A vision for the trout farming industry in the United Kingdom

British **Trout** Association

January 2025

Report Information

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AQUATIC RESOURCE MANAGEMENT

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FOREWORD

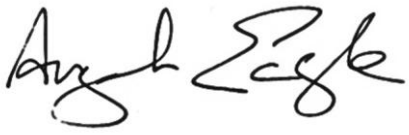
Minister of State Dame Angela Eagle

I welcome the British Trout Association's work in setting out its long-term thinking on the future of trout farming in the United Kingdom. Trout farming has been a valued part of our rural landscape for many decades, contributing to the diversity of the UK's food system and supporting employment across England, Scotland, Wales and Northern Ireland. The sector is recognised for its commitment to environmental stewardship, animal welfare and product quality, and continues to demonstrate the role that responsibly produced fish can play in supporting our food supply.

This vision is published at a time when food-producing sectors are navigating a range of significant pressures, from the impacts of climate change and global market volatility to the need to operate within increasingly sensitive natural environments. Against this backdrop, the sector's consideration of its future direction is both timely and welcome.

A central theme of the vision is the importance of innovation and the adoption of new approaches to support sustainable development over the long-term. Its emphasis on technology, improved resource efficiency, and collaborative working through research and partnerships reflects the sector's ambition to respond constructively to emerging challenges and opportunities. By highlighting the value of evidence and shared learning, the vision also underscores a commitment to collaborative approaches in addressing future risks and changing conditions.

I am grateful to the Association, its members and all those who contributed to the development of this vision. Their work adds to the broader discussion on the long-term direction of sustainable aquaculture in the UK, and I look forward to continuing engagement as the sector develops its ideas and contributes further to this important conversation.



DAME ANGELA EAGLE DBE MP

SUMMARY OF RECOMMENDATIONS FOR BTA AND ITS MEMBERS

Governance and regulation

1. Engagement with the new Labour-led UK government to highlight the current and potential **role of the trout farming industry** in growing healthy food production and to ensure it is explicitly included in future national food policy. This – and the role of aquaculture – should be embedded in high level policies and strategies.
2. Continued engagement with the regional development and environmental agencies across the UK to promote the inclusion of **sustainable trout farming in local planning, space and resource allocation**, including implementation of the Grigg Review recommendations in Scotland. This could cover the sometimes conflicting legislation e.g. the Habitat's Directive versus animal health.
3. To prioritise industry needs for **government support** – financial, technical or regulatory – in order to provide a systematic framework with which to engage the managing authorities. This could cover UK egg production, biosecurity, long-term research needs, funding application support, etc.
4. To work with Cefas and other aquaculture associations in the UK bodies to **develop annual surveys and the publication of production and socio-economic statistics** that are sufficiently granular to support aquaculture sector monitoring, evaluation and development planning.
5. To work with Seafish and the UK fisheries managing authorities to **reinstate the Aquaculture Leadership Group (ALG) and its meetings** to improve coordination and understanding across the sector and geopolitical boundaries.

Farm development and innovation

6. BTA to work with its members to lobby Defra and Cefas to develop a **UK trout broodstock strategy** that meets long-term production patterns and covers broodstock and hatchery development. This would be used to leverage government support in terms of both funding private sector hatchery capacity as well as supporting associated research.
7. Working with other aquaculture sectors (e.g. salmon, shellfish), develop a comprehensive, long-term, sustainability driven UK**-wide aquaculture research strategy and plan**. Demand-based, this would prioritise researchable constraints to sustainable sector growth and would put in place the means and partnerships to enable this. These partnerships might be regionally based e.g. with the University of Exeter in the SW England and University of Stirling in central Scotland.
8. Test and demonstrate **models for innovative trout aquaculture** e.g. partial recirculation or open pen containment to be developed, upscaled and replicated. For the former, experience in partial, lower cost recirculating systems from Poland could be explored and adapted to local conditions.

Fish health and welfare

9. The BTA should work with its membership to periodically review both the **changing biosecurity needs of the sector** as part of a wider holistic health management plan, and the capacity of veterinary network to address these. Where necessary, any geographical or thematic gaps should be predicted and mitigatory measures - and training - put in place.
10. As a principle the sector should continue to support **prophylactic vaccination** to reduce the need for later antimicrobial use. Fish health strategies need to be developed with VMD to allow the use of autogenous vaccines to combat known risks, working with the Fish Health Inspectorates and others to stay ahead of the ever-shifting pathogen threat. Pharmaceutical companies should be persuaded to develop affordable trout-specific vaccines to allow the sector to grow.
11. The BTA should **promote fish welfare** across the industry, helping in the development of codes of practice.

Environmental sustainability and social license

12. Work with the regulatory authorities e.g. EA, SEPA, etc. to agree long-term solutions that allow non-consumptive activities like trout farming to **maintain access to water** whilst contributing to maintaining the good environmental status of surface and ground waters on which the industry depends. In many cases this will require the **installation of partial recirculation** in flow-through systems, including In-pond Raceway Systems (IPRS).
13. BTA to develop specific **sustainability targets**, aligned with certifications and standards, and to create subsequent dialogue with the universities and feed companies.
14. Trout farmers to work with universities and the feed companies to **develop affordable, efficient and scalable diets based on alternative, low carbon, ethical and circular raw materials**.
15. The BTA needs to utilise product environmental footprint studies to identify **potential intervention points that can reduce carbon emissions** at both farm and sector levels. This can be part of a wider narrative on how the trout sector defines and reaches sustainability targets.
16. The BTA needs to continue to build the narrative of **trout as a sentinel species** being raised in clean, natural conditions as part of the local rural economy.
17. The BTA could provide **natural capital and socio-economic values** to farms areas and fisheries to demonstrate their contribution to the rural environment and economy.

Recreational fisheries

18. The BTA should work with angling interests to **better understand the implications of climate change for stocked still-water fisheries** and to develop a long term strategy in adapting to warming surface waters, extreme weather and declining water quality and availability.
19. The BTA should work with others to assess the **economic and non-monetary value of the trout-related recreational sector** across a spectrum of local economic development, societal mental health and wellbeing, and environmental stewardship areas. These should then be promoted to support the sustainable development and diversification of the trout sector.
20. The UK national and devolved governments should be encouraged to **support the full trout farming value chain to meet its commercial, socio-economic and environmental objectives** as provided for in the English Aquaculture Strategy. Increasingly recognised for their provision of nutritional benefits and economic value (Lynch *et al*, 2024), this should include ensuring that deserving investment projects have **access to public funding** and it is taxed in accordance with its contribution to the public good.

