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RECEIVED 15 March 2024

ACCEPTED 15 July 2025

PUBLISHED 25 August 2025

CITATION

Sønvisen SA, Johnsen JP and Vik J (2025)
Ungraying of the Norwegian fishing fleet:
turning the tide?
Front. Sustain. 6:1401587.
doi: 10.3389/frsus.2025.1401587

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Ungraying of the Norwegian fishing fleet: turning the tide?

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The “graying of the fleet” has been a persistent challenge in many fisheries worldwide, with an aging workforce and declining youth participation raising concerns about recruitment and knowledge transfer. However, since 2014–2015, Norway has experienced a reversal of this trend. This paper explores the phenomenon of “ungraying” in the Norwegian fishing fleet. Drawing on survey data and the Fisheries Employment System (FES) theoretical framework, the study finds that recruitment challenges are not widespread and current recruitment patterns reveal a strong reliance on social networks, though formal education is becoming more important. The Norwegian case illustrates how targeted policies, combined with evolving social and economic conditions, can address demographic challenges in fisheries. However, sustaining this trend requires adaptive strategies that balance the need for formal qualifications with mechanisms that maintain community-based engagement, ensuring the long-term vitality of coastal communities and the fisheries. This study contributes to the literature on fisheries recruitment and employment and introduces the Fisher Pathway Model (FPM), which is an analytical framework to capture the evolving FES and the interplay between primary and secondary socialization.

KEYWORDS

fisheries recruitment, coastal employment system, fisheries employment system, graying of the fleet, fisheries employment, Fisher Pathway Model (FPM)

1 Introduction

For decades, many fisheries nations have faced demographic changes in rural and coastal communities (Hamilton and Otterstad, 1998; Stein, 2019a). Alongside this, there has been a decline in number of fishers and an increase in the average age those engaged in commercial fishing. This phenomenon, often referred to as “the graying of the fleet” (Wink et al., 2007), has been extensively studied in the North American context (Cutler et al., 2022; Cramer et al., 2018; Haugen et al., 2021; Donkersloot and Carothers, 2016; Ringer et al., 2024; Johnson and Mazur, 2018). However, this phenomenon and its implications extend far beyond the North American context (Lebedef and Chambers, 2023; Maynou et al., 2013; White, 2015).

Research in various countries highlight several factors contributing to the graying of the fleet. Among these are management policy responses to ecological changes, such as fleet consolidation under limited entry regimes. These policies have increased the cost of entry for young fishers and reduced the number of small-scale operations, which often serve as entry point for young fishers (Cutler et al., 2022; Johnson and Mazur, 2018; Andreatta and Parlier, 2010; Richardsen, 2021). For example, in Bristol Bay and Kodiak, Alaska, the implementation of the halibut and sablefish IFQ program in 1995 raised the cost of access rights, creating substantial barriers for youth (Donkersloot and Carothers, 2016). Additionally, shifting occupational preferences among younger generation have further reduced the interest in pursuing a fishing career (Ringer et al., 2024; Johnsen and Vik, 2008).

The decline in the number of skilled fishers and the diminishing transfer of fisheries knowledge and expertise raise concerns for both the sustainability of the industry and the resilience of coastal communities (Johnson and Mazur, 2018). Further, fewer fisheries actors may reduce points of contact between the fleet and coastal communities, potentially disconnecting fleet from historical fishing communities (Sønvisen et al., 2011). With time, this may weaken the social and economic fabric of coastal fishing communities.

In Norway, the fisheries and seafood industry has played – and continues to play – a significant role in national, regional, and local economies. The about 10,000 registered fishers working in the Norwegian fishing fleet significantly impacts coastal communities through employment, income, and settlement (The Office of the Auditor General, 2020).

Despite of an increase in catch volume and value since 2000, the number of fishers in Norway has declined by over 30% in the same period (DoF, 2024a). Several factors contribute to this decline, with one factor being the lack of young fishers entering the fleet (Hagevik, 2006). Coupled with older fishers tending to remain in the occupation longer (Richardson, 2021), this has led to an increase in the average age of the Norwegian fishers, rising from 43.1 years in 2004 to 45.4 years in 2018 (The Office of the Auditor General, 2020).

Although the graying of the fleet is a challenge in many fisheries (Muratore, 2024; Ringer et al., 2024), in recent years, Norway appears to be “swimming against the current.” Since 2014, the long-term decline in number of fishers has stabilized, and between 2014 and 2023, the number of full-time fishers increased by 271 (from 9,386 to 9,657, a 3% increase). Notably, this growth has been driven by fishers under 30, whose numbers have risen from 1,613 in 2014 to 2,257 in 2023 (a 40% increase) (The Office of the Auditor General, 2020; DoF, 2025).

To explore this “ungraying of the fleet” phenomenon in Norway, this study examines recruitment trends and patterns in the Norwegian fishing fleet anno 2023. Specifically, we ask:

- Do vessel owners experience recruitment challenges?
- What are the current recruitment patterns?
- What is the outlook for retaining fishers in the near future?

Drawing on quantitative survey data and a theoretical framework derived from Fisheries Employment System (FES) theory, this article contributes to the understanding of the “graying of the fleet” phenomenon and the broader literature on fleet recruitment. Understanding the dynamics and complexities of this ungraying trend is crucial for developing effective strategies to rejuvenate fishing fleets and ensure sustainable coastal communities, both in Norway and globally.

The paper is structured as follows: Section 2 presents the theoretical framework, followed by a description of the methods used and the representativeness of our data in Section 3. Section 4 outlines the findings, which are discussed in Section 5. Section 6 outlines directions for future research, and the paper concludes in Section 7.

2 Theoretical framework – the changing employment system

In this paper, our point of departure is the theoretical framework of the Coastal Employment System (CES) (Jentoft and Wadel, 1984;

Johnsen, 2004). This theory builds on Berger and Luckmann’s (1967) concepts of primary and secondary socialization and is rooted in the notion that recruitment is intricately linked to socialization processes within fisheries communities. Consequently, the phenomenon of the “graying of the fleet” is not only linked to recruitment but also to processes of socialization.

In the CES the fishing fleet has played a central role as the site where constituting economic and social activities occur. In close-knit coastal communities, young individuals develop knowledge and interest in fishing through intimate relationships with family and friends. This reflects what Berger and Luckmann (1967) described as primary socialization, which takes place within personal and affective relationships in local environments. During this process, children acquire the knowledge, values, and norms specific to their social networks.

The primary socialization is followed by what Berger and Luckmann (1967) termed secondary socialization. Secondary socialization is a more structured and formal process, involving the acquisition of specialized fishing skills. This often entails formal education, apprenticeships, or on-board training, culminating in the attainment of certificates (tickets) and qualifications necessary to becoming a qualified fisher. As technology advances and formal requirements for participation increase, secondary socialization can be expected to play an increasingly important role in recruitment.

Due to radical changes both in fisheries and coastal communities since the 1980s and 1990s (Johnsen, 2004), the CES theory cannot be directly applied in the contemporary situation. Significant shifts in all aspects of life, such as the expansion of education, the need for dual incomes, the emergence of stable income-generating jobs for women, and evolving expectations around family life – with men taking more active roles in childcare and household responsibilities – have challenged the traditional division of labor.

Traditionally, the CES in Norway and other North Atlantic countries was gendered, with a strict division of labor between men and women. Fishing was male dominated, while women were involved in processing and land-based services that supported the fishing activity (Gerrard and Kleiber, 2019). This employment system reinforced the cultural patriarchy, power dynamics, and structural access to positions and resources within the community (Calderón-Contreras and White, 2020). Over time, however, more women began to enter the fisheries (Gerrard and Kleiber, 2019).

Simultaneously, reduced number of fishers and vessels, fewer fishing families, and changes in the operational patterns of the fishing fleet made fishing less geographically tied to coastal communities. This detachment, as described by Sønvisen et al. (2011) and Sønvisen (2013), weakened traditional patterns of primary socialization through local communities. New networks for fishing employment have emerged, becoming more specialized and extending beyond coastal communities, even internationally. As a result, the traditional CES evolved into a more professionalized Fisheries Employment System (FES), where primary and secondary socialization processes became more interwoven. In this paper, we make use of the FES framework (Sønvisen et al., 2011; Sønvisen, 2013).

