculture may be hindered by policies or

¹ Theuerkauf et al. 2019. A global spatial analysis reveals where marine aquaculture can benefit nature and people. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0222282>.

² Global restorative aquaculture spatial analysis interactive map; <https://sites.google.com/view/globalaquatest/home>

³ <https://oceanpanel.org/news/14-world-leaders-commit-100-percent-sustainable-ocean-management-solve-global-challenges>

⁴ O'Shea et al. 2019. *Towards a Blue Revolution: Catalyzing Private Investment in Sustainable Aquaculture Production Systems*. The Nature Conservancy and Encourage Capital, Arlington, Virginia, USA; <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/how-investors-can-turn-the-tide-on-aquaculture/>.

processes that view aquaculture solely as an environmental impact, to be managed, for example through risk assessment. Extensive research has determined that a policy perspective based solely on aquaculture as being extractive to the environment, together with other economic and social factors (including a 'not in my backyard' attitude), currently places a greater constraint on the development of this sector than biophysical parameters.

Government can partner with groups like TNC to strengthen private-sector investment in Australia's aquaculture sector, by supporting the development of new environmental standards and assessments that work in tandem with existing schemes such as the Aquaculture Stewardship Council, which are linked to private capital that is deployed under sustainability principles.

Opportunities to streamline and increase the effectiveness of the current regulatory frameworks that govern aquaculture activities in Australia

3. Develop spatial planning tools and undertake marine spatial planning to appropriately site new developments and negotiate use of congested marine and coastal regions.

Marine aquaculture occurs within and with common-pool areas and resources, which are prone to and at risk from overuse. Without sound regulation of the aquaculture sector it is unlikely we will completely address the negative ecological but also social externalities that can be associated with this industry.

A key governance solution involves creating spatial planning and siting tools; and continuing to update and strengthen these tools as new information and improved approaches become available. Where a farm is located is the first and most critical step to minimizing the environmental and social impacts of operations, greatly reducing the potential for pollution and impacts to critical habitat. Tools such as the Conservation Aquaculture Framework⁵ recently developed by industry, scientists and Indigenous representatives in the USA provides a clear and repeatable process for decision making that considers conservation goals and human needs together. This method could be adopted in Australia, and national, state and territory assessments made to reduce conflicts between users of the marine environment and establish shared, strategic priorities and locations for the use of aquaculture for restoration.

The ability for businesses to access and commercialise new innovations to expand aquaculture.

4. Strengthen collaboration amongst the emerging Conservation Aquaculture sub-sector and Commercial Aquaculture as a key opportunity to increase innovation, provide alternative income and address some of Australia's most pressing environmental problems.

Conservation aquaculture is an emerging sub-sector of aquaculture that focuses on utilizing aquaculture techniques in restoration and as tools for species rebuilding or habitat recovery. Areas for growth and mutual collaboration with commercial aquaculture include: cultivation of new species and bio-compounds, animal husbandry, disease and biosecurity management, genetic diversity and resilience to climate change, and greater investment in hatchery and nursery facilities.

Examples of existing partnerships include the Reef Resilience and Recovery Partnership⁶, coordinated by a consortium of partners located on the Great Barrier Reef and the Reef Builder Initiative⁷ coordinated by TNC. Both programs engage Australia's aquaculture industry to supply corals, oysters and other species to restore marine habitats at the landscape scale. The programs are supported by strong research and innovation themes that are developing new methods of cultivating and farming species, including the incorporation of design principles from precision agriculture to support automation and rapid scaling up of the production of corals and other species.

⁵ Ridlon et al. 2021. Conservation aquaculture as a tool for imperiled marine species: evaluation of opportunities and risks for Olympia oysters, *Ostrea lurida*. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0252810>.

⁶ <https://gbrrestoration.org/>

⁷ <https://www.natureaustralia.org.au/reefbuilder>

Investment into Conservation Aquaculture research and innovation has the potential to develop new businesses, commercial products and processes that support and enhance other sectors such carbon farming, biomedical and pharmaceutical, materials technology, veterinary science and biosecurity. These are in addition to producing genetically resilient species to restore our most threatened and critically endangered species and ecosystems.

Fostering the growth of a Conservation Aquaculture sub-sector will help to address our environmental challenges, while addressing constraints to industry activity, strengthening the productivity of the aquaculture sector, and advancing its sustainability. This sub-sector is already supported by private philanthropy and provides a pathway for blended finance and low-cost capital to enhance commercialisation of new species and solve common problems including disease management, genetics and production.

5. Support Indigenous Aquaculture through start-up business support, training, business arrangements, governance and identification of appropriate points of entry into the aquaculture sector.

Increased investment in the enabling conditions and business and governance support for new Indigenous Aquaculture enterprises would help accelerate growth of Indigenous-led aquaculture ventures. Indigenous aquaculture can provide a meaningful pathway to delivering on Australia's closing the gap targets in particular targets 8 (Strong economic participation and development of people and their communities) and 15 (People maintain a distinctive cultural, spiritual, physical and economic relationship with their lands and waters). Previous similar targeted investments in the Indigenous Ranger Programs and Indigenous Carbon Industry (i.e. savannah burning) have demonstrated successful pathways for Government-assisted establishment and growth of Indigenous-led enterprises.