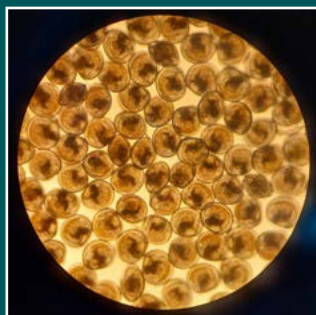




NSW Aquaculture Vision Statement

ROADMAP

Prepared by NSW Aquaculture Industry
and the Department of Primary
Industries and Regional Development

NSW Aquaculture Vision Statement

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2024 Aquaculture Vision Statement

To grow aquaculture farmgate production to \$300 million by 2030 for food security, bioproducts and climate change solutions.



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Why a vision statement

The NSW aquaculture industry is the most valuable seafood sector in NSW with unrealised potential for future development.

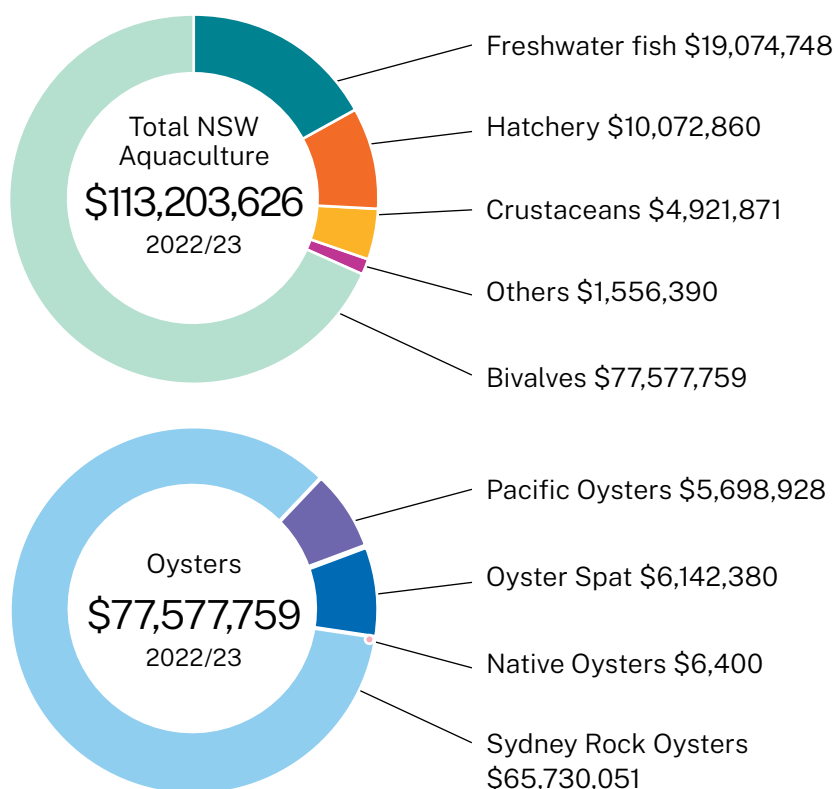
The Roadmap serves as a strategic framework for a collaborative effort between government and industry to implement targeted actions and achieve the vision of a \$300 million industry by 2030.

The NSW aquaculture industry has three sectors: estuarine, marine waters and land based. The Roadmap comprises 12 goals, under which initiatives will be mapped and tracked in stand-alone sector specific reports. Goals include a combination of funded and yet-to-be-funded projects, focusing on a 2025-2030 time frame.

“The Government is investing in research infrastructure and collaborative activities to drive industry growth, the sustainable development of our natural resources, and to support innovation so that industry can manage the risks and take advantage of opportunities in the coming decades.”

*The Hon. Tara Moriarty MP, Minister for Agriculture and Regional NSW,
Vision Statement Launch 2024*

2022/23 Production



In 2021/22,
NSW Aquaculture

Supported

2,321

full time equivalent total jobs



Contributed

\$145.1 m

in Total Household Income



Contributed

\$219.7 m

in Gross State Production



Remediated
a value of

\$5.6 m

nitrogen and phosphorus
through lease-based
aquaculture



12 Strategic Goals

1

Aquaculture Steering Committee

Whole of government approach to implementing the Roadmap



7

Streamlined administration

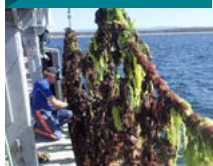
A modern online customer experience that is consistent with farmer expectations



2

Marine aquaculture investment

Marine waters aquaculture lease zoning and pre-approvals to increase investor confidence



8

Water quality

Address water quality impacts on shellfish harvest areas and increase direct harvest leases to 70% of the NSW Shellfish Program area



3

Closing the gap targets

Develop streamlined pathways to increase the number of Aboriginal participants in the aquaculture industry



9

Business security

Streamline aquatic biosecurity translocation protocols and legislation



4

Oyster industry risk management

Industry uptake of the Sydney Rock Oyster breeding program, establishment of emergency relay areas, and increasing shellfish harvest areas



10

Industry expansion

Diversify the industry and manage risk by supporting the aquaculture of a variety of species.



5

Environmental benefits

Undertake economic and environmental services research to determine the value and ecological benefits of NSW aquaculture



11

Social licence

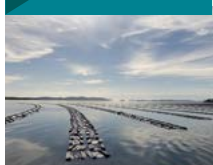
Promote aquaculture, increasing the communities' and industry's understanding of the economic, social and environmental benefits and risks of aquaculture.



6

Institutional investment

Improve investor certainty in the tenure of aquaculture leases and Crown Land oyster depots



12

Innovative research

Provide targeted research to support sustainable industry development, and address potential environmental impacts.



Key considerations and drivers

Policy and regulatory environment

As a primary production sector, the NSW aquaculture industry currently faces many challenges. This includes attracting institutional investment, aquatic diseases and pests, securing marine waters aquaculture leases, and climate change.