Supply chain, markets and associated infrastructure

21. The BTA should develop a **forward-looking strategy for the marketing of British trout.** This could consider 'trout' as a umbrella for a small number of distinct sub-brands (e.g. river-raised, sea-grown, wild ranched and increasingly RAS-produced), all with their own unique attributes. This strategy needs to establish the size, nature, pricing structure and growth potential of each 'sub-market', developing an associated narrative and branding approach that promotes trout in general as a relatively low volume, luxury item within these its distinct production segments.
22. Whilst the UK market has some capacity to expand, it is likely that **an increasing proportion of future production will need to be exported**. Whilst this includes post-Brexit Europe, probably the biggest potential lies in the higher-end markets in the Far East where trout is esteemed.
23. The BTA should work with processors, supermarkets and consumer groups to examine the appetite and **opportunities for new trout products** that recognise the small but diverse supply base and changing consumer tastes in order to add value to trout where possible.
24. The industry **adopts e-commerce approaches** in the farmed trout markets, both to consolidate existing sales as well as to develop new ones. The value chain will need to be supported through technical assistance, training and a coordinated approach to marketing.

Skills and career development

25. To work with government to **raise the profile of trout farming** in relevant policies and to promote it as a valuable contribution to the UK's food security and rural economy. The BTA will work with school career advisers to promote the different entry avenues available to school leavers, with a particular focus on practical, less academic but equally rewarding opportunities. One approach would be to develop a short video on the 'day in a life as a trout farmer' to highlight the enjoyment and other benefits in working in a beautiful environment, mixing an active, physical job in an increasingly technically challenging field of work.
26. To undertake a **forward-looking training needs analysis** (TNA) to identify the current and emerging skill needs and gaps as trout farming grows and adapts to a changing world. This can be used to develop existing and new school leaver and in job training and skills development approaches including vocational colleges, apprenticeship schemes and further education.

Acronyms used

ASC ..... Aquaculture Stewardship Council

BTA..... British Trout Association

Cefas ..... Centre for Environment, Fisheries and Aquaculture Science

CO_2 ..... Carbon dioxide

COVID-19... Corona Virus Disease 2019

Defra ..... Department for Environment, Food and Rural Affairs

EA..... Environment Agency

EAS..... English Aquaculture Strategy

EU..... European Union

FAO..... Food and Agriculture Organisation of the United Nations

FHI..... Fish Health Inspectorate

FTE..... Full Time Equivalent

GBP ..... Great British Pound

IMTA ..... Integrated Multi-Trophic Aquaculture

IPRS ..... In-pond Raceway Systems

mt..... Metric tonnes

NE..... Natural England

NGO..... Non-Governmental Organisation

PA..... Per Annum

RAS ..... Recirculating Aquaculture System

RTFS ..... Rainbow Trout Fry Syndrome

SAIC ..... Scottish Aquaculture Innovation Centre

Seafish..... Sea Fish Industry Authority

SME..... Small to Medium-Sized Enterprise

SWAN..... South West Aquaculture Network

UK..... United Kingdom

VMD..... Veterinary Medicines Directorate

1. Context

1.1 Introduction to trout

The trout is highly prized, both as a game fish as well as for its delicious taste. It is mainly found in the cool (10 – 16 °C) and clear rivers and lakes of North America, northern Asia and Europe. Trout have also been introduced into southern hemisphere locations as far afield as Patagonia, New Zealand and the Falkland Islands. Whilst mainly found in freshwater, a number of trout species are – like salmon – anadromous, which means they spend time at sea to feed before returning to their original rivers to spawn.

Reasonably easy to breed, transport and rear, trout have been cultured at a low level – often for restocking angling water – for many years. Commercial trout farming started in the 1950s and now over 1 million tonnes (t) of trout – 92% of which are the rainbow trout (*Oncorhynchus mykiss*) – are farmed worldwide. According to the Food and Agriculture Organisation (FAO) of the United Nations, the largest producers in 2022 were Iran (194,000 t), Türkiye (189,801 t), Norway (84,928 t) and Chile (73,315 t). Three-quarters of this is produced in freshwater with the rest in brackish or marine waters, especially in Norway, Chile and Türkiye[1]. According to the same FAO data, the UK is the world's sixth largest trout producer with around 13,470 t in 2022.

1.2 Trout farming in the United Kingdom

Although trout hatcheries in the UK have been used to re-stock rivers for many years, commercial trout farming for the table also started in the 1950s. Trout farming then rapidly expanded, initially in ponds dug parallel to rivers before newer methods such as tanks and raceways, as well as open water pens in both fresh and sea water that allowed both new sites and the intensification of production. The vast majority (98%) of production is the non-native rainbow trout with the balance mainly the native brown trout (*Salmo trutta*).

Of the *c.* 14,000 tonnes of trout produced from around 290 farms in the UK each year, around 80% is for the table. Scotland is the main producer (60%), followed by England (35%), Northern Ireland (4%) and Wales (1%). Scottish trout production is unique in that a significant proportion (38%) is raised in sea water, mainly in open water pens in sheltered sea lochs. Trout production of around 15,000 t has remained reasonably stable over the last decade or so (see figure overleaf). As prices have increased from £2.50 to around £4.80 a kilogram (kg) over the past ten years, the value of the dominant rainbow trout sub-sector has almost doubled from around £31 million in 2008 to £59 million in 2022.

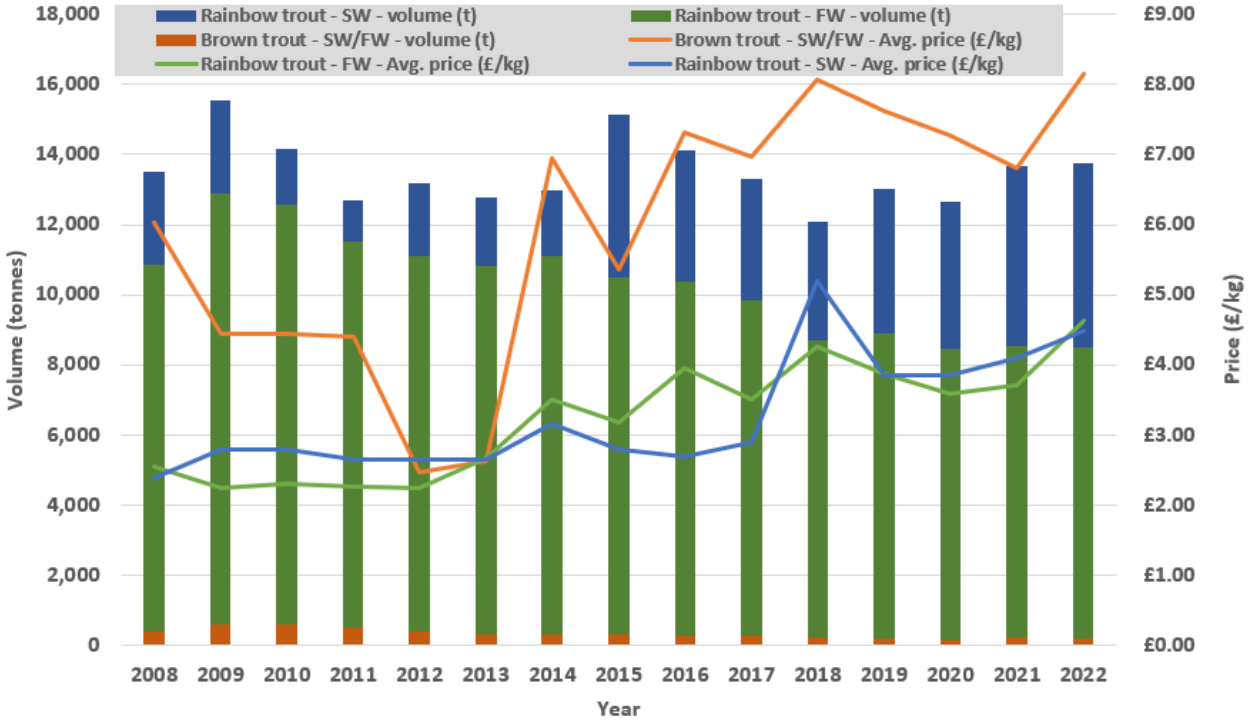
Compared to farmed salmon production, British trout has not shown any major changes in production volumes and has also avoided many of the perceived environmental issues affecting open pen farming at sea. It has gone through a steady evolution, becoming a more professional sector with a gradual integration of the value chain and a recent switch from smaller portion-size to larger fish. This said, the structure of the industry and its overall productivity is pretty much unchanged over the last decade.

