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Policy Feedback Report

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Executive Summary

The BOUTCAR project, “Blue Jobs through Blue Careers,” is an innovative alliance of leading companies, associations, and academic institutions from the EU. It aims to shape the future of fisheries and aquaculture by developing an inclusive and sustainable training pathway for young people and adults in the blue economy. This report provides policy recommendations and observations to support the upskilling and reskilling of “professions of the sea,” particularly in the context of the twin green and digital transitions.

This report is based on the results of skills mapping activities, stakeholder consultations, pilot testing in Italy, Spain and Greece, and the analysis of relevant European policy frameworks. The recommendations presented aim to support policymakers, education providers and industry stakeholders in strengthening blue skills development pathways.

In line with EU strategic priorities, including the European Green Deal, BlueComp and the Union of Skills framework, BOUTCAR develops practical training solutions to address skills shortages, strengthen workforce adaptability and improve the attractiveness of blue careers across European coastal regions.

Key Policy Insights and Recommendations

Main Insights:

- The fisheries and aquaculture sectors face persistent shortages in digital, environmental and regulatory skills.
- Existing qualifications remain fragmented across Member States, limiting labour mobility.
- Emerging blue economy sectors, particularly offshore renewable energy, require new hybrid professional profiles.
- Pilot testing confirms strong demand for modular, practical and flexible training pathways.
- Greater efforts are needed to attract young people, women and underrepresented groups into blue careers.
- The BlueComp framework offers an opportunity to harmonise skills recognition across Europe.

Key Policy Recommendations:

- Align training with BlueComp and EQF.
- Promote modular and stackable learning pathways.
- Develop EU-recognised certifications.
- Improve links between fisheries and offshore renewable energy.
- Increase access for youth, women and migrant workers.
- Simplify STCW/STCW-F transition pathways.
- Enable multi-use vessel certification.
- Strengthen EU legislation on fishers' training.
- Develop an EU repository of blue skills resources.

Methodology

The recommendations presented in this report are based on three complementary sources of evidence: (1) analysis of EU policy frameworks and strategic documents relevant to blue skills development; (2) identification of current and future skills needs in fisheries and aquaculture through stakeholder engagement and sectoral analysis; and (3) feedback collected through pilot testing activities conducted in Italy, Spain and Greece.

The pilot activities provided practical validation of the relevance, accessibility and applicability of the proposed training pathways, while stakeholder discussions contributed to the identification of remaining barriers related to qualification recognition, labour mobility and workforce diversification.

Policy Context and Relevance

Europe’s seas and coasts offer significant potential for sustainable growth and employment. However, persistent skill gaps, outdated qualifications, and limited awareness of blue career opportunities, especially in fisheries and aquaculture, undermine progress toward inclusive and sustainable blue growth.

This report aligns with:

- The EU Green Deal and Climate Adaptation Strategy;
- The Blue Skills Study (DG MARE, 2024);
- The European Year of Skills;
- The EU Skills Agenda;
- The European Education Area 2025 targets;
- Recent EU policy initiatives, including the European Ocean Pact and the Communication on the Energy Transition of the EU Fisheries and Aquaculture Sector, provide an important strategic framework.

These frameworks emphasize:

- Integration of energy transition measures to reduce greenhouse gas emissions while promoting biodiversity and pollution reduction;
- Prioritisation of skills development, upskilling, and reskilling to support sustainable blue economy careers, with focus on generational renewal, gender equality, and inclusive workforce participation;
- The expected Blue Generational Renewal Strategy, currently under preparation, which aims to strengthen marine research, ocean technology, sustainable fisheries careers and STEM education linked to marine sciences;
- Development of innovation ecosystems via the Smart Specialisation Thematic Platform, the Knowledge and Innovation Community (KIC), and the Union of Skills to facilitate investments and partnerships;
- Support for youth engagement through internship programmes under the EU4Ocean Coalition, linking ocean literacy with career pathways;
- A systemic vision for an Ocean Union, supporting maritime spatial planning, energy security, food sovereignty, and enhanced international cooperation.

BOUTCAR directly contributes to the development of a resilient and future-ready workforce through the promotion of BlueComp[1], a shared language and competency framework for stakeholders in the blue economy[2].

The European Ocean Pact[3] and the Communication on the Energy Transition of the EU Fisheries and Aquaculture Sector[4] provide a comprehensive strategic framework that furthermore complements these initiatives. These include ambitious measures to achieve climate neutrality by 2050 through integrating energy transition in fisheries and aquaculture, reducing greenhouse gas emissions, enhancing sustainability, and fostering social inclusivity.

[1] BlueComp is a European Commission-led initiative under development by DG MARE to establish a shared skills and competency framework across 12 blue economy sectors. As noted by Sandra Castaner, Policy Officer at DG MARE (Maritime Policy – Research and Innovation), during the Sectoral Social Dialogue Committee meeting on 25 June 2025, projects like BOUTCAR are invited to contribute sector-specific data and training insights to help inform and validate the BlueComp framework, particularly in fisheries and aquaculture. Platform online.