Before 1990, Norway’s fisheries, dominated by vessels under 28 meters, operated under open access with minimal regulations and low profitability. Employment and catch capacity were partially sustained through direct subsidies to the fishing fleet. After 1990,

with the closure of the main fisheries, Norway's commercial fisheries became strictly regulated, introducing access and catch limitations in form of permits and quotas. Moreover, direct subsidies were removed. These changes led to structural adaptations of the fleet, which reduced the demand for labor, limiting opportunities for local people in the fleet. The changes in the relationship between fisheries and communities must be understood against the backdrop of these regulatory transformations (for a general overview of the system see [Johnsen and Jentoft, 2017](#); [Johnsen, 2020](#)). The FES approach acknowledges that social-ecological changes have significantly influenced – and continues to influence – the employment system.

3 Methods

To answer our research questions, we make use of multi-method approach consisting of quantitative and qualitative methods. The following section describes the study design.

3.1 Data collection

The primary quantitative data in this article stems from the survey conducted as a part of the Recruitment 2023 Study ([Sønvisen et al., 2023](#)), which builds on two earlier studies ([Johnsen and Vik, 2008](#); [Sønvisen et al., 2017](#)). The purpose of all three studies have been to examine how changes in fleet structure and technology have impacted recruitment to the Norwegian fishing fleet. These studies collected quantitative data through a nationwide survey of active fishers and fishing vessel owners.

The data collected includes information on demographics, recruitment practices, career perspectives, and opinions about developments in the fishing industry, providing insights into employment systems and recruitment challenges over time. The 2023 survey was conducted during the spring and summer through mobile phone interviews administered by the professional polling agency Norfakta.

Of the total 9,597 fishers listed in the official fisher registry ([DoF, 2024a](#)), Norfakta had access to approximately 5,000 fisher phone numbers. A total of 921 fishers answered the survey, yielding a response rate of just above 18%. Informants were randomly selected from the Official Fisher Registry (Fiskeremnantallet) of full-time fishers (Blad-B). This registry is open to all individuals with permanent residency in Norway, provided their income from non-fishing activities does not exceed a specific threshold. Registration is mandatory for all vessel owners, but optional for crew members. Due the seasonality and high mobility in Norwegian fisheries, mobile phone interviews have proven to be the most effective method for reaching a representative sample of fishers.

The survey consisted of 33 questions, 14 of which were exclusively directed at vessel owners, focusing on vessel operations. These questions addressed topics such as origins of recruits, recruitment methods, desired qualities in recruits, experienced recruitment problems, and expectations for the future. The remaining questions were directed at both vessel owners and crew, covering topics such as motivations for becoming fishers, health-related issues, technological developments, and fisheries policy. Additionally, the survey included

questions on demographic and operations, such as geographic location, gender, vessel size, and type of fishing.

Most questions had predefined answer options, such as a Likert scale ranging from 1 to 6 (e.g., 1 = highly unlikely, 5 = highly likely, 6 = I do not know/do not want to answer). While most questions required a single response, some allowed for multiple answers, and a few included open-ended response options. For a detailed list of survey questions, see Attachment 1: Survey Questions.

This survey data was supplemented with open-access quantitative data from the Directorate of Fisheries (DoF), including data from the official fisher and vessel registries. This additional data was used to illustrate changes in number of fishers over the years and to analyze the representativity of the sample.

In addition, to the quantitative data, we used scientific reports, scientific articles, and newspaper articles. In particular, and for comparison, we relied upon two previous recruitment surveys from 2007 ([Johnsen and Vik, 2008](#)) and 2015 ([Sønvisen et al., 2017](#)).

3.2 Analysis

The analysis combined descriptive and inferential statistical techniques to examine recruitment and retention trends in the Norwegian fishing fleet. Official registry data from the Directorate of Fisheries (DoF) were analyzed to identify long-term developments in fisher demographics and labor engagement from 2003 to 2023. Time series visualizations were used to illustrate changes in the total number of fishers and in the subset under the age of 30.

Survey data from fishers ($n = 921$) were analyzed using descriptive statistics to assess perceptions of recruitment challenges, sources of recruitment, skill requirements, motivations for entering the occupation, and expectations about the future. Frequencies and percentages were reported for all categorical variables, and results were presented across relevant fleet segments (small coastal, large coastal, and deep-sea vessels).

Cross-tabulations were used to explore variation in recruitment experiences and retention expectations between fleet segments. Pearson chi-square tests ([Løvås, 2018](#)) were employed to test for statistically significant differences between groups.

The analysis was carried out using IBM SPSS version 29.0.2.0 (20). Graphs and tables were subsequently created in Excel based on the SPSS analysis.

3.3 The sample

[Table 1](#) presents the characteristics of the sample. Of the 921 informants, 506 of them were crew members, 184 were vessel owners without crew (fishers fishing alone), and 231 were vessel owners with crew. A total of 889 informants identified as male, while 32 identified as female.

Distinguishing between vessel owners with and without crew is crucial for the analysis, as recruitment involves both crew members and vessel owners. While vessels owners without crew play a significant role in supporting coastal employment and settlement through self-employment, vessel owners with crew make strategic decisions regarding recruitment that may affect employment both within and beyond their local communities.

The average age of the informants in our survey was 46.9, compared to 43 years in the official registry. Women comprised 3.5% of the sample, which is lower than the 5% representation in the official registry (DoF, 2024a). The underrepresentation of women was anticipated, given the relatively low number of women in the fishing fleet and the difficulty of locating them in a random sample.

3.4 Representativeness

Several analyses were conducted to assess the representativeness of the sample. First, the age of respondents was compared to that of full-time fishers (Blad-B) in the official fisher registry. Table 2 shows that the age group 50–59 was somewhat overrepresented, while the age group 20–29 was underrepresented. One reason for the underrepresentation of young people, may be that young people are particularly difficult to reach, often refusing to participate in surveys (Blaker, 2019).

Secondly, we analyzed the representativity of the sample in terms of geography. Table 3 shows that most respondents hailed from the biggest fisheries counties, particularly the northernmost counties of Troms and Finnmark (24.5%), as well as Nordland (20.1%), with substantial representation from Møre and Romsdal (21.0%) and Vestland (18.1%). It also shows minor differences between our survey and the official fisher registry. The largest discrepancy is in the county of Vestland, where our survey overrepresents the official registry by 1.8%.

Third, we analyzed the representativeness of our sample regarding the distribution of vessel owners (and, by extension, crew members). In Norway the Participation Act (Deltakerloven), requires vessel owners to be active fishers; thus, we can reasonably assume that each vessel has one registered owner. Thus, the official fishing vessel registry serves as a proxy for estimating the number of vessel owners. To focus on full-time fishers and active commercial vessels, we included only vessels generating a minimum annual income of NOK 50,000 (approx. USD 4,700).

Table 4 shows that the proportion of vessel owners (with crew and without crew) compared to crew members is consistent between our survey and the official registry, with 45% being vessel owners and 55% being crew members. However, a limitation of this comparison is that a single vessel owner may own several vessels, making the two figures not entirely comparable. This may however be offset by the fact that some vessels have more than one owner. Nevertheless, according to the DoF (2021), the majority of vessels are owned by a single individual.

Despite minor deviations, the sample was considered representative in terms of age, gender geography, and role (crew and vessel owners), thereby reflecting the entire fishing fleet (Sønvisen et al., 2023).

4 Results

In the following sections, we present the empirical data to explore why the Norwegian fishing fleet is “swimming against the current” and experiencing an ungraying trend. First, we examine the recent development in the number of fishers in the fleet and compare this with the vessel owners’ own perceptions of the recruitment situation. Next, we analyze the current recruitment

TABLE 1 Characteristics of the sample.