Legislative review is needed to align with evolving innovation and technology, social license targets, environmental changes particularly due to climate change, scientific advancements, and industry objectives.

Key to attracting institutional investment for example is the proposal to extend lease tenure from 15 to 30 years through an amendment to the *Fisheries Management Act 1994*, and to the State Environmental Planning Policy (Primary Production) 2021.

Human resources - vision extension manager

Many of the goals fall under the remit of government and could be progressed at an agency level. Funding could also be sought for an industry-appointed NSW Aquaculture Vision Manager who would support the execution and implementation of the Roadmap.

The Manager would be responsible for progress reporting to DPIRD, the Aquaculture Steering Committee and coordinating communications between industry and DPIRD.

In-kind industry support

- Ongoing water and shellfish meat monitoring in all NSW shellfish-producing estuaries/bays as an obligation of the NSW Shellfish Program
- Contribution to seagrass monitoring and research
- Participation in the Sydney Rock Oyster breeding program
- Coordination of the annual Tide to Tip clean up event administered by the Oyster Industry Extension Officer
- Continued research into Ecklonia farming on the south coast including involvement in research committees (for example the Blue Economy CRC)
- NSW Farmers Association channels and OceanWatch extension monthly newsletter, Facebook page and website and best practice training and innovation programs
- Contribution to the development of Murray Cod production health manual.





Workforce

The aquaculture industry attracts people from all backgrounds and provides opportunity for a variety of businesses including from small-scale startups, boutique operators, large-scale high-volume producers, vertically integrated companies, and publicly listed companies.

The BDO EconSearch 2023 study demonstrated that in 2021-2022, the NSW aquaculture industry employed 1,464 on-farm, and 858 downstream full time equivalent staff.

The aquaculture industry relies on well-trained staff for business growth. New workers often start in entry-level positions, making quality training crucial, especially in regional NSW. Beyond formal qualifications, the industry offers various training opportunities (hatchery skills, food safety, WHS, boat handling).

With NSW government funding, the NSW Farmers Association and OceanWatch launched the 2022 *NSW Responsible Oyster Farmer Training Program*,

which educates oyster farmers on best practices and reinforces their role as responsible waterway stewards.

The industry invests in modelling and mitigating poor water quality to extend harvest periods. Under the NSW Food Authority Shellfish Program, 71 commercial oyster harvest areas span over 30 estuaries. Eleven estuaries use real-time salinity data for harvest management, supported by extensive industry training on sensor installation, operation, maintenance, and calibration.

Thirty percent of hatchery permit holders are part of the *NSW Hatchery Quality Assurance Scheme (HQAS)*, accrediting fish hatcheries for producing native fish fingerlings like Murray Cod, Golden Perch, and Australian Bass for recreational fishing and aquaculture. With growing interest and improved technology, there's potential to extend HQAS to marine species and to other hatcheries that produce fingerlings for conservation stocking purposes. This requires ongoing training to meet accreditation standards.

Industry has identified a shortfall in training providers in regional areas to support aquaculture industry development.

The Vision Statement initiatives are designed to focus on and deliver outcomes for NSW. Some initiatives align with the Australian Government Aquaculture Statement 2024 priorities including:

Climate change

- Supporting investment in the Australian seaweed industry and scaling up of the production through Developing Australia's Seaweed Farming Grant Program
- Supporting the '*Alternate energy solutions for aquaculture: A Seafood Industry Australia and Blue Economy Cooperative Research Centre Collaboration project*' which will provide a wholistic decarbonisation platform as the aquaculture industry builds its climate resilience.

National approach

- Working in cooperation with state and territory governments and industry to implement the key actions under the National Fisheries Plan 2022-2030
- Reviewing the National Aquaculture Strategy 2017 including consideration of recognition of First Nations peoples and their communities, climate change mitigation and adaptation, and identifying new risks and opportunities.

Trade and markets

- Supporting the SafeFish program to address food safety for Australian Aquaculture.

Biosecurity

- Working with our aquaculture sector to protect it from diseases by leading collaborative implementation of Australia's National Strategic Plan for Aquatic Animal Health
- Protecting our aquaculture sector from introduced marine pests through collaborative implementation of the National Strategic Plan for Marine Pest Biosecurity
- Identifying and assessing biosecurity risks for aquatic animals and their products through import risk analyses
- Developing, implementing, and monitoring effective biosecurity measures to manage aquatic animal biosecurity risks and marine pests, to a level which achieves Australia's appropriate level of protection



Consultation



The NSW Shellfish Committee recommended that it collaborate with the NSW Aquaculture Research Advisory Committee (ARAC) and DPIRD to jointly create a Vision Statement for the NSW industry to identify key initiatives for future industry growth.

The NSW Farmers Association Oyster Committee also supported the Vision Statement and government–industry approach to its delivery via ‘a roadmap’ in a letter to the Minister in September 2024.

The support and involvement of key industry stakeholders will be essential to the implementation, including:

- NSW Shellfish Committee
- NSW Aquaculture Research Advisory Committee
- NSW Farmers’ Association Oyster Committee
- Aqua Association Inc
- Freshwater Native Fish Association
- Australian Prawn Farmers’ Association
- Australian Barramundi Farmers’ Association.



Additionally, a reinstated Aquaculture Steering Committee will provide a whole of government focus for the implementation of the Roadmap with representatives from:

- The Premier’s Department
- NSW DPIRD Fisheries (including Aboriginal Fisheries and Marine Conservation representation)
- NSW DPIRD Biosecurity & Food Authority
- NSW Department of Housing, Industry and Environment
- Division of Mining Exploration and Geosciences
- Transport for NSW
- NSW Environment Protection Authority
- NSW Crown Lands
- Office of Local Government
- NSW Department of Climate Change, Energy, the Environment and Water.

Industry overview

2030 Target

A recent BDO EconSearch report on the economic contribution of aquaculture to NSW identified that aquaculture contributed \$425.2 million in total economic contribution to the NSW economy in 2021/2022 based on \$102 million in farm gate value.