[2] European Commission (2024). *Study to support the design of skills development for the blue economy*. Maritime Forum – Ocean Literacy and Blue Skills. Available online.

[3] European Commission (2025), *European Ocean Pact*. Available online.

[4] European Commission (2025), *Communication from the Commission on the Energy Transition of the EU Fisheries and Aquaculture Sector* (COM(2023) 100 final. Available online.

Key priorities include generational renewal, gender equality, and upskilling to foster a resilient and attractive blue economy workforce. The upcoming Blue Generational Renewal Strategy aims to advance STEM education, ocean literacy, and intergenerational knowledge transfer, supported by EU-wide initiatives such as the Smart Specialisation Thematic Platform, the Knowledge and Innovation Community (KIC), and the EU4Ocean Coalition internship programme. Together, these policies reinforce the importance of developing tailored training pathways, like those proposed by BOUTCAR, that support sustainable fisheries and aquaculture, while contributing to EU climate and social objectives.

BlueComp: A European Commission-led competency framework

The BlueComp framework, developed by the European Commission in the context of the Blue Skills Study, aims to provide a shared reference structure for skills and competences across blue economy sectors. BOUTCAR operates in parallel with this emerging framework, but its activities support its objectives by mapping existing training gaps, piloting new course profiles, and providing early validation from fisheries and aquaculture sectors.

Rather than developing a separate framework, BOUTCAR provides practical evidence and sectoral insights that are consistent with the objectives of BlueComp and may support its future operationalisation.

BOUTCAR aims to:

- Define clear, structured career profiles in fisheries and aquaculture
- Support EU-wide recognition of qualifications
- Create a shared language across education, industry, and policy stakeholders

By translating competence needs into concrete occupational profiles, modular curricula and pilot-tested learning pathways, BOUTCAR contributes to the operationalisation of the BlueComp framework. Rather than creating a parallel competence model, the project demonstrates how BlueComp can be applied in practice within fisheries and aquaculture education and training. This practical contribution supports future European initiatives on qualification design, micro-credentials and skills recognition across Member States.

Proposed professional profiles include:

- Digital Aquaculture Specialist
- Marine Policy, Trade & Compliance Advisor
- Sustainable Aquaculture/Fisheries Officer

These profiles should be understood as evolving competence profiles rather than fully established occupations, reflecting the changing requirements of existing fisheries and aquaculture roles.

These profiles embed ecological, digital, and compliance-related knowledge and are informed by a modular, cross-border course design. Initial case studies in Greece are validating this structure.

Europe's Budget 2028–2034: Investing in Skills and Social Inclusion

The new Multiannual Financial Framework recognises that increased investment in skills is essential to enable European students and workers to seize opportunities arising from the green and digital transitions.

Integrate blue skills into National and Regional Partnership Plans Member States should use the European Social Fund under the new Partnership Plans to support upskilling, reskilling and quality employment in fisheries and aquaculture, ensuring that coastal communities benefit from the EU's social investment objectives under the European Pillar of Social Rights.

Support inclusive and accessible training pathways EU and national funding should reduce barriers to training by supporting modular courses, apprenticeships, certification costs and lifelong learning opportunities for fishers, aquaculture workers, women, young people and migrant workers affected by the green and digital transitions.

Strengthen links between blue careers, social inclusion and youth mobility Programmes such as Erasmus+, EU4Ocean and regional apprenticeship initiatives should be expanded to include fisheries and aquaculture placements, improving the attractiveness of blue careers while promoting social inclusion, labour mobility and generational renewal in coastal communities.

Invest in blue skills infrastructure and social innovation EU social and regional funding should support maritime training centres, digital learning platforms, blue economy skills hubs and social entrepreneurship initiatives that strengthen resilience, innovation and employment opportunities in fisheries-dependent regions.

Alignment of blue economy training with the Union of Skills framework

BOUTCAR training pathways support the objectives of the EU Union of Skills by promoting lifelong learning, vocational excellence, labour mobility and the development of green, digital and STEM-related skills for fisheries and aquaculture.

The Commission and Member States should expand the use of vocational education and training (VET), micro-credentials and modular certifications in blue economy sectors to support continuous upskilling and reskilling, while improving the portability and EU-wide recognition of fisheries and aquaculture qualifications.

Targeted measures should encourage the participation of young people, women and underrepresented groups in blue careers through apprenticeships, mobility schemes and awareness campaigns, while strengthening cooperation between industry, education providers,

social partners and EU skills intelligence initiatives to better anticipate labour market needs in the blue economy.

The proposed profiles should not be regarded as entirely new occupations but as emerging competence profiles reflecting the evolving needs of fisheries and aquaculture. They illustrate how existing occupations are expanding to integrate digital technologies, sustainability principles, regulatory expertise and cross-sector collaboration. Their future integration into BlueComp and the European Qualifications Framework (EQF) could facilitate the development of comparable qualifications across Member States.