Trout has become an increasingly popular fish to eat over recent years, regularly appearing on mainstream TV cooking shows such as 'Master Chef' and 'The Great British Menu' and is gaining favour with chefs around the UK who see it as a sustainable, healthy and good eating alternative to established species such as salmon, sea bass and other marine fish. Some endorsements from top British chefs include:

- **Cyrus Todiwala** (Café Spice Namaste): "*British farmed trout is probably the most sustainable fish farming today. So I am going to be cooking some and I am asking as many of you as I can to try this amazing farmed fish. I am a convert from one that didn't believe that trout would spice up so well*".
- **Tom Aikens** (Muse): "*Trout is a particular fish that's often gets overlooked. I actually prefer eating and cooking trout to salmon. Trout is a great sustainable fish to cook with, plus it's quick and easy to make any dish great*."

[1] Almost all of Norwegian and Chilean rainbow trout production is in the sea. About 24% of Turkish rainbow trout production is sea-grown.

Figure 1: Volumes and prices of UK farmed trout production (2008 - 2022)



Source: data from Cefas. Note this includes data for table production and angling but does not include production reported by number for on-growing and environmental restocking.

As with much of the UK's food production, trout farming faces a number of challenges, including competing for space and water with other users, the need to adapt to – and mitigate for – climate change, as well as a number of other economic and social issues that undermine commercial trout farming in the UK. These challenges – and the opportunities that accompany them - are explored further in **Section 1.4** overleaf

1.3 The policy environment

At the UK level, aquaculture is seen as a way to increase seafood production without putting pressure on wild food stocks (UK Government Food Strategy, 2022[2]). The recent UK Fisheries Act 2020[3] includes aquaculture within its remit and provides various objectives covering subjects such as the precautionary approach, ecosystems, scientific evidence and climate change. It also details a number of functions to the Devolved Authorities (DAs) of Scotland, Wales and Northern Ireland. However, the Fisheries Act is strongly focused on capture fisheries, with only limited attention to aquaculture, despite its greater prospect for growth.

In Scotland aquaculture is better recognised as having an important role in sustaining economic growth in rural and coastal communities. The 2017 Joint Ministerial Statement[4] seeks an industry that is "*sustainable, diverse, competitive, economically viable and which contributes to food security whilst minimising environmental impact*" and is an important element of Scotland's National Marine Plan. In 2016 Scotland Food & Drink produced their strategic plan for 'Aquaculture Growth to 2030' (Scottish Food & Drink 2016) and more recently in 2023 the Scottish Government published their 'Vision for Sustainable Aquaculture (Scottish Government, 2023) that sets out their long-term aspirations for the finfish, shellfish and seaweed farming sectors, and the wider aquaculture supply chain.

[2] See https://www.gov.uk/government/publications/government-food-strategy/government-food-strategy
[3] See https://www.legislation.gov.uk/ukpga/2020/22/pdfs/ukpga_20200022_en.pdf
[4] See https://www.gov.scot/publications/supporting-aquaculture-growth-and-protecting-scotlands-environment/

Policy direction for aquaculture elsewhere in the UK is less explicit. In England aquaculture policy is embedded to a certain extent within the regional marine plans. This provides a spatial planning element to aquaculture development but is only relevant to sea-grown trout which has never taken off in England to date. The English Aquaculture Strategy (EAS) 2021 – 2040 (Seafish, 2020) provides a comprehensive development pathway that includes the current freshwater trout sector and seeks to develop a small marine trout segment as well. In Wales the 2013 'Wales Marine and Fisheries Strategic Action Plan' (Welsh Government, 2013) includes sustainable aquaculture but provides very little detail beyond that. There is no specific policy for aquaculture development in Northern Ireland at present.

1.4 Challenges and opportunities for growing sustainable British trout production over the next decade

1.4.1 Challenges

The challenges for sustainable food production and security in Britain have never been greater. A combination of environmental issues, climate change, spatial squeeze, rising input costs and destabilising geopolitical events all need to be countered by forward-looking business planning that needs to be supported by strategic thinking and direction-setting.

Successful trout farming is dependent upon good *environmental conditions*. Key to this is the availability of sufficient volumes and quality of water that is currently threatened by over-abstraction and the pollution of water sources. It is important that these issues are addressed at watershed level and that trout farming does not contribute to the problem. *Climate change* is likely to have increasing and profound effects on our weather and water quality. A recent study suggested that in England river water temperature increases will result in a decrease in optimal growing temperature of rainbow trout, especially in the south east[5]. *Spatial squeeze* from both development and conservation needs – on land and in coastal waters – will also impact the availability of space and natural resources for aquaculture. Whilst not a major issue, *diseases* such as enteric red mouth disease (ERM), rainbow trout fry syndrome and puffy skin disease (PSD) can cause mortalities and blemishes that affect sales and farm profitability.

A series of geopolitical shocks – Brexit, COVID, the Ukraine war and a volatile Middle East – are all impacting on the costs associated with British trout farming. This includes the cost of feed, electricity and labour which when combined with a largely stable output price, means that margins and consequently businesses are under considerable financial pressure. Finally, the social license for salmonid aquaculture has never been lower. Much of this is down to the negative publicity surrounding the open pen farming of salmon in Scotland and elsewhere, it also reflects wider societal change and a move towards an inevitable move towards meat free diets.

1.4.2 Opportunities

Whilst the challenges described above are real, they also suggest that new opportunities for British trout farming are possible, contingent on innovative thinking, dynamic businesses and supportive governance. Trout farming has moved from its original production in earthen ponds to much more sophisticated raceway systems with increasing levels of control and recirculation. However, compared to salmon and other largely marine species, there is much more that can be done, especially as climate change and other factors affect our native waters. Substantial increases in production can be enabled through technical innovation that open up new growing opportunities and allows increased resilience to environmental change, but it will be important to maintain the current focus on fish welfare and quality. This could include new investment into recirculated aquaculture systems (RAS) – now a mainstay of Danish trout farming – although this must not sacrifice fish welfare and taste and will be dependent upon lower or subsidised energy costs. There is also an opportunity to move trout farming away from intensification and more towards nature-based solutions, such as incorporation into both terrestrial and marine farming operations through integrated multi-trophic aquaculture (IMTA). Although unlikely to be possible at a large scale, this could provide further diversification and enhance the social licence of trout farming.