Variable	Numbers/years
Crew	506
Vessel owner without crew	184
Vessel owner with crew	231
Male	889
Female	32
Average age	46.9
Years working as a fisher (average)	25

TABLE 2 Representativeness of the sample in terms of age (DoF, 2024a).

Year	Recruit23 (n = 921)	Fisher registry (n = 9,597)	Deviation
<20	0.9%	3.6%	−2.7%
20–29	14.7%	18.8%	−4.1%
30–39	17.0%	19.2%	−2.2%
40–49	19.0%	16.3%	2.7%
50–59	27.3%	21.7%	5.5%
60–69	17.5%	15.6%	1.9%
70+	3.7%	4.8%	−1.1%
Total	100%	100%	

TABLE 3 Representativity in terms of geography (DoF, 2024a).

County	Recruit23 (n = 921)	Full-time fishers Blad B (n = 9,597)	Deviation
Troms og Finnmark	24.5%	24.1%	0.4%
Nordland	20.1%	21.0%	−0.9%
Trøndelag	4.5%	5.2%	−0.7%
Møre og Romsdal	21.0%	21.7%	−0.7%
Vestland	18.1%	16.3%	1.8%
Rogaland	4.7%	4.3%	0.4%
Agder	3.1%	3.3%	−0.2%
Vestfold og Telemark	1.3%	1.3%	0.0%
Viken	1.7%	1.7%	0.0%
Oslo	0.8%	0.7%	0.1%
NA	0.2%	0.3%	−0.1%
Total	100%	100%	

TABLE 4 Representativeness of sample in terms of role (DoF, 2024c).

Role	Recruit23		Official registry	
	Count	Share	Count	Share
Crew	506	55%	5,306	55%
Vessel owner without crew	184	20%	4,291	45%
Vessel owner with crew	231	25%		
Total	921	100%	9,597	100%

patterns in the Norwegian fishing fleet. Finally, we address retention by examining the future outlook through the perspectives of the fishers themselves.

4.1 Development in numbers of fishers

In this section, we will first explore the development of the number of fishers in the Norwegian fishing fleet since 2003, using official data from the Directorate of Fisheries (DoF). Then, from section 4.2 onward, we present our findings on recruitment and recruitment patterns. Since recruitment involves onboarding young people, we focus particularly on the recruitment of youth (under the age of 30).

Over the past two decades, the number of full-time fishers has decreased, from around 13,821 in 2003 to about 9,657 in 2023. However, this trend has leveled off since 2015 (Figure 1). A similar

pattern is observed among fishers under the age of 30. While the overall number of fishers in this age group declined between 2003 and 2023, it has risen since 2014, increasing from 1,613 to 2,257 in 2023 – a growth of 40% (Figure 2) (DoF, 2025).

The annual profitability surveys of the fishing fleet, conducted by the DoF, indicate a continuous improvement in fleet profitability during this period (DoF, 2024b). These surveys, based on accounting data from a representative selection of Norwegian fishing vessels, assess the economic performance of various fleet segments, focusing on income, costs, and profitability.

Furthermore, despite the reduced number of vessels, the DoF's estimates reveal a rise in both employment and labor efforts within the

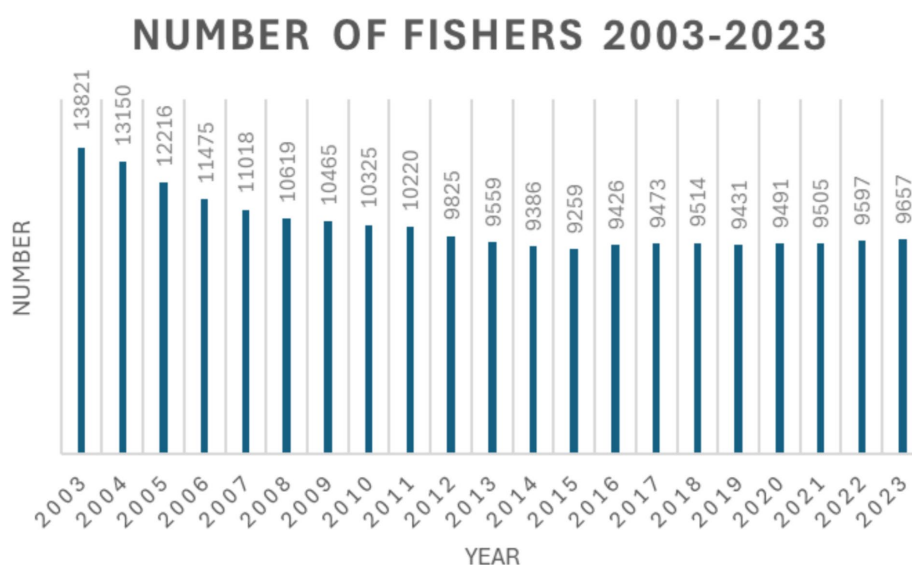


FIGURE 1

Development in total number of fishers in the Norwegian fishing fleet from 2003 to 2023 (DoF, 2025).

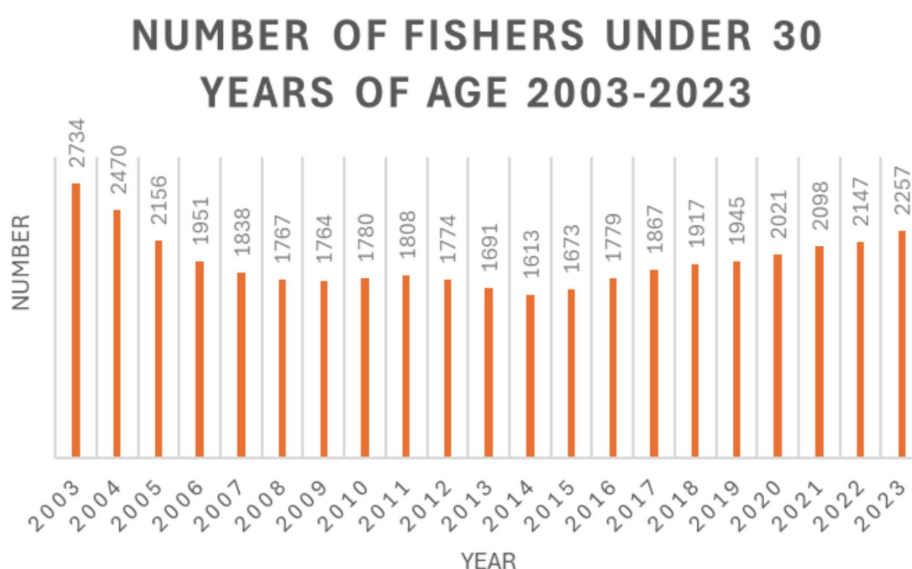


FIGURE 2

Development in number of fishers under the age of 30 from 2003 to 2023 (DoF, 2025).

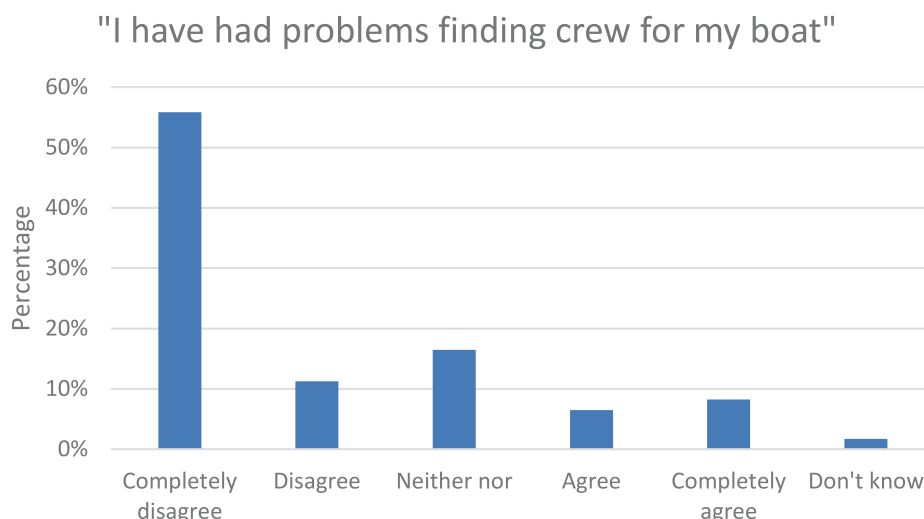


FIGURE 3
Experienced recruitment problem in the fishing fleet? (vessel owner with crew, $n = 231$).

fleet. A modernized fishing fleet with larger quotas appears better equipped to operate year-round with higher profit margins, enabling fleet operators to expand their workforce. Even among smaller coastal vessels, the use of shift systems has become increasingly common (DoF, 2024c).