Training profiles and curricula for key emerging roles in fisheries and aquaculture

The green and digital transitions are transforming workforce requirements across fisheries and aquaculture. To respond to evolving labour market demands, BOUTCAR has identified emerging professional profiles requiring a combination of technical, environmental, regulatory, and digital competencies.

The project supports the development of modular curricula that can be adapted to national education systems while maintaining a common European approach aligned with the BlueComp Competency Framework and the European Qualifications Framework (EQF).

1. **Digital Aquaculture Specialist (EQF 6)**

The increasing digitalisation of aquaculture production is transforming the way farms are managed, monitored, and optimised. Smart technologies such as sensors, artificial intelligence (AI), automation, and real-time monitoring systems are enabling producers to improve productivity while reducing environmental impacts and resource consumption. As these technologies become more widespread, the sector requires professionals capable of integrating biological knowledge with digital competencies.

The Digital Aquaculture Specialist is responsible for implementing and managing digital solutions that support precision aquaculture and data-driven decision-making. The role involves collecting and analysing production and environmental data, operating monitoring systems, optimising feeding and water quality management, and supporting predictive maintenance and operational efficiency.

Key competencies include:

- ✓ Data collection, management, and analysis;
- ✓ Artificial intelligence and automation tools;
- ✓ Sensors and remote monitoring systems;
- ✓ Precision aquaculture and smart farming technologies;
- ✓ Environmental performance monitoring and reporting;
- ✓ Digital platforms and decision-support systems.

Training programmes should combine aquaculture science with digital technologies, data management, and practical experience in smart farming systems. This interdisciplinary approach will enable operators to improve productivity, sustainability, and resource efficiency while supporting the digital transition of the aquaculture sector.

2. Marine Policy, Trade and Compliance Advisor (EQF 5)

The European fisheries and aquaculture sectors operate within an increasingly complex regulatory framework driven by environmental legislation, sustainability objectives, international trade agreements, and market requirements. Organisations therefore require professionals who can interpret evolving legislation, ensure regulatory compliance, and support strategic decision-making.

The Marine Policy, Trade and Compliance Advisor assists businesses, producer organisations, public authorities, and other stakeholders in understanding and implementing European and international regulations affecting fisheries and aquaculture. The role includes monitoring legislative developments, supporting certification and sustainability reporting processes, advising on trade regulations, and facilitating dialogue between industry and public institutions.

Key competencies include:

- ✓ EU fisheries and aquaculture policy;
- ✓ Maritime and environmental legislation;
- ✓ Trade regulations and market standards;
- ✓ Sustainability reporting and certification schemes;
- ✓ Policy analysis and regulatory monitoring;
- ✓ Stakeholder engagement and communication.

Training should combine legal, environmental, economic, and governance perspectives with practical knowledge of European policies, certification systems, and regulatory procedures. These competencies will support organisations in maintaining compliance while strengthening competitiveness and promoting sustainable sector development.

3. Sustainable Fisheries and Aquaculture Officer (EQF 6)

Growing environmental pressures, climate change, and biodiversity conservation objectives require fisheries and aquaculture operators to adopt more sustainable management practices. This profile addresses the increasing demand for professionals capable of integrating environmental sustainability into operational decision-making and long-term resource management.

The Sustainable Fisheries and Aquaculture Officer supports the implementation of sustainable production practices, ecosystem-based management approaches, and environmental monitoring activities. The role contributes to climate adaptation strategies, biodiversity conservation, circular economy initiatives, and compliance with environmental standards while promoting the resilience of fisheries and aquaculture systems.

Core competencies include:

- ✓ Marine ecology and ecosystem-based management;
- ✓ Fish stock conservation and sustainable harvesting practices;
- ✓ Climate adaptation and resilience strategies;
- ✓ Circular economy approaches;
- ✓ Environmental monitoring and risk assessment;
- ✓ Sustainability reporting and environmental performance evaluation.

Training should combine marine science, environmental management, fisheries and aquaculture knowledge, and practical field experience. Particular emphasis should be placed on interdisciplinary learning, stakeholder engagement, and the implementation of sustainability frameworks that support the green transition of the blue economy.

4. Fisheries and Offshore Renewable Energy Liaison Technician (EQF 6)

The rapid expansion of offshore renewable energy is creating new interactions between traditional maritime activities and emerging blue economy sectors. Offshore wind farms and other marine renewable energy installations increasingly share marine space with fisheries and aquaculture, creating both challenges and opportunities for cooperation. This evolving context requires professionals capable of facilitating dialogue, reducing conflicts, and supporting integrated marine planning.

The Fisheries and Offshore Renewable Energy Liaison Technician acts as an interface between fisheries, aquaculture operators, offshore renewable energy developers, public authorities, and local communities. The role contributes to maritime spatial planning processes, environmental monitoring, stakeholder consultation, and the implementation of coexistence strategies that balance economic development with environmental protection.