[5] See https://ceresproject.eu/1-rainbow-trout/

Trout may not have the same mystical allure as its larger brethren the Atlantic salmon, but it is increasingly seen as a more sustainable alternative to consumers, mainly due to its smaller-scale and largely riverine production. Life cycle assessments show that both species have a low carbon footprint compared to ruminant animals (MacLeod *et al*, 2020) and the omega-3 rich trout is a nutritionist's recommendation compared to leaner chicken. With a recent decline in the UK's red meat consumption in favour of white meat (Stewart *et al*, 2021), there is an opportunity for fish – and in particular trout - to benefit from this move to lower carbon alternatives.

Trout farming has always been associated with an idyllic British countryside, whether this be an English chalk stream, a Welsh wild lake or a Scottish highland loch. Trout is now considered as an affordable yet luxurious dish at on a restaurant menu or as a kitchen stalwart at home. However, as highlighted by the BTA's #ShoutOutForBritishTrout campaign, trout accounts for less than 10% of fish consumption and many people have not tried trout.

1.5 Scope, timeline structure and purpose of this Vision

1.5.1 Scope

The **geographical scope** of this vision and accompanying roadmap is the United Kingdom of Great Britain, including England, Wales, Scotland and Northern Ireland.

The **main focus** of this vision is on the reproduction and rearing of trout for food and restocking. It covers all species of trout including the native brown trout (*Salmo trutta*) and the introduced rainbow trout (*Oncorhynchus mykiss*) and their sea-grown equivalents[6]. It is recognised there are other similar species, including Arctic char (*Salvelinus alpinus*), brook trout (*Salvelinus fontinalis*) and various hybrids e.g. the 'tiger trout' (*Salmo trutta* × *Salvelinus fontinalis*).

1.5.2 Timeline

This document provides a vision for British trout farming by 2040. This is in line with the aspirations in the English Aquaculture Strategy. It will be divided into the following three phases in order of priority:

- Short-term: over the next three years e.g. up to the end of 2028;
- Medium-term: over the next ten years, e.g. up to the end of 2035;
- Long-term: up to 2040.

1.5.3 Structure

Following the preamble in this first section, this document provides the following three elements:

- A '**Vision'** of how British trout farming might look like in 2040, together with some '**guiding principles'** on how it should develop.
- A series of seven '**Development areas'** that each have a *Development goal*, a summary of the *key issues to be addressed* and the *key activities that might be undertaken by BTA and its partners*.
    - Governance and regulation
    - Farm development and innovation
    - Fish health and welfare
    - Environmental sustainability and social license
    - Recreational fisheries
    - Supply chain, markets and associated infrastructure
    - Skills and career development
- A '**Roadmap'** that provides a graphical, time-bound pathway to the 2040 vision, including with key steps and milestones.

[6] The sea-grown equivalent of brown trout is the sea trout, and the rainbow is the steelhead trout

1.5.4 Purpose

This vision for British trout is aspirational and intended to imagine a point where trout farming might be in fifteen years' time and how we might get there. Whilst some of its ambitions may not be fully achievable, it will have served to stimulate discussion and may open some eyes on the 'size of the prize'.

This document is designed to allow the BTA to plan and prioritise their support to the industry in what are challenging times. This said, with a new, growth-focused government, it is also aimed at the UK's managing authorities, whose support and partnership is so essential.

2. Vision and Development Goals

2.1 Vision for British trout farming in 2040

By 2040, climate change will have resulted in huge changes to the world we live in, with major consequences for the UK's food security and the way it is produced. The UK joint and devolved governments now recognise the role and value of low carbon and sustainable aquaculture in high level policies and strategies, such as the UK Food Strategy. As a result, there is active political support for the growth of trout production, so long as it is sustainable and recognises the welfare needs of the animals involved. Likewise, consumers and their champions increasingly appreciate the position of trout as a healthy, green and ethical alternative to the 'big five' seafood species of salmon, cod, haddock, tuna & warm-water prawns.

The UK's production of trout for the table has therefore been allowed to double from the current level of 14,000 tonnes to around 30,000 tonnes. This increase is the result of considerable diversification in production methods. Traditional flow-through freshwater pond and tank systems have maintained their contribution, adapting to changing conditions by the use of the sophisticated environmental controls, including the widescale adoption of partial recirculation, oxygenation, water temperature regulation and *in situ* stress monitoring. However, the gradual scaling up and more reliable performance of RAS - which is likely to attract new entrants into the sector - means it now accounts for the majority of the UK's trout production capacity, especially around the population centres in its constituent nations.

There has also been a cautious increase in the production of sea-grown trout through the adoption of semi- and fully contained pens in deeper water that can ensure favourable water temperatures, good water quality and provide a barrier with wild organisms and pathogens. The move to autonomous mobile sites powered by on-board generation of electric power and guided by artificial intelligence using remote-sensed environmental data has both increased resilience to - and mitigated against - climate change. Whilst the majority of this has occurred in the cooler waters of Scotland, a small volume of sea-grown trout is being raised in the coastal waters of England, Wales and Northern Ireland. Trout is also being grown in combination with other marine species such as mussels and seaweed as part of integrated multi-trophic aquaculture solutions, both in marine and freshwaters.

Technical innovation has been the foundation of this expansion by ensuring it remains commercially viable as well as environmentally sustainable. Accepted genetic techniques have developed trout strains with an increased resilience to environmental change, are adapted to particular growing conditions e.g. full-strength seawater, as well as the threats from continually evolving wild pathogens as our climate changes. The carbon footprint of trout farming has been reduced to a minimum and now is one of the lowest fed animal protein production systems in the UK, mainly through the use of circular feeds made from plant or low trophic animal ingredients and by-products. The use of antibiotics is almost unknown, with autogenous vaccines readily available for the majority of production areas. Most trout farms are now carbon net zero through the use of on-site renewable energy production, intelligent carbon off-setting and the wider move to low carbon energy production in the UK as a whole.

The future of British trout farming sees it evolve from an occasional treat from an experienced cook to an everyday meal suited to every different lifestyle. Riding a wider move to lower carbon food, and encouraged by both government and industry, trout is recognised as an affordable, tasty, healthy and accessible part of the UK diet, with every UK citizen eating at least three portions of trout a year. Trout is now widely available in a wide range of products, including cooked and value-added meals, and is appreciated by a broad spectrum of cuisines, from hearty seafood pies to spicy tandoori dishes. Consumers particularly value the consistent quality and welfare of the trout they eat, enjoy the distinct taste, appearance and back stories of the trout products grown in English rivers, Welsh lakes and the lochs / loughs of Scotland and Northern Ireland. The benefits and pleasure from eating British trout is not limited to the UK, as it is now a firm favourite in some Asian countries, especially China and Japan who particularly enjoy its versatility in cooking and presentation.