4.2 Vessel owners' perception of recruitment problems

Regardless of whether the total number of fishers is increasing or decreasing, a key question remains: do Norwegian vessel owners have sufficient crew to operate? In 2023, 67% of vessel owners with crew ($n = 231$) either disagreed or strongly disagreed with the statement: "I have had problems acquiring crew for my vessel" (Figure 3).

However, we cannot assume that this is the case across the fleet. Deep-sea vessels, which require larger crews, may face different recruitment challenges, compared to smaller coastal vessels. For the analysis, the fleet was divided into three categories: small coastal vessels (under 15 meters), large coastal vessels (15–27.99 m), and offshore or deep-sea vessels (28 m and above). Given their larger crew requirements, it was reasonable to expect that large coastal vessels and deep-sea vessels may encounter greater recruitment challenges. However, as seen in Table 5, neither of these vessel categories reported recruitment problems.

4.3 Recruitment patterns

While the fishing fleet in 2023 did not experience a recruitment problem, its future vitality hinges on the continual influx of new fishers. Therefore, understanding why individuals choose to pursue a career in fishing and where they originate from is important. Exploring the latter aspect first – the origins of recruits, we asked vessel owners with crew "where do the recruits come from geographically?" Table 6 shows that for the smaller vessels' recruits hail from a smaller geography (e.g., home municipality, indicated by

TABLE 5 Recruitment challenges in various fleet segments (vessel owner with crew, $n = 231$).

To what degree do you agree or disagree that "I have had problems finding crew for my boat"?	Small coast	Large coast	Deep sea
Completely disagree	54%	43%	66%
Disagree	8%	27%	11%
Neither nor	21%	13%	9%
Agree	7%	7%	6%
Completely agree	8%	10%	8%
Do not know	3%	0%	0%

Pearson chi-square 16,849; df 15; $p = 0,328$.

TABLE 6 From where recruits come from (vessel owner with crew, $n = 231$).

Recruit from	Small coast ($n = 136$)	Large coast ($n = 30$)	Deep sea ($n = 64$)
Own family	27%	17%	25%
Home municipality	45%	37%	42%
Home county	38%	43%	48%
Norway	22%	27%	44%
Other countries	5%	17%	13%

Significant difference for recruitment from "Norway" (Pearson chi-square 10.505; df: 3; $p = 0.015$).

higher share in darker green); whereas larger sized vessels' recruits come from a larger geography (e.g., all of Norway).

To understand why fishers decided to pursue a career in fishing, we asked our respondents to evaluate the importance of various factors influencing their decision to become fishers. Figure 4 shows the responses to the question "How important were the following factors for you to become a fisher?" "I do not know" and "Do not want to answer" have been omitted (from 0.2 to 1.7% of the answers). The vast majority were drawn to the profession due to their interest

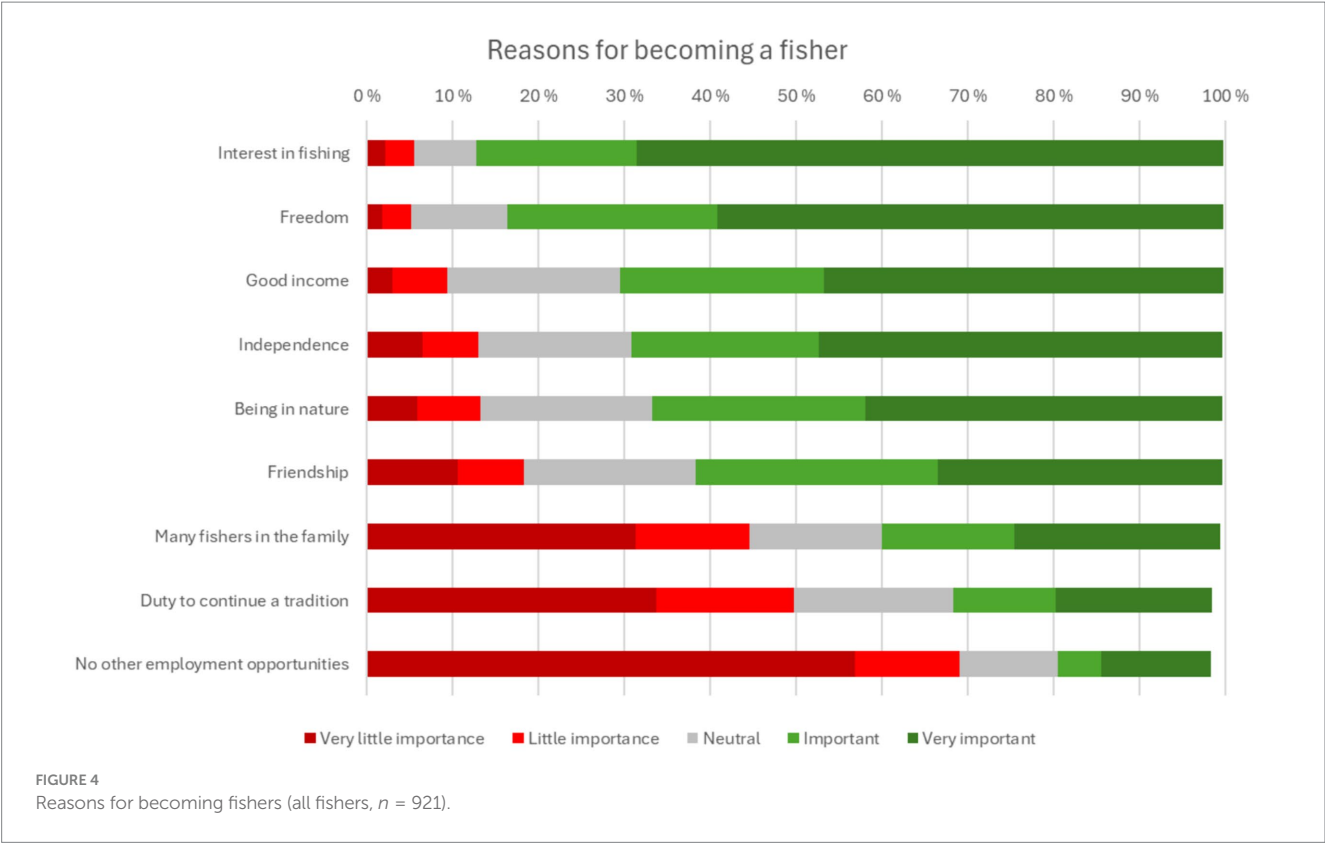


TABLE 7 Recruitment channels (vessel owner with crew, $n = 231$).

Recruitment channels	Small coast ($n = 136$)	Large coast ($n = 30$)	Deep sea ($n = 64$)	Total
Acquaintance and social networks	63%	47%	66%	61%
Social media	15%	10%	23%	17%
Other	8%	23%	19%	13%
Vocational schools	7%	17%	16%	11%
Requests from potential recruits	7%	10%	8%	8%
Advertising	5%	3%	9%	6%
Do not know	7%	3%	3%	5%
Cooperation with other vessels	2%	10%	3%	4%
Employment agencies	2%	0%	0%	1%

Sign. difference for “recruitment through cooperation with other vessels” (Pearson chi-square 28.791; df: 3; $p < 0.000$).

in fishing (87%), but the sense of freedom in the occupation was also important (83%). These factors were followed by good income opportunities in fishing (70%), a desire to be independent (69%), being in nature (66%) and friendship (61%). Other factors of less importance for the occupational choice were that there were many fishers in the family (39%), they felt it was a duty to become a fisher (30%), and they had no alternative job opportunities (18%).