Key competencies include:

- ✓ Maritime spatial planning;
- ✓ Environmental impact assessment;
- ✓ Offshore health and safety procedures;
- ✓ Marine monitoring and data collection;
- ✓ Stakeholder consultation and conflict resolution;
- ✓ Understanding of fisheries, aquaculture, and offshore renewable energy operations.

Training should combine marine sciences, environmental management, offshore renewable energy, and stakeholder engagement with practical field experience. Developing multidisciplinary competencies will enable professionals to support the sustainable coexistence of maritime sectors while contributing to workforce diversification and innovation in coastal communities.

5. Cross-Cutting Skills

While each emerging professional profile requires specialised technical expertise, the BOUTCAR project highlights a common set of transversal competencies that are essential across all

occupations in the fisheries and aquaculture sectors. These cross-cutting skills support professionals in adapting to technological change, responding to environmental challenges, and working effectively within increasingly multidisciplinary and international contexts.

The integration of these competencies into vocational education and training (VET), higher education, and lifelong learning programmes will strengthen workforce resilience and facilitate the green and digital transitions of the blue economy.

Core transversal competencies include:

- Digital literacy, including the ability to use digital tools, data platforms, and emerging technologies effectively;
- Problem-solving and critical thinking, enabling professionals to analyse complex situations, assess risks, and make informed decisions;
- Communication and teamwork, fostering collaboration across multidisciplinary teams, value chains, and stakeholder groups;
- Adaptability and lifelong learning, supporting continuous upskilling and reskilling in response to technological, environmental, and regulatory changes;
- Health, safety, and risk awareness, ensuring safe working practices both onshore and offshore while complying with occupational standards;
- Understanding of sustainability principles and climate challenges, including knowledge of circular economy approaches, ecosystem protection, climate adaptation, and responsible resource management.

The development of these emerging professional profiles, together with a shared set of transversal competencies, provides a practical foundation for future qualification standards, competency-based training programmes, and micro-credential schemes. Together, these technical and transversal competences support modular learning pathways, recognition of prior learning (RPL), and the progressive alignment of training provision with the BlueComp Competency Framework and the European Qualifications Framework (EQF). Such an approach would facilitate lifelong learning, improve workforce mobility across European maritime sectors, support generational renewal, and strengthen the long-term competitiveness, resilience, and sustainability of the European fisheries and aquaculture industries.

Project insights: skills needs and gaps in fisheries and aquaculture

The BOUTCAR study and training design processes have revealed the following sector-specific needs.

Foundational knowledge requirements:

- Marine ecology and aquatic ecosystems
- Sustainable aquaculture and fish stock management
- EU and national fisheries legislation, trade, environmental and maritime compliance
- Climate impact awareness and circular economy concepts
- Opportunities in the fishery and aquaculture sector

Technical and digital skills:

- Use of Artificial Intelligence (AI), sensors, and automated systems
- Data literacy and digital monitoring in aquaculture
- GIS-based disease prediction and smart farming systems

Soft skills:

- Cross-disciplinary collaboration (biology, policy, engineering, digital)
- Communication, problem-solving, and adaptability
- Continuous learning and technology absorption

These insights are consistent with DG MARE's Blue Skills Study findings: skills shortages, lack of recognised qualifications, and uneven access to training remain critical issues.

Additionally, according to the output of the Italian pilot test, the student profile appears more theoretical, with transversal knowledge but less grounded in daily and practical operations. Also, a limited awareness about the opportunities of the sector, including the emerging profiles required on the job market.

Linking skills development with offshore wind and blue innovation

As EU offshore renewable energy deployment accelerates, especially in shared marine spaces, fishers and aquaculture workers must be enabled to participate in the new economy through:

- Training for the sustainable coexistence of fisheries and offshore wind infrastructure, including regulatory compliance, operational practices, and safe access to shared maritime areas
- Development of risk management and environmental monitoring skills
- Participation in multi-use sea space planning

Policy pathways should prioritise qualifications for Sustainable Fisheries Technicians, combining traditional fishing knowledge with new ecological and digital skills.

Recent discussions at DG EMPL on the Socioeconomic Impacts of Offshore Renewable Energy (ORE), where the Commission tasked Trinomics with conducting a supporting analysis, have highlighted additional policy-relevant barriers. Based on concerns raised in a European Court of Auditors report[5], the workshop addressed socioeconomic risks for fisheries communities impacted by ORE expansion.

Key insights included:

- Certification barriers: fishers often face prohibitive costs in acquiring additional health and safety certificates needed to transition into offshore wind roles.

[5] European Court of Auditors (2023). *Special Report 22/2023: Offshore renewable energy in the EU – ambitious plans for growth but sustainability remains a challenge*. Luxembourg. Available online.

- Labour gaps in entry-level roles: In Portugal, for instance, many entry-level roles such as deck workers are increasingly filled by migrant workers. These individuals often lack the means or pathways to requalify or retrain for emerging blue economy roles, including offshore support jobs.