Extrapolating this total economic contribution figure against the farm gate value results in a multiplier of 4.17. A summary of predicted values is provided in Table 1 and articulated in following pages. These figures will be tracked over time as annual production data and updated economic reports become available.

Industry	Current Value (2022/23)	2030 Production Target	Projected 2030 production if no change	2030 Direct Economic Contribution*	2030 Total Economic Contribution [#]
 Oysters (mature)	\$71 million	\$162 million	\$116 million	\$279 million	\$676 million
 Oyster Spat ⁺	\$6 million	\$13 million	\$10 million	\$22 million	\$54 million
 Mussels	Not available	\$20 million	\$5 million	\$35 million	\$83 million
 Seaweed	Not available	\$25 million	\$5 million	\$43 million	\$104 million
 Land Based [^]	\$33 million	\$80 million	\$69 million	\$86 million	\$209 million
Total	\$110 million	\$300 million	\$209 million	\$465 million	\$1.126 billion

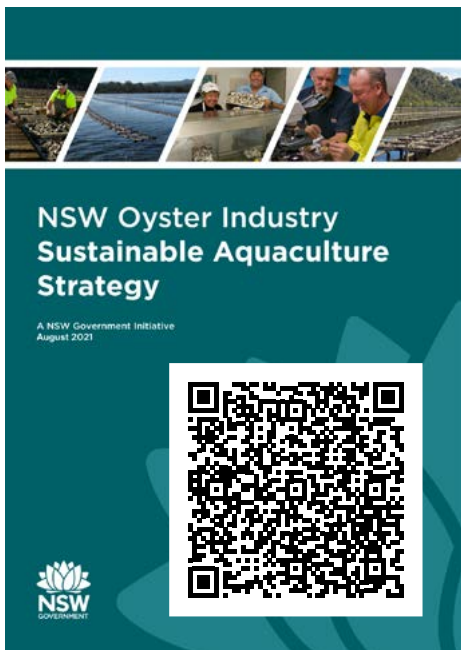
* Assuming a 1.72 multiplier based on the BDO EconSearch 2023 economic report

[#] Assuming a 4.17 multiplier based on the BDO EconSearch 2023 economic report

⁺ Including hatchery and wild-caught spat

[^] Including finfish and crustacean hatchery production

Estuarine 2030 target



The NSW oyster industry has demonstrated rapid economic growth with an annual farm-gate growth rate of 8.9% between 2013/14 and 2022/23. While there are 3,100 hectares leased, there are approximately 400 hectares currently unleased and available. The NSW Oyster Industry Sustainable Aquaculture Strategy (OISAS) estimates a sustainable production level of ~7,500 tonnes of oysters by 2030 utilising the currently available lease area. This equates to ~12.5 million dozen which would be worth ~ \$162 million p.a. based on the 2022/23 average farm gate price for Sydney Rock and triploid Pacific Oysters. This would equate to a 120% increase in the value of the NSW oyster edible industry.

If the productivity of current oyster leases is fully realised by 2030, this could result in \$279 million direct and \$676 million total contribution from oysters, and \$22 million direct and \$54 million total contribution from oyster spat.



These values are conservative estimates, as they may increase with improved genetic outcomes from the Sydney Rock and Pacific Oyster breeding programs, and an increase in the number of hatcheries supplying spat.

The Sydney Rock Oyster breeding program focuses on disease resistance, growth, meat condition, and climate change adaptation. Industry is also looking into alternative bivalve species as a risk management strategy, and alternative technology such as wet storage to improve continuity of supply.

OISAS was implemented as an Aquaculture Industry Development Plan in 2006 and has had three revisions since. It details a whole of government approach to industry best practice and sustainable development. It takes effect under the State Environmental Planning Policy (Primary Production) 2021. OISAS will play a crucial role in implementing Roadmap initiatives for the Vision target.

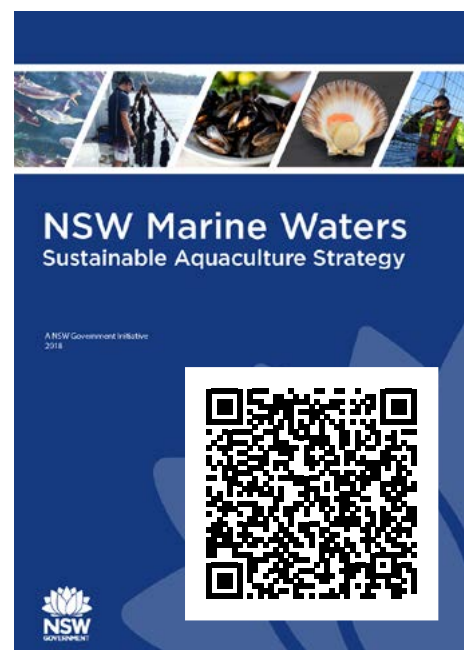
Marine waters 2030 target

Mussels

With appropriate enabling policy and operating environment there is a high likelihood of mussel farming becoming a mature industry in NSW. Mussel farming is one of the most sustainable food production industries in the world. In addition to edible product, mussel bioproducts including shell and meat meal is also becoming a reality for high-end markets in pet food and nutraceuticals. Assuming mussel farming in NSW will expand into new areas and capitalise on high end markets, the industry could be worth equivalent to 5% of the New Zealand mussel industry. This may result in a potential value of \$20 million p.a. by 2030 and a flow-on economic contribution of ~\$83 million p.a.