Another crucial aspect related to the recruitment of young fishers is the channels through which vessel owners conduct their recruitment efforts. Understanding these channels is essential for informing recruitment policies. Table 7 shows the recruitment channels vessel owners with crew utilize in the various fleet segments to recruit crew members. The table shows that most vessel owners, regardless of fleet

segment, rely on social networks as a primary mode of recruitment (61%). The second most utilized channel for recruiting fishes is social media (17%), followed by other methods (13%), and vocational schools (11%). There was no significant difference between the fleet segment apart from “cooperation with other vessels.”

Yet another critical aspect concerning recruitment pertains to the skills and competencies demanded of recruits. Table 8 shows the specific skills and competencies vessel owners seek in their recruits. Foremost among these is the willingness to work, which encompasses factors such as working capacity and effort. Despite the growing importance of formal education in society in general, only 5% of vessel owners demand formal education. Of particular significance is the observation that most skills and competencies demanded revolve

around personal attributes. This underscores the importance of qualities such as motivation, adaptability, communication skills, and teamwork – attributes that are often cultivated through life experiences and on-the-job training.

4.4 Retention of fishers – thoughts about the future in fishing

Retaining young people within the fishing industry is crucial for its sustenance and development. A key measure of potential retention is whether respondents envision themselves remaining in the industry. Table 9 shows what the informants think they will be doing in 5 years. Most informants (between 72 and 77%) think they are still fishing. Between 13 and 19% think they are retired by then. Among crew members 1% think they will have started a fisheries education, 2% may have quit fishing, while less than 1% have bought their own vessel (There was no significant difference between the groups).

Another gauge of potential retention lies in the future expectations of fishers. Consequently, all vessel owners, with crew ($n = 231$) and without crew ($n = 184$), were asked about their expectations regarding

the financial developments of their business in the next 5 years. Among them, 55% expressed optimism, foreseeing positive economic growth within the next 5 years. Conversely, 27% held a pessimistic outlook, anticipating a decline in economic results (There was no significant difference between the two groups).

This finding must be contextualized within the broader economic trajectory of recent periods, as this is likely to affect future expectations. Therefore, vessel owners with crew ($n = 231$) and vessel owners without crew ($n = 184$) were asked about the economic performance over the past 5 years. Almost 80% of respondents indicated a positive direction in economic results during this period (There was no significant difference between the two groups).

A final, and important, metric for assessing potential retention, is the level of satisfaction with the occupation, which tends to positively correlate with the likelihood of individuals recommending the occupation to others (Lee et al., 2023). All respondents received this question and in total 87% affirmed that they would recommend the occupation to others. On this question, crew members were significantly more positive to recommend the fishing occupations (93%), compared to vessel owners with crew (85%) and without crew (76%) (Pearson chi-square 45.026; df: 6; $p < 0.0000$).

TABLE 8 Demanded skills and competencies in recruits (vessel owners with crew, $n = 231$).

As an owner, which qualities do you emphasize and demand in recruits?	
Willingness to work (incl. Work capacity/effort)	45%
Interest	29%
Dutiful (incl. Honest/punctual)	21%
Willingness to learn	16%
Collaborative (incl. Social/sociable)	10%
Independence	8%
Experience (incl. Practical knowledge)	8%
Good mood	6%
Education	5%
Physically strong (incl. Good shape)	4%
Sobriety	2%
Safety focus	2%

5 Discussion

In this section, we will discuss our findings and highlight how they contribute to the “ungraying” of the Norwegian fishing fleet. We will mirror our findings with other research, in particular, the recruitment studies carried out in 2007 and 2015 (Sønvisen et al., 2017; Johnsen and Vik, 2008). The questions to be discussed are: (1) whether vessel owners face recruitment problems, (2) what the current recruitment patterns are, and (3) the prospects for retaining fishers in the near future. We then discuss (4) various recruitment and fisheries policies that may have contributed to recruitment to varying degrees, before we (5) summarize our findings in a comprehensive model for fleet recruitment.

5.1 Recruitment problems

Our findings indicate that there is currently no widespread recruitment problem in the Norwegian fishing fleet. Between 2007

TABLE 9 What fishers see themselves doing in 5 years ($n = 921$).

What do you think you will be doing in 5 years?	Crew ($n = 506$)	Vessel owner without crew ($n = 184$)	Vessel owner with crew ($n = 231$)	Total ($n = 921$)
Same as now	76%	72%	77%	76%
Retired	13%	19%	17%	15%
Fisheries education	1%	0%	0%	1%
Quit fishing	2%	1%	1%	1%
Work in other maritime industry	1%	1%	1%	1%
Bought my own boat	<1%			0%
Work in oil/supply	1%	0%	0%	0%
Other	4%	3%	2%	3%
Do not know	3%	5%	2%	3%

Pearson Chi-Square 22.976; df: 16; $p = 0.114$.

and 2015, the number of active fishing vessel declined by 11% and the number of full-time fishers decreased by 16% (DoF, 2024c). During the same period, the average age of fishers rose from 46.5 to 47.2 years (Johnsen and Vik, 2008; Sønvisen et al., 2017). This rise was partly driven by a 9% decline in number of fishers under the age of 30 and a 12% increase in fishers over the age of 60 (DoF, 2025).

While these trends reflect an aging workforce, they do not point to an acute recruitment crisis. Although the share of vessel owners reporting difficulty in hiring crew increased from 10.6% in 2007 to 20.6% in 2015, the majority still reported being able to recruit the crew they needed (Sønvisen et al., 2017; Johnsen and Vik, 2008).

Moreover, recruitment challenges at the local level were often mitigated through the open labor market within the European Economic Area (EEA). In both 2007 and 2015, around one in five vessel owners reported hiring crew from abroad – primarily from other Nordic countries and the wider EEA (Sønvisen et al., 2017; Johnsen and Vik, 2008).

These trends shifted between 2015 and 2023, as the decline in numbers of fishers began to reverse around 2014–2015. From 2015 to 2023, there was a marginal increase of 40 active vessels (1%) and around 4% rise in the number of full-time fishers. Similarly, the number of young fishers under the age of 30 grew by 35% and the number of fishers over the age of 60 declined by 4% (DoF, 2024c, 2025). As a result, the average age of fishers slightly decreased from 47.2 to 46.9 years (Sønvisen et al., 2017; Johnsen and Vik, 2008).

At the same time, the share of vessel owners reporting recruitment problems dropped from 20.6% in 2017 to 14.7% in 2023 (Sønvisen et al., 2017; Johnsen and Vik, 2008). In our survey, vessel owners also reported that the use of foreign crew has remained at the same level as in 2007 and 2015. These positive trends appear to be associated with an improved recruitment situation.

However, whether the graying or “ungraying” of the fleet can be used as an indicator for a recruitment problem in the fleet, is not clear cut, as it may be only one of several indicators. First, no baseline has been established for what constitutes a “healthy” age structure in the fisheries. Employment levels in the past, prior to the introduction of modern resource management, do not represent an ideal condition due to issues such as overfishing and low profitability. Second, fisheries development is not linear. After a period of increased average age of the fishers in Norway, there are now signs of a generational shift, suggesting that the fleet’s development is cyclical. However, a generational shift depends on the availability of new entrants, making it essential to understand current recruitment patterns and mechanisms. These cycles are influenced by multiple factors, which will be discussed in the following section.

5.2 Recruitment patterns

As in 2007 and 2015, recruitment into the fishing fleet anno 2023 remains heavily reliant on social networks, with primary socialization continuing to play a key role. This aligns with previous studies of the Fisheries Employment System (FES) (Sønvisen et al., 2011), which showed that primary socialization – based on face-to-face interactions and affective relations – introduced youth to fishing, integrated them into the fisheries culture, and equipped them with essential skills. This process ensured that young people were recruited onto family and

community vessels, maintaining the generational transfer of knowledge and skills (Hetland, 1984; Johnsen, 2004).