These findings underscore the need to design inclusive requalification schemes that:

- Minimise cost barriers for certification;
- Recognise informal or non-formal experience;
- And directly address vulnerable labour groups within coastal and fisheries communities.

In addition to these challenges, it is important to recognise that employment opportunities for fishers within offshore renewable energy (ORE) projects are often concentrated in specific project phases, particularly construction and installation activities, while long-term operational opportunities depend on project models and local conditions. Most roles are concentrated during the construction, planning, and installation phases, offering little in the way of long-term employment continuity. This further reinforces a sense of job insecurity among coastal communities.

Moreover, regulatory mismatches complicate vessel use and crew transition. For example, when traditional fishing vessels are repurposed for offshore personnel transport, they frequently fall under the STCW Convention (Standards of Training, Certification and Watchkeeping for Seafarers) rather than STCW-F[6], which applies specifically to fishing vessels. This shift introduces new legal requirements, safety standards, and certification costs that many small-scale operators are not equipped to meet.

These structural challenges highlight the need for a comprehensive policy response that not only focuses on skills development but also:

- Ensures regulatory clarity and recognition of existing maritime qualifications;
- Facilitates longer-term employment pathways within ORE for former or part-time fishers;
- And supports legal and logistical transitions for vessels and crews seeking to diversify their operations

Results of Pilot Tests

1. **Italy**

The Italian pilot test was held on the 21/04/2026 and organized in two separate sessions:

- **Morning session**: with university students attending the first year of the bachelor's degree in Aquaculture and Fish Production Hygiene. A total of 12 participants attended the session

[6] STCW-F (1995): Applies to crew on fishing vessels ≥24 meters and/or operating at high seas. It's generally less demanding in terms of safety training than STCW and customised to the fishing profession. STCW (1978, as amended): Applies to merchant vessels and other commercial ships, including vessels used for offshore crew transfer, support vessels, and wind farm operations. It requires a higher level of safety, firefighting, survival training, etc. So, when a fishing vessel is repurposed to transport personnel to offshore wind farms or perform non-fishing support functions (e.g. survey, crew transfer), it usually must comply with STCW, not STCW-F. This means new certifications for crew and upgrades in vessel safety compliance, which is often costly and administratively complex, particularly for small-scale fishers.

- **Afternoon session**: fully dedicated to fishery professionals. A total of 13 participants attended the session

In both sessions, the moderators introduced the overall objectives of the BOUTCAR project, the training course and its content material, the digital platform, and their applicability to enhancing both upskilling and reskilling pathways within the European fishery and aquaculture sector. Furthermore, the moderators facilitated and encouraged the exchange of ideas, opinions, and insights during the pilot test, thereby promoting networking among participants.
From the analysis of the final evaluation questionnaires, the participants when asked about the usefulness of the skills presented, the dominant response was “Very much”, indicating a very high perception of the educational value of the BOUTCAR course. Among the concepts most frequently cited as significant were:

- The importance of aquaculture
- The value of specialized training in the sector
- The role of artificial intelligence applied to fishing
- The complexity of maritime legislation
- The need for greater institutional attention towards the issues of fishing and aquaculture

These elements suggest that the course promoted not only the acquisition of important technical knowledge, but also a broader awareness of the sector context and practical applications of maritime law and technology.

A substantial portion of the discussion concerning key sectoral topics with fishermen focused on offshore wind farms. This subject is of considerable interest among them, as the installation of offshore wind farms necessitates careful consideration of coexistence with fishing activities and, critically, addresses the potential reduction of available fishing grounds. While this issue is applicable across all European waters, it is particularly pertinent given that offshore wind farms and floating solar panels are scheduled for installation off the coast of Emilia-Romagna (Italy) in about 10 years (according to the most recent estimates).

The discussion comprised both the technical aspects of the planned offshore wind farms and potential solutions for ensuring the coexistence of fishing activities with this strategic infrastructure. Toward the conclusion of the session, a noteworthy proposal emerged. Access to maritime areas containing wind turbines could be allowed to fishermen who have received certified training on the regulations and best practices to be observed within these zones. This proposal holds significant relevance for the BOUTCAR project, as it represents a direct application of the core objectives and rationale of the project.

The pilot activities confirmed both the relevance of the proposed training pathways and the need for stronger links between skills development, labour market needs, and emerging blue economy sectors. The following recommendations build on project findings and stakeholder feedback.

2. Spain

The Spanish pilot test was held on 19 June 2026 at Centro de Formación Folgado and was organised in two sessions involving students and teachers. A total of 26 students and 4 tutors participated in the activity. The session focused on testing and evaluating the BOUTCAR digital

training platform, specifically the training programme for advisers on maritime policy, trade, and regulatory compliance.

The pilot test was moderated by Iris Paradís, Andrés Grima, and Carlos Catalán from CFFolgado. The moderators introduced the overall objectives of the BOUTCAR project, the training course and its content material, the digital platform, and its applicability to upskilling and reskilling pathways within the European fisheries and aquaculture sector. Participants were then invited to access the platform, navigate through the available materials, test the course structure, complete quizzes, and provide feedback on usability, clarity, content relevance, and overall learning experience.