Seaweed

Seaweed farming is an emerging industry with substantial potential, though it remains in the early stages of development. According to the NSW Seaweed Prospectus, the potential value of the state's seaweed industry is estimated between A\$900 million and A\$2.3 billion. This projection reflects NSW capturing approximately 6–14% of the forecast global market for seaweed-derived products and utilising around 1,800 hectares of potential land-based sites and 1,000 hectares of marine areas. The Prospectus focuses exclusively on macroalgae, yet microalgae cultivation in land-based ponds is also emerging as a complementary industry in NSW. A new facility on the state's north coast, which opened in July 2024, currently operates eight ponds and employs five full-time staff. For this roadmap, a conservative estimate of A\$25 million has been included for algae production in NSW, with the potential to generate a direct economic contribution of A\$43 million and a total contribution of A\$104 million by 2030.



The NSW Marine Waters Sustainable Aquaculture Strategy (MWSAS) was implemented in 2018 to support the development of the marine waters sector, including mussels and seaweed. MWSAS will play a crucial role in implementing Roadmap initiatives for the Vision target.



Land based 2030 target



Land based aquaculture includes fish, hatcheries, and crustaceans. These sectors have been growing strongly in recent years on the back of native fish and trout production. In particular, pen-reared Murray Cod production in irrigation storages is growing. Despite the impacts of white spot disease on prawn production, total land-based aquaculture production is predicted to continue to grow. Government funded programs are in place to aid the recovery of the prawn sector, and drive investment opportunity for alternative species using the prawn pond infrastructure.

A conservative projected increase of A\$15 million, bringing total farm-gate production to A\$50 million by 2030, could generate an estimated A\$86 million in direct economic contribution and a total contribution of A\$209 million from land-based production by 2030.

The NSW Land Based Sustainable Aquaculture Strategy (LBSAS) was implemented in 2009 to support pond, tank, raceway aquaculture, hatcheries and fishout operations. It has undergone one revision. LBSAS will play a crucial role in implementing the Roadmap initiatives for the Vision target.



STRATEGIC GOAL 1 SUMMARY

NSW Aquaculture Steering Committee

Goal 1 is a whole of government approach to implementing the Roadmap.



The Aquaculture Steering Committee was a high-level decision-making group that coordinates and aligns agency activity.

It was established to identify constraints to aquaculture industry development in NSW and encourage a whole of government approach to overcoming these constraints and promoting and developing aquaculture.

The Vision Statement will reinstate the Aquaculture Steering Committee, in line with a revised Terms of Reference and a new Chair.

The NSW Aquaculture Steering Committee aims to promote viable and sustainable aquaculture development in NSW and streamline approvals processes.

The committee will:

- Coordinate a multi-agency revision and continued implementation of Aquaculture Industry Development Plans under section 143 of the *Fisheries Management Act 1994* to inform constructive policy and industry best practices.
- Identify and resolve impediments to aquaculture development and investment in NSW including workforce training.
- Support ecologically sustainable aquaculture development.
- Provide a forum to resolve or progress issues raised at relevant consultative committees.
- Coordinate actions with the Commonwealth by contributing to national aquaculture priorities.
- Provide oversight to implement the 2024 NSW Aquaculture Vision Statement Roadmap.

STRATEGIC GOAL 2 SUMMARY

Marine aquaculture investment

Goal 2 aims to zone NSW marine waters aquaculture leases and increase investor confidence.



Marine waters areas (to 3 nautical miles, excluding estuaries) are underutilised in terms of aquaculture. The marine environment provides opportunity for sustainable seafood and bioproduct cultivation.

The *NSW Marine Waters Aquaculture Sustainable Aquaculture Strategy 2018* established mandatory criteria for consideration of areas that are potentially suitable for aquaculture, for instance, outside of areas identified for conservation and navigation channels. These criteria would inform agency and stakeholder consultation to enable informed on ground aquaculture zoning surveys that also meet stringent seafood safety standards.

The establishment of aquaculture zones by DPIRD would increase investor confidence by streamlining the approvals process. This would be consistent with all other Australian states.

This would be achieved by a marine waters zoning project to identify suitable aquaculture lease areas, undertake stakeholder consultation, prepare State Significant Infrastructure (SSI) applications and if approved, tender lease areas. Akin to Priority Oyster Aquaculture Areas that zone for oyster aquaculture within estuaries, marine waters zones would significantly reduce investor risk. The success of previous DPIRD applications for marine waters leases in Port Stephens and Jervis Bay has proven to fast-track sustainable industry development.

In order to progress this, DPIRD is seeking the funding to resource this project through the Regional Development Strategy, and linking with the Marine Estate Management Strategy Blue Economy Working Group.

DPIRD will also coordinate a Seaweed and Algae Group, informed by the Seaweed Prospectus 2024.

STRATEGIC GOAL 3 SUMMARY

Closing the gap targets

Goal 3 aims to increase the number of Aboriginal owned and operated businesses.

There is a long history of Aboriginal involvement in the NSW aquaculture industry. Key to this goal is identifying and opening new pathways while building capacity through training and support to help individuals and communities to grow.

This goal will consider Aboriginal business development, while also considering Aboriginal cultural activities, access to cultural areas and cultural fishing activities, potential impacts on cultural sites, and Native Title matters.

The Roadmap is a significant opportunity to meet the *Closing the Gap* outcomes and targets for 2031, particularly:

- **Outcome 8:** Strong economic participation and development of people and their communities (By 2031, increase the proportion of Aboriginal and Torres Strait Islander people aged 25-64 who are employed to 62 per cent), and
- **Outcome 15:** People maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters (15b: By 2030, a 15 % increase in areas covered by Aboriginal and Torres Strait Islander people's legal rights or interests in the land and the sea).

In order to achieve this, it is essential that NSW Government deliver services in partnership with Aboriginal and Torres Strait Islander organisations, communities and people, increase accountability through transparent funding allocations and improve engagement with Aboriginal and Torres Strait Islander people.

DPIRD is identifying and supporting growth opportunities for broader Aboriginal involvement in aquaculture through:

- The Aboriginal Fishing Trust Fund
- Initiative 4 of the Marine Estate Management Strategy-*Supporting Protecting the Aboriginal cultural values of the marine estate.*



STRATEGIC GOAL 4 SUMMARY

Oyster industry risk management

Goal 4 aims to increase industry uptake of the Sydney Rock Oyster breeding program, establishment of emergency relay areas, and increasing shellfish harvest area.