However, studies indicate that growing specialization in fishing operations and the rise in formal requirements have compelled vessel owners to recruit beyond their local communities (Sønvisen et al., 2011). This shift may also explain the rise of the use of social media for fisheries recruitment, which increased from 1.5% in 2015 to 16.5% in 2023 (Sønvisen et al., 2017, 2023). These findings suggest that these social networks may now extend beyond the traditional local geographic boundaries.

As observed in studies from 2007 and 2015, interest in fishing remains the main motivation for entering the occupation, pointing to the importance of primary socialization (Sønvisen et al., 2011). This reliance upon primary socialization is also reflected among vessel owners, who typically do not prioritize formal education in new recruits. However, with growth in vessel size and increasing requirements for formal certifications, secondary socialization is becoming increasingly important. When the necessary qualifications cannot be found locally, vessel owners must recruit outside the local community (Vik et al., 2011; Ahmer, 2023). Thus, social networks may further extend beyond traditional fishing communities to secure recruitment for local vessels.

A concern regarding this development is that, over time, it could disrupt the transfer of knowledge, exacerbate recruitment challenges, and ultimately lead to fewer fishers in coastal communities. This process could contribute to the disembedding of the fleet from its traditional communities (Jentoft and Wadel, 1984).

Another concern with increased reliance on secondary socialization is that it may direct youth out of the local communities if they have to leave to gain the required formal qualifications (Johnsen, 2004; Sønvisen et al., 2011). This could result in lost opportunities for primary socialization and reduced interest in pursuing a fishing career (Gerrard, 1993; Paulgaard, 1993; Wiborg, 2000). For those unable or unwilling to leave, these formal requirements may become barriers for entry.

However, the formalization of qualifications through the education system could also create opportunities in the fleet for youth outside traditional coastal communities (Ahmer, 2023) – youth who were previously excluded because they were not part of the primary socialization process. As a result, becoming a fisher is no longer solely about *who you know* but increasingly about *what you know* – and having the documentation to prove it.

Fisheries vocational education has grown in popularity in the recent years (DIKU, 2024). This rise in interest is likely driven by the income potential in the industry. In 2023, the average annual income for a fisher, across all fleet segments, was NOK 540,000 (approximately USD 50,000), making it competitive with other occupations in the seafood or agriculture sectors (Nyheim, 2024). Additionally, reports of apprentices making up to NOK one million (approximately USD 91,000) annually, including both salary and catch shares (Olaisen and Staberg, 2024), may further contribute to the occupation’s appeal.

As a result of this growing popularity, admission requirements for vocational fishing schools have become more stringent. Recently, fisheries media reported on a young man who owned three fishing vessels but was unable to gain admission to a vocational school due to his grades. He expressed his frustration, saying: “I think the grade requirements for the fishing school are unfair. Fishing is a practical trade, and should be measured by

practical skills – not grades.” (Ahmer, 2023). The emphasis on academic merits may create barriers for youth less academically inclined, potentially limiting opportunities for local coastal youth to enter the fishing industry. Still, vocational education institutions play a crucial role in supporting fleet recruitment and coastal employment, working alongside “Training Offices” that coordinate and administer apprentice contracts and work-related training.

5.3 Outlook for retaining fishers

Retaining fishers is crucial for the future of the fleet. Our findings suggest that most fishers plan to remain in the industry in the near future, with a large majority seeing themselves continuing as fishers 5 years from now. This optimism is likely influenced by their positive business experiences over the past 5 years and expectations for continued growth. Profitability analyses from the DoF support this perception of positive financial developments (DoF, 2017, 2023).

At the time of the survey, there was a sense of stability, with minimal recruitment challenges and strong expectations for crew retention. However, it should be noted that our survey was conducted before respondents became aware of the reduction in quotas in key fisheries the coming years. How these quota cuts will affect employment and recruitment remains to be seen.

Studies suggest that the “graying” of the fleet, as seen in North America, can impact community identity and weaken the cultural role of commercial fisheries in coastal communities (Cramer et al., 2018). In Norway, similar concerns arise when fewer local youths enter the profession, potentially weakening the link between fishing and coastal communities (Sønvisen et al., 2011). However, since fishing represents only a minor part of the overall coastal employment system, other factors – such as the reliance on migrant labor in fish processing – also influence coastal employment and community vitality.

Ultimately, “internal” pull factors, such as job satisfaction and future expectations, remain critical for both retaining and recruiting fishers (Johnsen and Vik, 2013). It appears that the combination of policies facilitating access to fisheries and the evolving socio-economic landscape will be essential for securing a positive outlook for retaining fishers.

Thus, the concept of “graying” or “ungraying” are insufficient indicators for recruitment, as they fail to capture hidden dynamics in the employment system. For example, advancements in technology that make fishing safer and easier may enable fishers to have longer careers, thereby affecting the age composition in fleet. Therefore, instead of focussing solely on graying or ungraying, fisheries policies must strive to understand how coastal employment systems function and how recruitment and retention processes occur.

5.4 Fisheries policies and recruitment schemes

So far, we have discussed several factors affecting recruitment to the fishing fleet. However, the “ungraying” of the Norwegian fishing fleet may also be driven by fisheries policies. While rationalization policies have reduced the number of vessels and fishers, other policies have been designed to facilitate entry for young fishers.

One such policy is the open group fishery. When access to the commercially important cod fisheries was restricted in 1990, two regulatory groups were established: the closed group, which included vessels of all lengths with special permits and guaranteed quotas, and the open group for those who did not qualify for the closed group. The open group consists of vessels under 11 meters that fish on a shared quota. In general, all Norwegian residents who meet certain conditions can register as commercial fishers and participate in the open group (see Johnsen and Jentoft, 2017 for details; Johnsen, 2020). Traditionally, small-scale fisheries were combined with small-scale farming, and is still so in some areas. In particular, the open group remains important for the livelihoods of the coastal Sami (indigenous) population (Johnsen and Sørensen, 2018).

According to Høst and Christiansen (2018), the open group makes the Norwegian quota system more accessible to young fishers compared to systems in Iceland and Denmark. The Norwegian system encourages broader participation through lower entry requirements and less restrictive licensing, enabling young fishers to establish their own fishing businesses and gain practical experience. Additionally, the open group provides opportunities for fishers to build equity capital, which can later be used to invest in the more lucrative closed group.

However, the Office of the Auditor General reported in 2017 that the cost of a nine-meter vessel with quota in the closed fishery was around NOK 1.8 million (approximately USD 170,000) (The Office of the Auditor General, 2020). Given that the average income of fishers in the open group was about NOK 280,000 (approximately USD 26,000) at the time, transitioning to the closed group was deemed financially challenging for young fishers (Richardson, 2021). In the beginning of 2025, prices appear to have increased further. According to a fishing vessel broker, nine-meter vessels in the closed fisheries were being sold for NOK 3–5.25 million (approximately USD 283,000–496,000) (Stubberud, 2025).

Moreover, the open group fishery has increasingly become dominated by older fishers. Many older fishers sell their vessels and quotas in the closed group fishery but continue fishing in the open group. Consequently, instead of serving primarily as an entry point for young fishers, the open group functions as a space where older fishers remain active (Richardson, 2021).

To support transitions, the government has introduced various recruitment schemes. One main policy, the recruitment quota scheme, was introduced in 2009 to help fishers under 30 years of age access the closed-access fisheries by allocating 10 recruitment quotas annually. Despite its intention, the scheme was criticized for its limited scale and low success rate (Richardson, 2021, p. 15). Although the scheme allowed a few young fishers to enter, an average of 100 full-time fishers exited the fisheries annually between 2007 and 2023 (DoF, 2024a), suggesting minimal overall impact. Its narrow scope and strict eligibility criteria – such as formal certifications, fisheries income thresholds, and industry experience – excluded many young aspiring fishers. Additionally, it was criticized for undermining the closed-access fishery by reducing its quota base and granting free entry to a select few. These concerns ultimately led to the scheme’s discontinuation in 2020 (Richardson, 2021).