2.2 Guiding principles for the sustainable development of British trout farming

If the production of British trout is to double in volume, it is essential that it retains its current reputation for responsibly reared and high-quality products yet develops a wider appeal and consumer base. With the greater awareness of the need for environmental sustainability and animal welfare amongst the young, the future buyers of tomorrow, any expansion of the sector will need to continue to adhere to certain principles and ethical considerations.

- **Growth in the sector is the gateway to its survival**. Many of our current issues stem from its low level of production and its lack of recognition across both government and market. The recent success of larger trout production shows its potential for growth and a place in the UK's food supply and security mix.
- **Trout production must respect the environment in which it exists, be this inland or coastal waters**. Trout are associated with the clean rivers, lakes and sea lochs in the UK and this cannot be jeopardised by poor farming practises. New or expanded operations should utilise proportionate environmental impact assessments to ensure that any negative impacts are mitigated and to design in positive impacts where possible.
- **New and existing farmers should work with local communities to ensure their social licence to operate**. Given the likely location of trout farming in areas of public interest, this requires robust engagement, transparency and inclusive communication throughout the life cycle of the operation.
- **Trout farming must respect its use of a wild and sentient animal from hatchery to dispatch**. Consumers respect the animals they eat and recognise they deserve a good life and subsequent dispatch. A good life includes clean water, minimal stress, appropriate stocking densities, good nutrition and sensitive handling.
- **Scientific innovation is based on good evidence and sound ethics**. This includes emerging areas such as the use of artificial intelligence in decision-making and automation, and genetic tools to improve animal productivity and resilience, which must be open to scrutiny discussion and if necessary, amendment.
- **Trout farming must minimise its contribution to greenhouse gas emissions**. Climate change mitigation should include minimising energy use where possible, utilising low carbon and circular feeds and other inputs, and meeting its own energy needs through the use of solar, wind, hydro and tidal generation.
- **Trout farming provides rewarding and secure jobs.** Based on current productivity around, a production of 30,000 t will directly provide 500 jobs, with more than 2,500 in the value chain. These must be well rewarded, fully available to the diverse workforce of modern Britain and provide opportunities for skills development and progression.
- **Trout are a recognised part of the UK's food supply.** Governance of the trout farming sector needs to recognise the role of this species in both food security as well as the recreational heritage of the UK, actively supporting its sustainable development through proportionate and light touch regulation, as well as financial support where needed and appropriate.

3. Development Areas

3.1 Governance and regulation

3.1.1 Development goal

Farmed trout are explicitly recognised within national food security strategies as a healthy and sustainable part of the UK's food production mix. The UK managing authorities actively support the development and growth of trout farming through a combination of sympathetic planning and permitting, informed decision-making and the funding of strategic research and other investment.

3.1.2 Key issues to be addressed

Rightfully or not, the trout farming industry does not feel well supported by government, especially in England and Wales. This may stem from the small scale of the industry, it's perceived position as niche rural pastime that supports angling rather than food production and its lack of development over the past decade or so. The key issues that need to be addressed include the following:

- **Access to space and water**: ensuring trout farms have access to space and water across a wide range of environments, including the riparian zone, freshwater lakes, coastal waters and even coastal land. In terms of *space*, this suggests a more proactive inclusion of trout in its own right in marine and terrestrial spatial planning, including potential RAS sites. For *water*, there needs better official recognition that aquaculture 'borrows' water and is able to return it in good condition. Industry also needs to recognise that water is an increasingly limited commodity, and every effort is needed to reduce its use and ensure the good environmental status of intermediate and receiving waters.
- **Trout is not considered as food**: a lack of recognition that trout farming is a small but unique form of sustainable food production. The sector therefore needs proactive and policy-driven government support to growing the sector through a more positive approach to licensing, permitting and regulating trout farming activities whilst safeguarding the environment we all depend upon.
- **Lack of targeted and demand-driven government support**: related to the above, the direct government assistance to trout farming needs to be more focused and demand-driven. This includes supporting strategic research needs as well as providing targeted funding that results in more productive, sustainable and resilient trout production.
- **Insufficient information on the sector to support its growth**: finally, whilst the Scottish Government's annual production surveys provide useful and accessible information on production, employment and value, this information is lacking from elsewhere in the UK.

3.1.3 Key activities to be undertaken by BTA and its partners

- Engagement with the new Labour-led UK government to highlight the current and potential **role of the trout farming industry** in growing healthy food production and to ensure it is explicitly included in future national food policy. This – and the role of aquaculture – should be embedded in high level policies and strategies.
- Continued engagement with the regional development and environmental agencies across the UK to promote the inclusion of **sustainable trout farming in local planning, space and resource allocation**, including implementation of the Grigg Review recommendations in Scotland. This could also cover the sometimes conflicting legislation e.g. the Habitat's Directive versus animal health.
- To prioritise industry needs for **government support** – financial, technical or regulatory – in order to provide a systematic framework with which to engage the managing authorities. This could cover UK egg production, biosecurity, long-term research needs, funding application support, etc.
- To work with Cefas and other aquaculture associations in the UK to **develop annual surveys and the publication of production and socio-economic statistics** that are sufficiently granular to support aquaculture sector monitoring, evaluation and development planning.

3.2 Farm development and innovation

3.2.1 Development goal

UK farmed trout production adapts to and builds upon changing environmental and geopolitical conditions, technological advances and consumer preferences to become more productive and commercially resilient. A key feature will be the upgrading and development of traditional open-water and flow-through systems to serve and develop existing markets, with the emergence of good quality, higher volume production from recirculation systems.

3.2.2 Key issues to be addressed

Compared with other forms of food production, trout farming techniques have not significantly changed since the last century. This comfortable *status quo* needs to change for two main reasons, these being (i) the need to adapt to changing climate and environmental conditions and (ii) the requirement for a paradigm shift to allow the sector to grow in a sustainable manner. The key issues that need to be addressed include the following:

- **Dependence on external supplies of eggs**: the UK relies on the import of trout eggs. This makes the country vulnerable to market changes, supply failures and the import of disease. There is a need to build a domestic egg production capacity, including developing high-performing broodstock lines appropriate for the differing environment conditions across the UK.
- **Lack of sites, water and ability to increase trout production**: In Scotland, concerns such as the environmental impact of salmon farming on wild populations has had a spill-over effect on the licensing of sea-grown trout farming. Regulators and the public need to understand that sea-grown trout are hardier and less vulnerable to sea lice infections and therefore have a place in the mariculture species mix. New technologies, such as semi- or fully contained pens, can further reduce public concerns and even enable open pen farming in southern areas. Elsewhere in the UK the need to reduce water use can be enabled by partial recirculation. RAS and other intensive systems also have the prospect to significantly increase production volumes over time if they can overcome scaling and cost constraints.
- **Lack of innovation in UK trout farming**: UK aquaculture research interests have focused on salmon, marine finfish and increasingly low-trophic species. There are real opportunities to increase farm productivity and increase resilience through good science, such as the development of high-performing trout strains, the use of machine learning and AI in stock management and environmental monitoring. The research and innovation agenda has to be industry-driven and implemented through long-term partnerships between industry, academia and government.
- **Climate and other environmental challenges**: trout farming must contribute to net zero through reducing its carbon footprint and adapting to changing environmental conditions. This can be a 'win-win' situation as energy costs are a concern, especially if recirculation levels increase.