The oyster industry is at risk of emerging and known aquatic diseases, including QX Disease, Winter Mortality Disease and Pacific Oyster Mortality Syndrome.

The oyster industry also faces an increasing frequency and intensity of climate change related natural disasters including floods, storms and food safety related events. Industry faced an estimated \$18.7 million in damages and losses following the devastating flooding and storm events of 2022.

Key tasks to achieve this goal include:

- Adoption of the Sydney Rock Oyster breeding program led by the Aquaculture Research branch at Port Stephens Fisheries Institute, and continued support for industry uptake of the breeding program. DPIRD will continue to provide access to breeding program stock for commercial use and engage with industry and hatcheries both in NSW and interstate.
- The establishment of emergency relay lease areas for use during natural disaster events. NSW Farmers and NSW DPIRD have undertaken preliminary work in Wonboyn Lake and the Hawkesbury River to explore potential sites and approval pathways in preparation for future events.
- Focus on disaster preparedness based on existing documented learnings of growers, and improved monitoring and alert systems.
- NSW Farmers have also engaged Deloitte Access Economics to look at the merits of different financial support arrangements to support growers through disease events not covered by state / commonwealth disaster legislation.
- Upgrades to the Port Stephens Fisheries Institute to support the Sydney Rock Oyster breeding program, with funding announced by the Minister in September 2024.

All commercial oysters and mussels produced in NSW are harvested in accordance with the NSW Shellfish Program, established by the Food Regulation 2015 under the Seafood Food Safety Scheme.

The Food Authority specifies harvest areas in estuaries for growing commercial quantities of shellfish. Each harvest area is classified based on food safety and local environmental risk factors, which determine the approval level of the area.

Classification and approval level is periodically reviewed. The Food Authority also specifies environmental conditions under which a harvest area can be open for commercial shellfish harvesting in harvest area management plans. This approach aligns with international best practice for the safe harvest of shellfish.

Increasing shellfish harvest areas can be achieved by:

- Reassessing areas from provisionally open/restricted to direct harvest areas
- Identifying and establishing new Priority Oyster Aquaculture Area in current direct harvest areas



STRATEGIC GOAL 5 SUMMARY

Environmental benefits

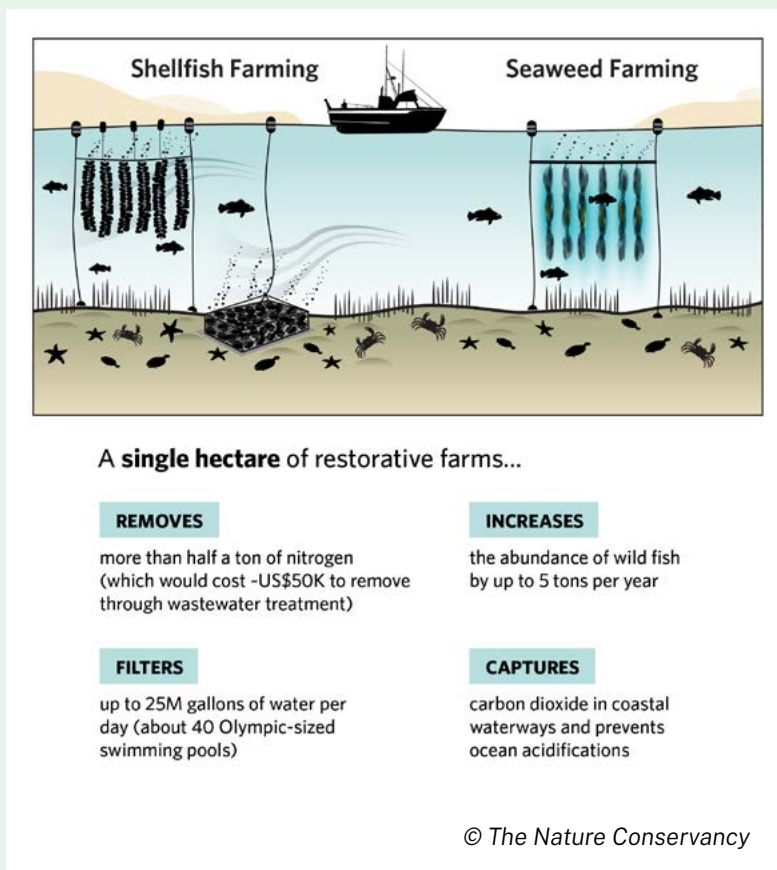
Goal 5 aims to undertake economic and environmental services research to demonstrate and quantify the value and ecological benefits of NSW aquaculture.

The reason for this goal is to demonstrate the extent of the value of the industry to NSW and inform policy.

Extensive aquaculture, defined as aquaculture systems that do not require external feed input, such as bivalve and algae cultivation, provides multiple environmental and ecological benefits. These include habitat provision, improvement of water quality through filter feeding, and nutrient remediation in areas where positive environmental outcomes are desired.

Oyster, mussel and seaweed aquaculture have one of the lowest greenhouse gas emissions per 100g of protein produced.