All participants completed a pre-assessment test covering aquaculture and fisheries in the Mediterranean, digitalisation, traceability and certification, maritime law and food safety, environmental impacts and climate change, socioeconomic management, and ecosystem services. The results showed an adequate initial average level of knowledge in both groups, with teachers scoring slightly higher than students overall. Students obtained an average score of 9/15, while teachers achieved 10/15. This difference can be linked to the teaching staff's professional background and greater familiarity with regulatory and practical aspects of the sector.

The student group showed a good understanding of general concepts such as traceability, regulation of human activities at sea, electronic logbooks, fisheries certification, invasive species, small-scale fisheries, and socio-economic indicators. However, some weaknesses were identified in more specialised topics such as species, blockchain, quality control systems, the precautionary principle, Codex Alimentarius, climate change, and ecosystem services. Overall, the student profile appeared more theoretical, with transversal knowledge but less grounded in daily sector operations. The teachers' profile was more closely connected to both theoretical and practical knowledge, particularly in relation to maritime regulation and management, although some uncertainty was observed regarding advanced technological concepts when presented in an abstract way.

The evaluation questionnaires completed by the students reflected a positive reception of the course and the digital platform. Participants highlighted the clarity of the course objectives, the good relationship between contents and competences, the progressive and well-structured organisation of the modules, the adequacy of the language used, and the balanced duration of the training programme. The platform was generally considered easy to navigate, useful as a learning tool, and suitable for addressing training needs in the maritime, fisheries, and aquaculture sectors. However, three students experienced access problems due to incorrect login details and participated by working together with other classmates.

Several suggestions for improvement were collected. Students recommended reducing the density of information in some presentations, creating discussion forums for each module instead of only one general forum, and continuing to improve the navigation experience to make it even more intuitive. Teachers also proposed allowing participants to download the syllabus at the end of the course, creating sections for supplementary documentation, especially for regulatory updates, and clearly defining the type of prior training required for each learning pathway.

The final discussion session involved both students and teachers and provided an opportunity to go beyond the technical assessment of the platform. The debate focused on several key challenges currently affecting the fisheries and aquaculture sector, including generational renewal, the need to foster young people's interest in fishing and aquaculture, the simplification of administrative procedures, and the economic difficulties faced by professionals in the sector. Participants also discussed how to comply with environmental regulations without placing an excessive burden on fishing and aquaculture activities.

Particular attention was given to the role of the "Blue Manager" as a possible response to some of these challenges, especially in relation to bureaucracy, technical support, regulatory compliance, and the connection between training and real sector needs. The discussion highlighted the importance of presenting the sector in a more innovative and attractive way, linking it to sustainability, digitalisation, new technologies, and professional opportunities.

Overall, the Spanish pilot confirmed the relevance and usefulness of the BOUTCAR training pathway in vocational education and training contexts. The results show that the course can contribute to strengthening technical, regulatory, environmental, and digital skills among students and teachers. At the same time, the feedback collected points to the need to make some materials more accessible, practical, and visually clear, while reinforcing the connection between theoretical content and real challenges in the fisheries and aquaculture sector.

3. Greece

The Greek pilot test was held on 25 June 2026 at the University of Patras, in two hybrid sessions combining in-person attendance in Mesolongi with remote teleconference. The morning session targeted university students (Bachelor, Master, PhD), and the afternoon session targeted fisheries and aquaculture professionals. Both were moderated by Professors Dimitrios Moutopoulos, George Katselis, and John Theodorou, who introduced the project, training content, and digital platform, and facilitated discussion among participants.

A pre-assessment test covering Mediterranean aquaculture/fisheries, digitalisation, traceability, maritime law, and environmental/climate topics was completed by the participants. Professionals scored marginally higher overall (7/15 vs. 5/15), a pattern consistent across all three knowledge domains. Full consensus was reached on foundational items such as farmed species, traceability definitions, the precautionary principle, and small-scale fisheries characteristics, showing strong familiarity with core terminology. The weakest areas for both groups were climate-change impacts on farmed molluscs and shellfish ecosystem services, flagging clear targets for module reinforcement.

An evaluation questionnaire completed by professional workers and managers showed overwhelmingly positive, consistent feedback: easy navigation, no technical issues, and a clear, readable interface. Course descriptions, language, and lesson duration all received top ratings, and all respondents found the content logically sequenced. Every participant would recommend the courses and continue them at home, with high self-assessed skill adequacy. Free-text comments stressed the importance of digital transition and specialised skills for Blue Economy participation, with minor suggestions including a subsidy-application scoring bonus for training and making some demographic fields optional.