3.2.3 Key activities to be undertaken by BTA and its partners

- BTA to work with its members to lobby Defra and others to develop a **UK trout broodstock strategy** that meets long-term production patterns and covers broodstock and hatchery development. This would be used to leverage government support in terms of both funding private sector hatchery capacity as well as supporting associated research.
- Working with other aquaculture sectors (e.g. salmon, shellfish), develop a comprehensive, long-term, sustainability driven **UK-wide aquaculture research strategy and plan**. Demand-based, this would prioritise researchable constraints to sustainable sector growth and would put in place the means and partnerships to enable this. These partnerships might be regionally based e.g. with the University of Exeter in the SW England and University of Stirling in central Scotland.
- Test and demonstrate **models for innovative trout aquaculture** e.g. partial recirculation or open pen containment to be developed, upscaled and replicated. For the former, experience in partial, lower cost recirculating systems from Poland could be explored and adapted to local conditions.

3.3 Fish health and welfare

3.3.1 Development goal

British farmed trout live a good life, are handled and dispatched with respect, and are reared in an environment suited to their natural, behavioural and other needs. Trout farms will have access to targeted vaccines that minimise the need for subsequent and often stressful intervention.

3.3.2 Key issues to be addressed

Whilst a relatively robust fish, trout farmers lack much of the specialist veterinary support afforded to the larger livestock farming industries. This means that there is a lack of pathogen and species-specific vaccines that can prevent the need for the later use of antimicrobials which are expensive and disruptive to use. Although fish welfare is extensively covered by the 'Quality Trout UK' combined farm and hatchery certification standards, it needs to be supported better through legislation and further mainstreamed into everyday farming operations and updated as the industry grows and changes. The key issues that need to be addressed include the following:

- **Current level of veterinary focus is insufficient to support growth of the sector**: the trout farming sector currently depends on a small network of specialist veterinarians and the support of feed companies. However, if trout farming is to grow, there is a need for more comprehensive veterinary contact, including stock welfare assessments, engagement with welfare schemes and health checks for stock movement. This should be supported by the necessary facilities and equipment, as well as more engagement with farmers to ensure regular review and to bolster national aquatic biosecurity.
- **Lack of trout-specific vaccines**: the small size of the trout industry means that vaccine manufacturers focus on polyvalent vaccines for salmon, rather than more affordable and targeted monovalent trout vaccines. Combined with regular supply chain issues, and alternative route such as the development of autogenous vaccines is required, but this will need to be supported by the Veterinary Medicines Directorate (VMD).
- **Limited availability of antimicrobials**: whilst vaccines are the front line and although their usage is low and declining, trout farmers may need to resort to antimicrobials in the event of a disease outbreak. With only oxytetracycline specifically licenced for use with trout, others are available through VMD's cascade system but may need to be imported if not available in the UK. If the sector is to grow, the availability and range of antimicrobials may become limiting.
- **Lack of specific legislation covering the welfare of farmed trout:** as our understanding of fish sentience grows, there is an increasing need to guide and where necessary enforce good practice across the growing cycle to ensure that stock is well cared for and dispatched with due respect. As the industry grows and changes e.g. with a mixture of fish sizes being produced, the Quality Trout UK guidance needs to be under regular review and supported by appropriate underpinning legislation.

3.3.3 Key activities to be undertaken by BTA and its partners

- The BTA should work with its membership to periodically review both the **changing biosecurity needs of the sector** as part of a wider holistic health management plan, and the capacity of veterinary network to address these. Where necessary, any geographical or thematic gaps should be predicted and mitigatory measures - and training - put in place.
- The sector should continue to support **prophylactic vaccination** to reduce the need for later antimicrobial use. Fish health strategies need to be developed with VMD to allow the use of autogenous vaccines to combat known risks, working with the Fish Health Inspectorate (FHI) and others to stay ahead of the ever-shifting pathogen threat. Pharmaceutical companies should be persuaded to develop affordable trout-specific vaccines to allow the sector to grow.
- The BTA should **promote fish welfare** across the industry, helping in the development of codes of practice.

3.4 Environmental sustainability and social license

3.4.1 Development goal

British trout farming operates to the highest possible environmental standards to ensure the health, welfare and quality of its products. Trout farms will minimise their water and energy consumption and will reduce its carbon footprint across its life cycle through the considered use of low carbon feeds and the circular use of all inputs. As an important part of the rural economy, trout farming will work transparently with local communities and other stakeholders to ensure it has the social licence to operate.

3.4.2 Key issues to be addressed

To many people, trout are associated with a pristine environment, whether this be the crystal clear water of chalk streams or the deep blue water of a Scottish sea loch. Environmental sustainability is therefore at the heart of British trout farming. However increasing competition for river water, the profound effects of a changing climate and ever greater pressure on our landscape all make sustainable growth a challenge. The key issues that need to be addressed include the following:

- **Maintaining the quality and volume of riverine water flows**: increasing water efficiency in farms has been discussed above. Another consideration is maintaining minimum water flows between abstraction points, as well as ensuring the quality of water as it is returned to the river.
- **Moving to more sustainable and circular feeds**: feed is a critical environmental consideration, as good quality, well-formulated food minimises faecal and uneaten food waste and the careful selection of circular feed ingredients can reduce their carbon footprint. A move away from marine proteins and oils to terrestrial alternatives has its own challenges, as it should not drive unsustainable practices such as deforestation. Options include the use of land animal proteins or alternative ingredients such as novel insect meals where it is affordable and technically possible.
- **Reducing and mitigating trout farming's contribution to carbon emissions**: flow through and open water trout farming is by nature energy efficient, but the need to increase levels of water recirculation and environmental control will likely increase energy needs. There are solutions, such as the use of solar energy coupled with battery storage, as well as low-head hydropower, but these have high initial capital costs that may be unaffordable, especially for smaller farms.
- **Better integrating trout farming into the local ecosystem**: many trout farms are located in rich natural ecosystems. These need to be protected through further efforts to integrate farming activities and infrastructure into these. This includes nature-based solutions to predator control and developing settlement and finishing ponds into more natural wetland areas
- **Ensuring the social license to expand trout farming to new locations**: any growth of trout farming must be broadly endorsed by local communities. This will require transparency, open communication and a willingness to listen and where necessary adapt to meet local concerns.