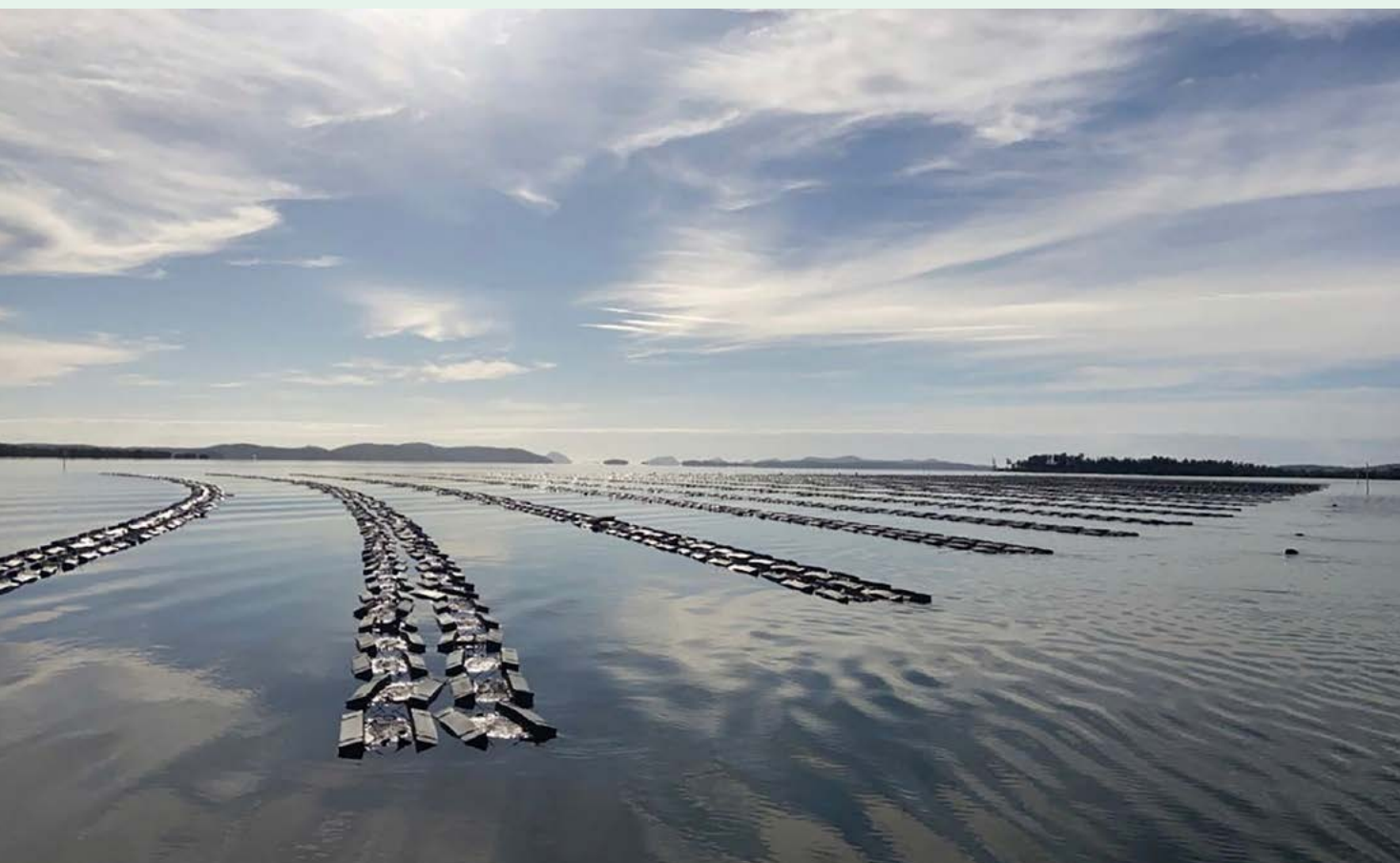
At a rate of approximately 2.8 kg of nitrogen and phosphorus removed per tonne of shellfish harvested, the total value of nutrient removal services by oyster and mussel aquaculture in NSW in 2021/22 was estimated to be \$5.6 million (BDO 2023). Research projects have been applied for to investigate ecosystem services provided by oyster and mussel aquaculture in NSW including water quality improvement, nutrient removal and habitat.



STRATEGIC GOAL 6 SUMMARY

Institutional investment

Goal 6 aims to improve investor certainty in the tenure of aquaculture leases and Crown Land oyster depots.



An aquaculture lease tenure is currently 15 years under Division 3 of the *Fisheries Management Act 1994*. This length of tenure does not provide enough investor certainty and makes it difficult for businesses to refinance or receive bank loans for their leases.

Extension of tenure to a fixed 30 years will also contribute to the industry's capacity to contribute to longer-term environmental protection and offset initiatives.

In December 2022, planning reforms were introduced to help agricultural landowners add value to their existing agricultural operations and encourage sustainable agri-tourism.

Planning reforms for oyster land bases would provide similar investor certainty for business diversification to include framework and guidelines around shed door sales, on land, and on-water tourism experiences.

This initiative will also investigate the long term tenure of the Woollooware Bay aquaculture land base precinct in the Georges River. This is the birthplace of oyster aquaculture in NSW and has a significant role to play in the Sydney Rock Oyster and Pacific Oyster breeding programs. Located adjacent to the Towra Point Aquatic Reserve and Ramsar Wetland, this site has historical, cultural and economic significance.

STRATEGIC GOAL 7 SUMMARY

Streamline administration

Goal 7 aims to provide a modern, on-line customer experience that is consistent with farmer expectations

Key tasks to achieve this goal include:

- Full customer access to online lease and permit management.
- Improved administrative efficiency to keep pace with an increasing administrative transaction rate and a growing industry.
- Interoperability with other DPIRD business units' systems, which will achieve valuable cost and time saving efficiencies for both the department and the aquaculture industry. This will also enable improved data sharing processes, resulting in a more collaborative and efficient approach to natural disaster responses, minimisation of biosecurity risks and safe seafood delivery.

Aquaculture administration manages the day-to-day essential transactions of approximately 390 permit holders.

The first phase of the development of an e-business online platform within the FishOnline system was completed in 2021 which modernised the previous aquaculture database to an online system. AquaAssist was developed to enable the internal administration processes, and AquaDirect was developed for external customers (aquaculture businesses).

Phase two of development is essential to enable the AquaAssist and AquaDirect systems to facilitate online transactions that are interoperable with other departmental systems. The changes will also enable tailored and comprehensive online transactions to significantly reduce time spent by aquaculture businesses at the user interface, and for DPIRD during processing.