To replace the recruitment quotas, the recruitment quota bonus scheme was introduced in 2022 for the open-group fishery (hereafter “the quota bonus”). This program aims to strengthen young fishers’ quota base and facilitate long-term participation in closed-group fisheries. Each year, six quota bonuses are awarded, with three specifically reserved for women. The DoF sets the quota bonus so that the total quota basis

amounts to 80% of the vessel quota for vessels in the closed group at the start of the regulatory year. Allocations are determined by lottery, provided applicants meet the basic requirements, including an age limit of 30 for men and 40 for women, full-time fisher registration (Blad B), vessel operation experience of 24 months in the last 3 years, and a minimum catch value of NOK 250,000 (approximately USD 23,000). The quota bonus is granted for up to 5 years (Ministry of Trade Industry and Fisheries, 2022). In 2024, 58 fishers applied for the quota bonus – 50 men and 8 women (DoF, 2024d).

Another recruitment-focused scheme in the open-group fishery is the age supplement quota, introduced in 2021 to support youth during their early fishing careers. This scheme allows fishers under 30 (for men) or 40 (for women), who meet the general requirements for open-group participation and who have not received the quota bonus (discussed above), to fish an additional quota. In 2024, this additional quota was 3 tons of cod (Ministry of Trade Industry and Fisheries, 2021; White Paper no. 32, 2018–2019).

Finally, the youth fishing scheme offers an entry point for individuals age 12 to 25 to fish during the summer holidays. Participant can land catches with a maximum value of NOK 50,000 (approximately USD 4,600) under specific gear and vessel restrictions – only passive gear and non-commercial vessel (DoF, n.d.). In 2024, 378 youth participated in this program (Engø, 2024).

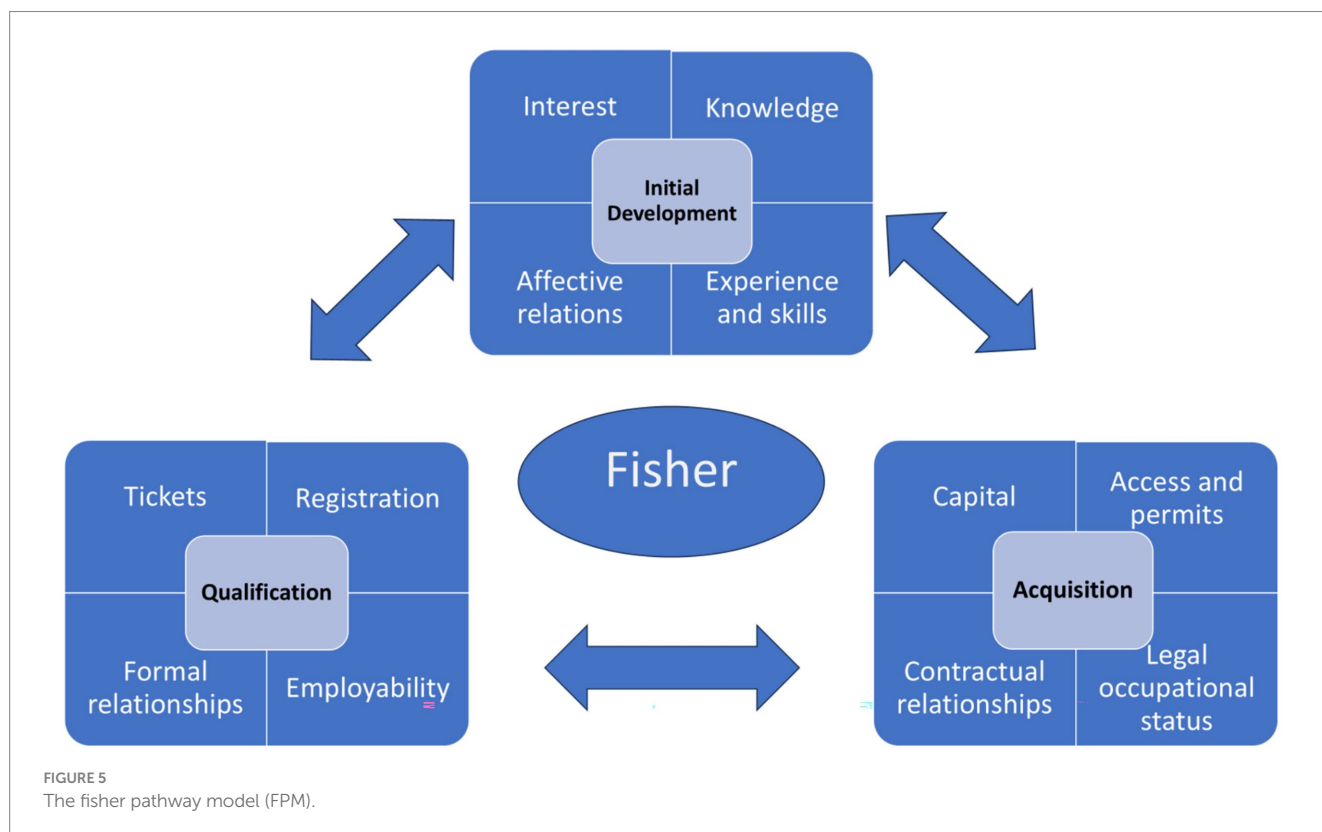
Despite these recruitment policies, a 2021 study found that certain regional quota schemes, such as the king crab fishery and the coastal fishing quota, play a more significant role in recruitment within their regions, than targeted recruitment policies (Richardsen, 2021). This finding is supported by the Office of the Auditor General, which reported that these quotas schemes make full-time fishing in the open-group fleet feasible, while communities without such access face

greater challenges (The Office of the Auditor General, 2020). For example, in eastern Finnmark, the king crab quota has been critical, contributing to an 88% increase in full-time fishers between 2007 and 2023 (DoF, 2024a; Richardsen, 2021). Originally introduced to control an invasive species, the king crab fishery now provides economic benefits to local communities, with small-scale vessels collectively landing about 1,000 tons annually (Ministry of Trade Industry and Fisheries, 2023).

Similarly, the coastal fishing quota, introduced in 2011, provides additional quotas to small-scale coastal fishers residing in Sámi (indigenous) areas, and has been crucial in supporting vulnerable coastal communities. In 2024, the allocated quota amounted to 4 tonnes of cod per vessel (Richardsen, 2021; Ministry of Industry and Fisheries, 2003, 2023). This scheme is limited to vessels owned by residents in municipalities within the Sámi Parliament's subsidy area, which primarily covers parts of northern Norway. The Sámi Parliament is a representative body tasked with safeguarding Sámi interests, culture, language, and rights. Fishers are not required to apply for the quota but must register with the DoF prior to the start of the fishing season.

5.5 Toward a theoretical understanding of recruitment in the Norwegian fishing fleet

To summarize our findings and to highlight the theoretical contribution of our work, we developed a comprehensive model of recruitment (Figure 5), “the Fisher Pathway Model.” Drawing on FES theory and the work of White (2015) and Sønvisen et al. (2023), the model illustrates the intricate interplay of processes and stages involved in recruitment of fishers within the contemporary Fisheries



Employment System (FES). It provides a framework for understanding the recruitment process and identifying where targeted initiatives can be effectively applied. In this model, the various stages of becoming a fisher are: (1) initial development, (2) qualification, and (3) acquisition.

In the first stage, Initial Development, recruitment begins with young individuals developing an interest in fishing through primary socialization. Traditionally, this interest was fostered through affective relationships, where aspiring fishers gained basic knowledge and skills by actively participating in fishing activities, often within their home community with family or close relatives.