3.4.3 Key activities to be undertaken by BTA and its partners

- Work with the regulatory authorities e.g. EA, SEPA, etc. to agree long-term solutions that allow non-consumptive activities like trout farming to **maintain access to water** whilst contributing to maintaining the good environmental status on which the industry depends.
- BTA to develop specific **sustainability targets**, aligned with certifications and standards, and to create subsequent dialogue with the universities and feed companies.
- Trout farmers to work with universities and the feed companies to **develop affordable, efficient and scalable diets based on alternative, low carbon, ethical and circular raw materials**.
- The BTA needs to utilise product environmental footprint studies to identify **potential intervention points that can reduce carbon emissions** at both farm and sector levels. This can be part of a wider narrative on how the trout sector defines and reaches sustainability targets.
- BTA need to continue to build the narrative of **trout as a sentinel species** being raised in clean, natural conditions as part of the local rural economy

3.5 Recreational fisheries

3.5.1 Development goal

The role of recreational trout fisheries is recognised in terms of its considerable societal benefits. The stocking of farmed brown and rainbow trout into angling waters provides a wide range of such benefits, including environmental restoration, economic income to local communities and the mental well-being for its participants, which are often under-valued by policy-makers, local government and wider society.

3.5.2 Key issues to be addressed

The stocking of fish into angling waters provides pleasure – and indeed fresh trout – to thousands of people, young and old, across the UK. The societal benefits of recreational angling are often under-appreciated by local planners and trout fisheries are facing an existential crisis in our warming climate, which means they will likely become more expensive and exclusive. There is a real need to both adapt this important part of the trout farming value chain to higher water temperatures and to maintain its accessibility to all parts of our society. The key issues that need to be addressed include the following:

- **Adapting to a warmer climate**: once open year-round, an increasing number of still water fisheries are being closed over the summer months as water temperatures exceed their carrying capacity. There are some solutions, such as the development of more temperature-tolerant strains of trout, but will there inevitably be a rationalisation of fisheries, with a move to larger or better water-fed lakes and reservoirs, especially in the south of the UK. There are also other ramifications of climate change, including the increased reproduction and potential geographical spread of the various freshwater fish louse *Argulus* species.
- **Limited awareness of the societal benefits of trout and other forms of angling**: although there has been some progress in recent years, such as the National Angling Strategy (2019 – 2024)[7] to emphasise the mental health and physical fitness benefits of fishing, it is still not fully recognised by local planners as a positive rural diversification opportunity that increases the local amenity offering and provides additional resilience to rural businesses. Likewise, there is a need to emphasise the role of trout restocking and associated fisheries in promoting public interest and maintaining investment into riverine and wetland habitat protection.
- **Trout fisheries not considered part of the trout farming value chain**: the rearing of fish for recreational fisheries is not considered part of the trout farming value chain, despite evidence that they contribute nutritional benefits and economic value (Lynch *et al*, 2024). This has a number of ramifications, included in the value-added tax (VAT) regime (which table fish production is not) and ineligibility for government fisheries-related funding support.

3.5.3 Key activities to be undertaken by BTA and its partners

- The BTA should work with angling interests to **better understand the implications of climate change for stocked still-water fisheries** and to develop a long term strategy in adapting to warming surface waters, extreme weather and declining water quality and availability.
- The BTA should work with others to assess the **economic and non-monetary value of the trout-related recreational sector** across a spectrum of local economic development, societal mental health and wellbeing, and environmental stewardship areas. These should then be promoted to support the sustainable development and diversification of the trout sector.
- The UK national and devolved governments should be encouraged to **support the full trout farming value chain to meet its commercial, socio-economic and environmental objectives** as provided for in the English Aquaculture Strategy. This should include ensuring that deserving investment projects have access to public funding and it is taxed in accordance with its contribution to the public good.

[7] See https://www.gov.uk/government/news/new-national-angling-strategy-aims-to-get-more-people-fishing

3.6 Supply chain, markets and associated infrastructure

3.6.1 Development goal

Farmed British trout is increasingly considered by consumers as a high quality but affordable, healthy, sustainable centrepiece to a family meal. The market has expanded and the move to bigger fish sustained, making production more efficient, adding resilience to the supply chain and offering consumers a straightforward and more diverse buying, cooking and eating experience.

3.6.2 Key issues to be addressed

Compared to its larger relative salmon, trout has been considered a niche product, occasionally available on the supermarket fish counter or on a country pub restaurant menu. With its more diverse production, e.g. from the cool, fast flowing chalk streams of Hampshire to the deep water sea lochs of Argyll, there is an array of unique high quality trout products that are yet to fully catch the country's - and world's - culinary imagination. In addition the mainstream transition away from portion-size fish, as well as the challenges of the Covid pandemic have tested the supply chain, with the industry slow to capitalise on the opportunities that have emerged from these changing times. With a new government and possibly closer ties to the European market, now is a time to grow and consolidate the market for trout, thus enabling a cautious expansion of British trout production. The key issues that need to be addressed include the following:

- **Revisiting and updating the image of British trout**: as intimated above, trout is a far more diverse product than most fish, as demonstrated by recognised but distinct brands such as ChalkStream® and Kames' 'steelhead' sea-grown rainbow trout. The challenge is how to build a generic brand with the common and unique attributes of quality and taste, that also celebrates and communicates the different offerings available. This challenge will become more complicated as and when RAS-farmed trout come onto the market as well.
- **Increasing the variety of and demand for trout products**: the variety of trout products is relatively small. The move to bigger fish will provide new opportunities for fresh, smoked and added value trout products. There are challenges involved, including the aforementioned small size of the sector which also limits investment into new processing and value-adding lines.
- **Modernisation of the supply chain**: the Covid pandemic showed the opportunities for – and challenges of - moving sales online. However, there is broad agreement that the supply chain can be improved and markets expanded through embracing new information technology and e-commerce tools, especially if access to the EU markets improves. This change needs to recognise the particular nature of the trout products and production, including its limited supply base often made up of SMEs, its perishability and the current, rather conservative market.

3.6.3 Key activities to be undertaken by BTA and its partners

27. The BTA should develop a **forward-looking strategy for the marketing of British trout.** This could consider 'trout' as a common umbrella for a number of distinct sub-brands (e.g. river-raised, sea-grown, wild ranched and RAS-produced), all with their own unique attributes. This strategy needs to establish the size, nature, pricing structure and growth potential of each 'sub-market', developing an associated narrative and branding approach that promotes trout in general as a relatively low volume, luxury item within these its distinct production segments.

- Whilst the UK market has some capacity to expand, it is likely that **an increasing proportion of future production will need to be exported**. Whilst this includes post-Brexit Europe, probably the biggest potential lies in the higher-end markets in the Far East where trout is esteemed.
- The BTA should work with processors, supermarkets and consumer groups to examine the appetite and **opportunities for new trout products** that recognise the small but diverse supply base and changing consumer tastes in order to add value to trout where possible.
- The industry **adopts e-commerce approaches** in the farmed trout markets, both to consolidate existing sales as well as to develop new ones. The value chain will need to be supported through technical assistance, training and a coordinated approach to marketing.

3.7 Skills and career development

3.7.1 Development goal

Trout farming is considered a rewarding, progressive and reasonably well-paid career, combining a variety of different opportunities including practical outdoor activities, skilled management, innovative research and interesting technical niches. As such it attracts, sustains and develops people from a wide variety of ages, genders and ethnic backgrounds from across the United Kingdom.