A round table with a mixed group, an aquaculture manager, a lagoon ecosystem manager, a PhD candidate, a postgraduate and an undergraduate student, and a public-authority manager, converged on strong recognition of the emerging "Blue Manager" competence framework. Highlights included the value of fish-pathology knowledge for small-scale operators, managing spatial conflict between fishers and aquaculture, integrating environmental and socioeconomic skills, the relevance of Blue Careers to research and management roles, and growing interest in traceability and emerging technologies. The public-sector representative flagged the workforce's ageing demographic and rising EU reporting requirements as key drivers for Blue Manager training, especially in remote fisheries-dependent areas.

Overall, the Greek pilot confirmed strong relevance and reception of the BOUTCAR training among a senior professional cohort, while flagging climate-change and ecosystem-service content for reinforcement. As with the Italian pilot, small sample sizes (n=9 pre-assessment; n=4 evaluation) warrant caution in generalising results.

Common findings across the pilot tests

Despite differences in national contexts, the pilot activities revealed a high degree of consistency regarding training needs and stakeholder expectations. Participants across all three countries highlighted the growing importance of digitalisation, sustainability, and regulatory knowledge, while expressing strong interest in practical and flexible learning pathways. The pilots also confirmed the need to strengthen links between education providers, industry, and public authorities to ensure that training programmes better reflect evolving labour-market requirements.

Common themes emerging from the pilots include:

- stronger demand for digital skills;
- greater awareness of environmental sustainability;
- increasing importance of regulatory compliance;
- preference for modular and practice-oriented learning;
- need to improve the attractiveness of fisheries and aquaculture careers for young people.

The evidence collected through skills mapping, stakeholder consultations and pilot testing provides a robust basis for the following policy recommendations. These recommendations are intended to support European institutions, Member States, education providers and industry stakeholders in strengthening skills development across the fisheries and aquaculture sectors.

Detailed policy recommendations

The recommendations are organised according to four strategic priorities:

- Alignment with EU policy frameworks;
- Modernisation of education and training;
- Workforce mobility and qualification recognition;
- Support for the green and digital transition.

Based on project progress and alignment with DG EMPL and DG MARE priorities, the following early recommendations are made:

1. Support and align with EU strategic frameworks

- BOUTCAR supports the development of the BlueComp Competency Framework by the European Commission as a tool to standardise skills terminology and support sector-wide recognition of qualifications. Member States and training providers should be encouraged to adopt and contribute to BlueComp through aligned course design, certification schemes, and skills mapping initiatives.
- Leverage the European Ocean Pact and Energy Transition Communication to align BOUTCAR training pathways with EU-wide goals on sustainability, energy efficiency, and social inclusion in fisheries and aquaculture.
- Support the Blue Generational Renewal Strategy (2027) by promoting STEM education, intergenerational knowledge transfer, and targeted upskilling/reskilling programmes, including dedicated pathways for women and underrepresented groups.
- Integrate innovation ecosystem tools such as the Smart Specialisation Thematic Platform and the Knowledge and Innovation Community (KIC) into regional and national blue skills development strategies to boost competitiveness and investment attraction.
- Expand youth engagement initiatives, building on the EU4Ocean Coalition's internship programmes to create hands-on training and career entry points that connect ocean literacy with emerging blue economy jobs.
- Foster an Ocean Union approach that promotes coordinated maritime spatial planning, strengthens international cooperation, and underpins a resilient and sustainable blue economy workforce.

2. Support modular, stackable training paths

- Develop flexible, stackable learning modules that allow reskilling without long career breaks.
- Align modules with the European Qualifications Framework (EQF).

3. Recognise and certify blue professions

- Establish EU-wide recognised certifications for emerging blue careers, particularly in digital aquaculture, marine compliance, and sustainable fishing.

4. Bridge training and offshore energy opportunities

- Fund pilots and training initiatives that link fisheries workers to roles in marine environmental monitoring and offshore renewable infrastructure.

5. Enhance access and attractiveness

- Support targeted outreach to young people, women, and migrant workers.
- Integrate blue career modules into secondary education, apprenticeships, and university pathways.
- Support initiatives that orient young people towards education and vocational training programs related to the blue economy.
- Develop dedicated career guidance models for blue economy professions.
- Promote entrepreneurship and self-employment within the blue economy.

6. Streamline transition pathways between STCW-F and STCW

Establish clear and accessible pathways for fishers and small vessel operators to transition between STCW-F and STCW certification, including:

- Modular or "bridging" training,
- Recognition of prior experience at sea,
- And financial support for mandatory certifications.

7. Enable multi-use vessel certification for coastal operators

Support regulatory innovation allowing for hybrid or dual-use vessel certification (e.g. fishing + maritime offshore personnel transport), particularly for small-scale operators. Pilot schemes could:

- Reduce administrative duplication,
- Expand income diversification for fishers,
- And ensure vessels can safely and legally serve multiple blue economy functions.