STRATEGIC GOAL 8 SUMMARY

Water quality

Goal 8 aims to address water quality impacts on shellfish harvest areas and increase direct harvest leases to 70% of NSW Shellfish Program area

The oyster industry is at the frontline of water pollution impacts, with oysters being referred to as the “canary of the estuary”. The decline in their health presents an early warning sign of river health problems (Healthy Rivers Commission, 2003).

Due to farming activities and obligations under the NSW Food Authority Shellfish Program, oyster farmers are often the first to notice the impacts of water pollution and take action to mitigate these impacts where they can.

The NSW oyster industry loses millions of dollars each year due to poor water quality caused by agricultural chemicals, sewage spills, illegal discharge of sewage, diffuse pollution from catchment development, impacts from stock in riparian vegetation, floodplain management (floodgates), acid sulfate soil exposure and black water events, and compounding effects of climate change such as increased rainfall. A day's closure can cost up to \$100,000 for a farmer. Sewage spills, whether caused by rainfall or dry spills caused by system overload, close an estuary for a minimum of 21 days.

Key tasks to achieve this goal include:

- Working with MEMS Initiative 1 on water quality protection.
- Improved interaction with EPA for data sharing 30+ years of water quality data from NSW estuaries.
- Prosecution pathways for destruction of marine vegetation by stock in riparian vegetation.
- Increased water quality monitoring in conditionally approved and restricted harvest zones through the NSW Shellfish Program to change classification to allow harvest.
- Working with the seafood industry to raise the profile of water quality issues to facilitate a co-ordinated approach to water quality protection.
- Working with councils to act on industry-detected water quality pollution events.



STRATEGIC GOAL 9 SUMMARY

Business security

Goal 9 aims to streamline interstate biosecurity translocation protocols.

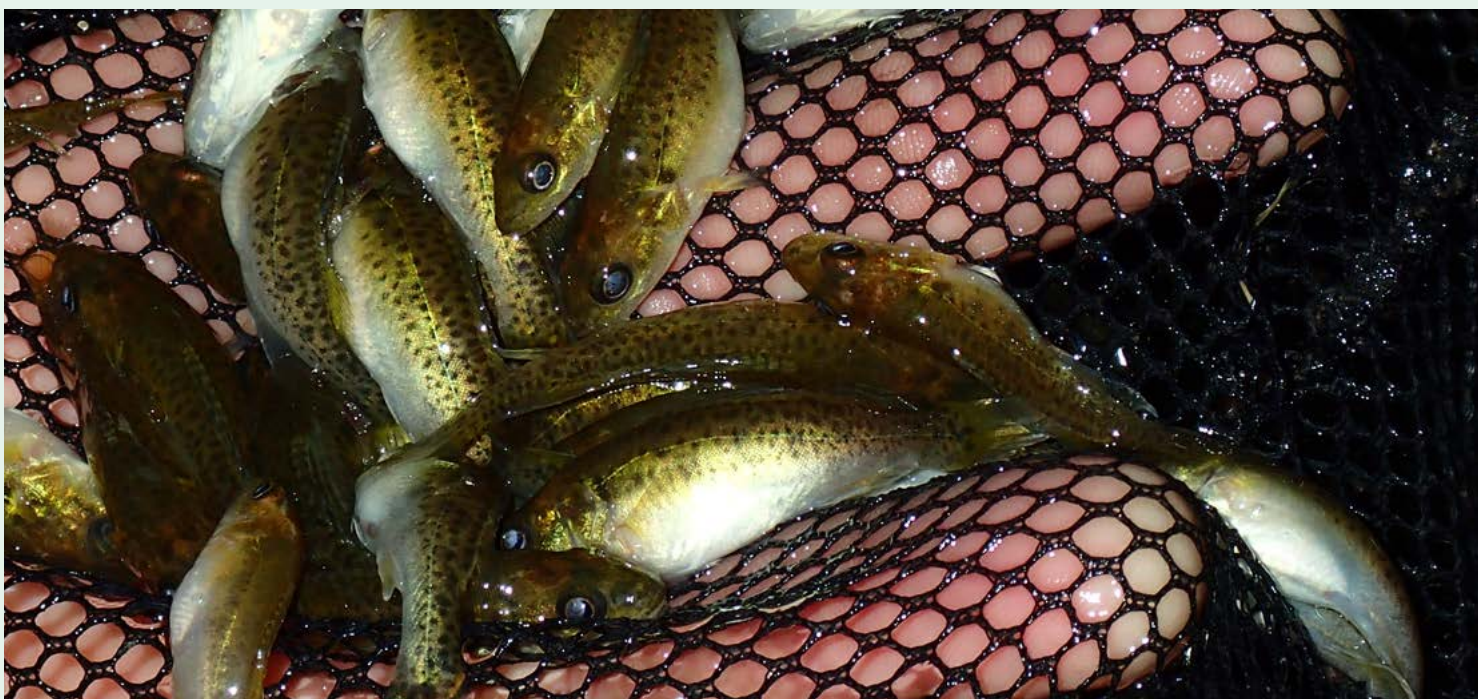
There is an increasing demand within NSW for bivalve spat, broodstock, and fingerlings from hatcheries and aquaculture suppliers to support the growth of the industry. This demand is also often met from hatcheries in other states. There is an increasing need to improve resilience and ability to forecast and respond to biosecurity threats as they arise.

Known oyster diseases such as QX, Winter Mortality and Pacific Oyster Mortality Syndrome have had significant impacts upon affected areas despite farmers best efforts to maintain healthy, high-quality stock, even the most experienced growers are vulnerable to losses in the dynamic and often unpredictable marine environment. It's not uncommon for oyster farmers to cite a 30% mortality rate across the production cycle, a broadly accepted norm that underscores the persistent risks facing oyster health.