3.7.2 Key issues to be addressed

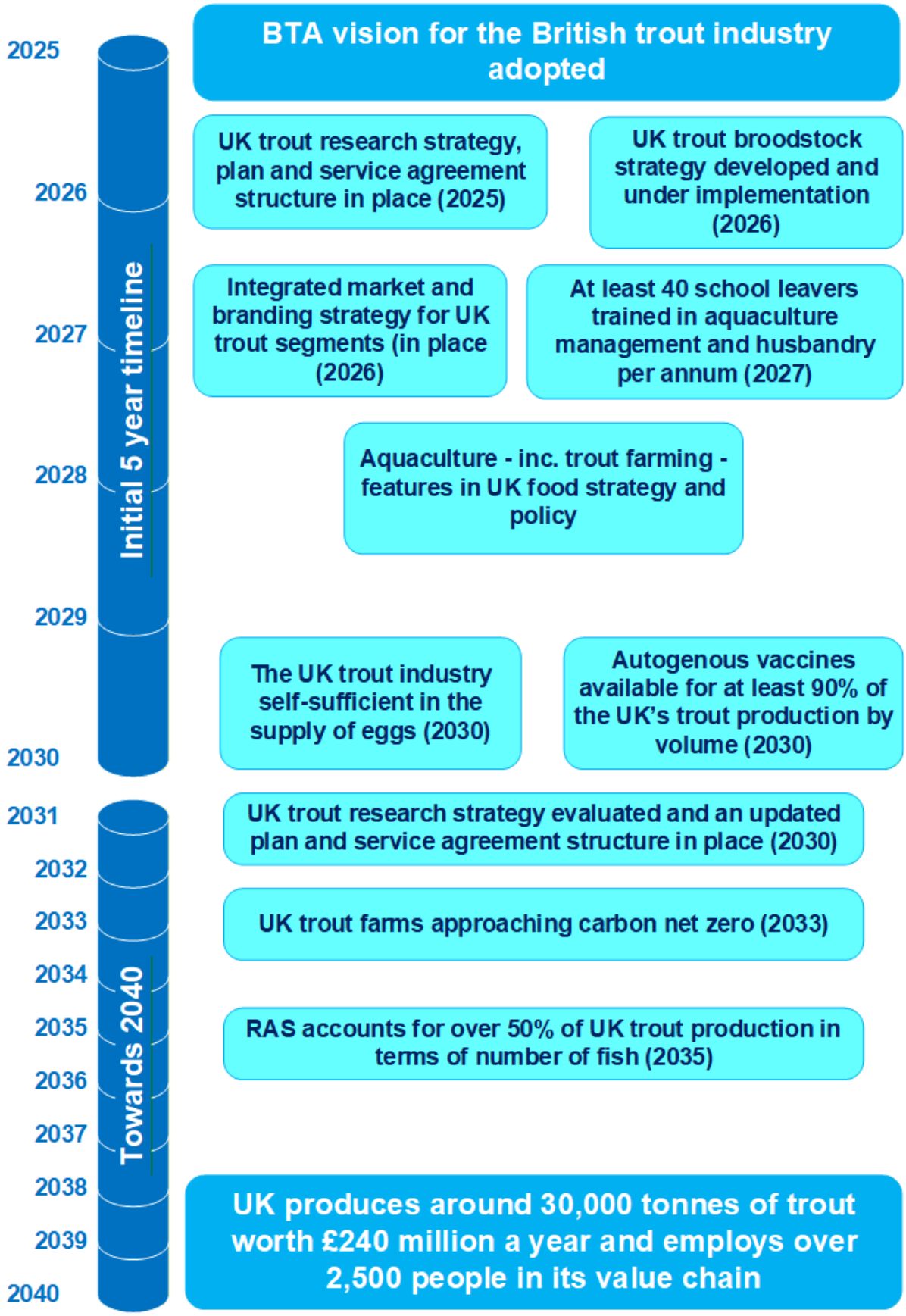
There are two key issues associated with career development in the UK's trout industry, these being (i) attracting young people into businesses and onto training courses and (ii) retaining good people within the industry. Examined further below, it is important to note there are some underlying reasons for this, including the small size of the industry, its lack of development compared to other industrial and food producing sectors and the narrow commercial margins as costs increase against a fairly flat pricing structure. The key issues that need to be addressed include the following:

- **Promote aquaculture as an important sector contributing to the UK's food security and rural economy**: The exclusion of aquaculture in the UK's food security and rural economic development policies, especially south of the border, reinforces the perception of aquaculture in general – and trout farming in particular - as an unimportant and niche sector. Even a mild recognition of its role in these areas would have an important positive message for aspiring trout farmers.
- **Promoting vocational education and training**: although the number of vocational courses in finfish aquaculture around the UK is small, they have difficulty in attracting sufficient numbers of students. As a result there is a shortage in practically-trained, production-orientated students available to join the industry and course managers find it difficult to justify further investment in course development. School careers advisers need to better recognise the diversity of student ambition and the career opportunities that await practical-minded people outside the academic focus of the Russell Group universities.
- **Provide in-job skills development and training opportunities**: whatever level people join trout farming they should be provided an opportunity to develop and diversify their skills as their experience and careers progress. This could be developing technical skills, as well as introducing management and business training in order to enable them to take on more decision-making responsibility and to increase mobility and adaptability within the sector.
- **Identify and develop technical skills area for efficient, innovative and competitive trout farming**: in order for trout farming to adapt to the commercial and climate-related challenges discussed earlier in this document, there is a need to adopt new approaches and technologies to modernise an industry that has little changed since its maturity in the early 1990's. This is a need to bring new skills across a wide range of topics – genetic, environmental, engineering, computing, business management, etc. and to apply them to the unique needs of the trout sector.

3.7.3 Key activities to be undertaken by BTA and its partners

- To work with government to **raise the profile of trout farming** in relevant policies and to promote it as a valuable contribution to the UK's food security and rural economy. The BTA will work with school career advisers to promote the different entry avenues available to school leavers, with a particular focus on practical, less academic but equally rewarding opportunities.
- To undertake a **forward-looking training needs analysis** (TNA) to identify the current and emerging skill needs and gaps as trout farming grows and adapts to a changing world. This can be used to develop existing and new school leaver and in job training and skills development approaches including vocational colleges, apprenticeship schemes and further education.

4. Roadmap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Initial 5 year timeline
Towards 2040
BTA vision for the British trout industry adopted
UK trout research strategy, plan and service agreement structure in place (2025)
UK trout broodstock strategy developed and under implementation (2026)
Integrated market and branding strategy for UK trout segments (in place (2026)
At least 40 school leavers trained in aquaculture management and husbandry per annum (2027)
Aquaculture - inc. trout farming - features in UK food strategy and policy
The UK trout industry self-sufficient in the supply of eggs (2030)
Autogenous vaccines available for at least 90% of the UK's trout production by volume (2030)
UK trout research strategy evaluated and an updated plan and service agreement structure in place (2030)
UK trout farms approaching carbon net zero (2033)
RAS accounts for over 50% of UK trout production in terms of number of fish (2035)
UK produces around 30,000 tonnes of trout worth £240 million a year and employs over 2,500 people in its value chain

Appendix A: References

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