8. Incorporate STCW-F into EU law and assign oversight to EMSA

As highlighted by the European Commission in its assessment of fisheries training and certification needs, there are currently no harmonised minimum standards for the training and certification of fishers in the EU. This poses problems for: (i) safety (fishing is considered one of the most dangerous occupations in Europe); (ii) understanding of existing legal obligations; (iii) adaptability to changing circumstances; and (iv) mobility across Member States. The Commission is currently assessing the best way to implement into EU law existing international standards for the training and certification of fishers[7].

To ensure safety, labour mobility, and fair working conditions in the fisheries sector, the Commission should:

- Propose a dedicated directive transposing the STCW-F Convention into EU legislation, as has been done for STCW (Directive 2008/106/EC).
- Assign the European Maritime Safety Agency (EMSA) a coordinating role to support mutual recognition of STCW-F certificates, promote harmonised implementation across Member States, and assist in training quality assurance.

Online Repository of Training Resources and Learning Materials

To maximise the long-term impact and transferability of project results, BOUTCAR supports the establishment of an online repository of training resources and learning materials accessible to education providers, industry stakeholders, public authorities, and learners across the European Union.

[7] European Commission (2025), *EU fishers training and certification standards*, Available online: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/16352-EU-fishers-training-and-certification-standards_en

The repository should serve as a central knowledge hub containing training modules, teaching materials, case studies, practical exercises, assessment tools, policy resources, and guidance documents developed throughout the project. Wherever possible, materials should be made available as open educational resources (OERs) to facilitate their adaptation and reuse by vocational education and training (VET) providers, universities, training centres, and industry organisations.

The repository should also support the objectives of the BlueComp Competency Framework by linking learning materials to relevant skills and competence areas, thereby contributing to greater consistency and comparability of blue economy training across Member States.

To ensure broad accessibility and uptake, the repository should:

- Provide multilingual resources where feasible;
- Include materials suitable for both initial training and lifelong learning pathways;
- Promote the use of micro-credentials and modular learning approaches;
- Facilitate knowledge exchange between education providers, industry, social partners, and policymakers;
- Showcase examples of good practices and innovative training initiatives from different EU regions.

In the longer term, the repository could be integrated into wider European blue skills initiatives and networks, supporting the dissemination of project results, fostering cooperation among stakeholders, and contributing to the development of a more skilled, resilient, and future-oriented workforce for the fisheries and aquaculture sectors.

Conclusion and Main Takeaways

The BOUTCAR project demonstrates that the future competitiveness, sustainability, and resilience of the European fisheries and aquaculture sectors will depend on the availability of a skilled and adaptable workforce. As the blue economy undergoes both green and digital transitions, new competencies are required across all levels of employment, ranging from operational and technical roles to management, compliance, and policy-related functions.

Project activities, including skills mapping, stakeholder consultations, and pilot testing, confirm that significant gaps remain in digital literacy, environmental management, regulatory knowledge, and awareness of career opportunities within the sector. At the same time, participants highlighted strong interest in emerging topics such as artificial intelligence, smart aquaculture systems, maritime legislation, and the interaction between fisheries and offshore renewable energy developments.

BOUTCAR contributes to addressing these challenges by developing flexible and modular training pathways that support upskilling, reskilling, and lifelong learning. The project also provides practical insights that can support the implementation of key EU initiatives, including the BlueComp Competency Framework, the European Ocean Pact, the Energy Transition of Fisheries and Aquaculture, and the future Blue Generational Renewal Strategy.

Particular attention should be given to ensuring that future fisheries and aquaculture qualifications are progressively aligned with the BlueComp Competency Framework, facilitating transparency, comparability, and mobility across the European Union.

The project highlights the following priority actions for European institutions, Member States, education providers, and industry stakeholders:

- Support the **development and recognition of blue economy qualifications across the EU**.
- **Promote modular and stackable training pathways** aligned with the European Qualifications Framework.
- **Improve access to training** for young people, women, migrant workers, and other underrepresented groups.
- **Strengthen links** between fisheries, aquaculture, offshore renewable energy, and other emerging blue economy sectors.
- **Reduce regulatory and financial barriers** affecting workforce mobility and professional diversification.
- **Enhance cooperation** between industry, education providers, social partners, and public authorities to anticipate future skills needs.

By supporting these actions, the European Union and Member States can help ensure that fisheries and aquaculture remain attractive, innovative, and sustainable sectors capable of contributing to Europe's food security, climate objectives, coastal resilience, and long-term blue growth.

Beyond its immediate project outputs, BOUTCAR demonstrates how European cooperation can translate emerging labour-market needs into practical education and training solutions. By aligning competency profiles, modular learning pathways and policy recommendations with BlueComp and other EU strategic initiatives, the project provides a scalable model for future blue skills development. Its legacy extends beyond the fisheries and aquaculture sectors, contributing to a more resilient, innovative and sustainable European blue economy capable of supporting long-term competitiveness, social inclusion and climate objectives.

The experience of BOUTCAR demonstrates the value of sector-driven approaches in translating European skills strategies into operational training solutions capable of supporting coastal communities and the long-term sustainability of the blue economy.