An Aquatic Biosecurity translocation review project is underway to improve the protection of the NSW aquatic environment and aquaculture through a risk-based approach.

The threat of emerging diseases must also be managed through appropriate risk-based biosecurity behaviours and regulations to minimise the risk of other aquatic diseases being introduced to NSW through movement of imported and domestic aquatic products, animals, vessel movement and equipment movements.

Aquaculture permit holders are required to have a Biosecurity Risk Management Plan. This is to ensure that the farmer has adequate understanding of risks, including emerging risks associated with the cultivation of aquaculture species including vectors for introduction of notifiable and non-notifiable diseases and pest species, and management strategies to reduce the risk and impacts of such introductions.



STRATEGIC GOAL 10 SUMMARY

Industry expansion

Goal 10 aims to diversify the industry and manage risk by supporting the aquaculture of a variety of species.

Estuarine aquaculture is currently exclusively oyster aquaculture growing only four edible oyster species (Sydney Rock Oyster, Pacific Oyster, Native Oyster and Akoya Oyster). With over 3,500 hectares of leases in 33 estuaries from Tweed River to Wonboyn Lake, there is opportunity for diversification and sustainable growth.

After the 2020 drought/fires/floods, species diversification was seen as a key risk management strategy. Following the detection of QX disease in Sydney Rock Oysters in Port Stephens in August 2021, the broader NSW oyster industry and NSW Shellfish Committee endorsed an approach to consider a statewide, rather than individual business process for the assessment of additional bivalve species for cultivation. This would allow oyster farmers to cultivate alternate species on their aquaculture leases, to manage the risk of natural disasters, disease events, environmental stressors, and access new markets.

Key tasks to achieve this goal include:

- Research into the hatchery production and cultivation of other bivalve species, such as clams and scallops, on oyster leases. This includes optimizing cultivation and assessing the feasibility of alternative bivalve species on and under oyster infrastructure, as well as determining if modifications to the infrastructure are necessary.
- Review of State Environmental Planning Policy (Primary Production) 2021 to streamline development consent for aquaculture species other than oysters.
- Finalise a Review of Environmental Factors to streamline the approval process for aquaculture of alternative bivalve species on oyster leases using existing oyster infrastructure and farming techniques.
- Continued support for growth of land based native freshwater fish industries including Murray Cod, Silver Perch and Barramundi. This work also involves consultation with local Councils and consent authorities for land base aquaculture.



STRATEGIC GOAL 11 SUMMARY

Social licence

Goal 11 aims to promote aquaculture, increasing the communities' and industry's understanding of the economic, social and environmental benefits and risks of aquaculture.

Aquaculture is an important industry to regional NSW. The BDO EconSearch 2023 report indicated that aquaculture is worth \$219.7 million gross state product, employs 2,321 FTE people and generates a household income of \$145.1 million per year. In addition to the economic benefits, aquaculture provides environmental services, with nitrogen and phosphorus removal by bivalve aquaculture valued at \$5.6 million.

Goal 5 sets out actions to be completed to better quantify the environmental and broader social benefits of aquaculture. Goal 11 is focused on promoting those benefits to increase the broader community high-level understanding on the importance and benefits of aquaculture.

- Under Goal 5, the benefits and impacts of oyster aquaculture on estuarine ecosystems under The Nature Conservancy's Restorative Aquaculture Framework will be assessed.
- The benefits and impacts of oyster aquaculture on seagrass will be investigated through an industry monitoring program.
- DPIRD Aquaculture continued funding support for the Oyster Industry Extension Officer.
- Aquaculture Festivals: This includes hosting events featuring local aquaculture products, oyster judging (Sydney Royal Aquaculture Competition, Bega Show) cooking demonstrations, and farm gate sales/trails.
- Input into the revised MEMS Threat and Risk Assessment via the Blue Economy Working Group 2025
- Open Farm Days: Invite the community to visit aquaculture facilities to see operations first hand and engage with producers
- Develop educational materials, such as brochures, newsletters, and digital content, to inform the community, which explain industry operations and address common concerns.
- Engage communities to scope key issues and inform targeted social licence strategies
- Promote and support the ongoing annual Tide to Tip estuary clean-up program



STRATEGIC GOAL 12 SUMMARY

Innovative research

Goal 12 aims to provide targeted research to support sustainable industry development and address potential environmental impacts.

Innovative research is a key priority for the Roadmap. The *NSW ARAC Research and Development Strategic Plan 2024 – 2029* establishes five key areas of focus for research in the aquaculture sector:

- 1. **Primary production:** to increase sustainable production and value of selected species
- 2. **Post-harvest and market development:** to increase demand and profitability for aquaculture products through the supply value chain
- 3. **Communities:** improve community knowledge of aquaculture and the natural resources it depends on
- 4. **People:** knowledge and skills of people in the industry are developed
- 5. **Adoption:** RD&E outputs are used to derive maximum benefit

There are synergies between this priority and research programs being undertaken in other goals.

- Oyster aquaculture and seagrass interactions, including potential environmental impacts of aquaculture (Goals 5 & 11)

- A project is underway at the Port Stephens Fisheries Institute investigating hatchery production capacity and feasibility for Sydney Cockle (*Anadara trapezia*) for cultivation on existing oyster leases (Goal 10)
- Research into the hatchery production and cultivation of other bivalve species such as clams and scallops on oyster leases (Goal 10)
- Marine Estate Management Strategy-funded research looking at the impacts (positive and negative) of oyster aquaculture on sediment and benthic environments (Goal 5)
- FRDC-funded research into strains of QX Disease (Goal 11)
- The value of environmental services provided by oyster and mussel aquaculture in NSW including water quality improvement, nutrient removal and habitat (Goal 5)
- Adoption of the Sydney Rock Oyster breeding program led by the Aquaculture Research branch at Port Stephens Fisheries Institute (Goal 4)
- Market analysis and marketing needs to address increased production volumes.
- Development of the Murray Cod production health manual (Goal 9)





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