The second stage, Qualification, relies on secondary socialization, as several formal requirements must be met. Recruits must acquire formal knowledge (e.g., ticket related to safety or navigation) and formally register as a fisher, thereby enhancing their employability. This stage involves entering formal working relationships (e.g., as crew members) to gain access to more specialized training. This process follows one of two paths: as an apprentice or via traditional on-the-job training.

Through an apprenticeship recruits receive formal education and basic training through vocational schools, followed by an apprenticeship on a fishing vessel, or complete an extended apprenticeship without prior formal vocational training. Both cases culminate in a final apprentice test, granting formal qualification as fishers. In contrast, through on-the-job training recruits receive informal training onboard a vessel, learning through experience, without strict formal procedures and no formal certification.

The qualification stage is critical for developing the necessary skills and knowledge. In the modern FES, the boundaries between initial development and qualification are increasingly blurred, as primary socialization through family and community has become less common. Today, recruits often experience a mix of affective and formal relationships during this phase.

Further employability of recruits largely depends on work experience, and the training path chosen may not significantly affect job offers (as our results indicate). However, since the traditional recruitment and training path has not been equally accessible to everyone, such as women or individuals outside fishing communities, the formal apprenticeship path offers an alternative recruitment channel for those who have not been socialized into the fisheries through community or family ties.

The third stage, Acquisition, builds on the primary and secondary socialization of the previous stages. To become vessel owners, recruits must obtain legal status as occupational or commercial fishers, enabling them to acquire essential capital such as funding, access rights, and permits. This phase often involves entering formal contractual relationships beyond employment, such as bank loans, purchase agreements, or partnership contracts.

The elements of this model are not mutually exclusive and often overlap across fleet segments and recruitment stages. Historically, the Coastal Employment System (CES) relied on tight-knit social networks within local communities (Jentoft and Wadel, 1984). Over time, this has evolved into the more specialized and formalized Fisheries Employment System (FES), characterized by species-specific and gear-specific specialization (e.g., cod fishing or longlining) and increased regulatory demands, such as formal education and certifications. While formalization has created barriers for local youth – who can no longer simply “hop on board” – it has

also opened opportunities for individuals outside traditional coastal communities to pursue fishing careers. As illustrated in Figure 5, primary socialization is no longer the sole pathway into fishing. Instead, recruits with formal education and proper certifications are now sourced from broader geographic and social contexts, often requiring vessel owners to look beyond local communities, resulting in a disembedding of fishers from coastal communities (Vik et al., 2011; Sønvisen, 2013).

This shift underscores the need for targeted policies that address the generational transition and counter the trend of “graying” within the fishing fleet. Such policies are crucial for sustaining Norway’s coastal communities, where fishing remains integral to local culture and economies, albeit in a transformed way. However, the geographically bounded coastal community is no longer a guarantee for preservation of fishing knowledge and skills traditionally passed down through generations. The current situation is more complex, with recruits increasingly coming from non-coastal areas.

The Fisher Pathway Model captures the different stages and qualification processes in the fisheries and can be used to explore how, where and when these processes take place, regardless of how the employment systems are configured. While the stages of qualification and recruitment can be organized differently across Fisheries Employment Systems (FES), there are essential knowledge and skill components that must be acquired in a specific sequence dependent on context. Internationally, these insights can inform policy development in other nations facing similar challenges in fisheries recruitment and demographic. Our model serves as a framework to describe and analyze diverse FES configurations and contribute to balancing the need for formal qualifications with strategies that support community-based recruitment and local job retention. This balance is particularly vital for fostering more diverse and sustainable coastal economies.

6 Future studies

To build on the current findings, several areas warrant further investigation. As this study has shown, the presence of supportive institutional and policy frameworks is crucial for effective recruitment into the fishing fleet. However, considering recent quota reductions, it remains uncertain whether these frameworks will continue to uphold recruitment pathways. Accordingly, research on how recruitment functions during periods of reduced quotas is essential for understanding the dynamics of entry into the industry under shifting resource conditions.

Norway appears to have established relatively accessible entry pathways – possibly through vocational education, apprenticeship models, financial support schemes, and the availability of quotas. Nevertheless, further inquiry is needed into the effectiveness of national and regional programs in facilitating recruitment and lowering barriers for young fishers. As Ringer et al. (2024) point out, although there is strong youth interest in Alaska, limited entry systems and privatization have often constrained access to viable fishing careers.

Ringer et al. (2024) also emphasize the importance of equitable policy frameworks that support the sustainability of fishing livelihoods across generations. In this context, examining how

Norwegian policies – such as succession planning and entry quota mechanisms – facilitate or hinder intergenerational transfer of fishing rights could provide valuable insights for policy development in other contexts.

Another important dimension of recruitment research concerns long-term retention. Longitudinal studies tracking young fishers over time could help identify the key factors that sustain engagement in the profession or contribute to attrition, including issues such as economic viability, work conditions, and evolving aspirations (Szymkowiak and Rhodes-Reese, 2022).

Although the influence of technology on recruitment has been recognized in earlier studies (Sønvisen et al., 2011; Johnsen, 2004), the implications of emerging digital technologies for recruitment and retention remain underexplored. It is particularly important to understand how such technologies – ranging from digital decision support systems to AI tools – are shaping occupational attractiveness, required competencies, and labor organization within modern fishing operations.

7 Conclusion

The trend of “ungraying” within the Norwegian fishing fleet marks a promising shift from previous decades, which were characterized by an aging workforce and declining youth participation. This process, driven by a combination of economic, regulatory, and social factors, has at least temporarily increased the number of young fishers entering the industry since 2014.

Vessel owners generally do not experience significant recruitment challenges. Current recruitment patterns show a strong reliance on primary socialization and social networks, with many new fishers entering the industry through family connections or recommendations. Social media has become an important recruitment tool, while vocational education plays a growing role as a formal entry point.

Formalization of fisheries education and training, or secondary socialization, acts as both an enabler and a barrier to fleet recruitment. On one hand, formalization through vocational schools facilitates entry, particularly for youth outside traditional fishing communities. On the other hand, it may hinder local recruitment if the formal qualifications are not available locally or if stringent entry requirements for vocational schools exclude local youth. In addition, and of central importance, the rising costs of vessels with quotas in the closed-group fishery are a significant barrier to entry.

The outlook for retaining fishers in the near future appears positive, with most fishers expressing a strong intention to remain in the industry. Economic stability, increasing earnings, and job satisfaction contribute to this retention. However, retention may be challenged by unpredictable resource availability, shifts in fisheries policies, and broader socio-economic trends affecting coastal employment.

We argue that “graying” or “ungraying” should not be used uncritically as indicator for recruitment and retention problems in the fisheries, nor as a proxy for the demographic challenges faced by coastal communities (Stein, 2019b). In Norway, fisheries policy aims to preserve the traditional, community-centered character of the fishing occupation. However, the demographic challenges faced by many coastal communities cannot be resolved by reverting to fisheries

policies that reintroduce subsidies or direct economic support for fishers.

Fisheries recruitment is a dynamic and context-dependent process, reflecting cyclical recruitment patterns within the Fisheries Employment System (FES). Moreover, resource fluctuations, quota regulations, and market forces, demand proactive recruitment policies that adapt to changing conditions while remaining sensitive to where and when the development of knowledge, skills, and formal qualifications occurs. These dynamics is what our Fisher Pathway Model captures, allowing for the analysis of recruitment processes and the identification of where to apply targeted initiatives.

Maintaining the vitality of the fleet will requires a balanced approach. Policy should support new entrants by creating clear and relevant pathways into the fisheries while also motivating them to settle in coastal communities. Achieving this balance requires a broader political approach that extends beyond fisheries policy alone. This is crucial for securing the long-term sustainability of both the industry and the coastal communities that depend on it.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The work was approved by Norwegian Agency for Shared Services in Education and Research (SIKT). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin because the data was gathered through telephone interviews, a verbal consent was given to the interviewer (which was carried out by a professional polling agency).

Author contributions

SS: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. JJP: Conceptualization, Formal analysis, Funding acquisition, Methodology, Writing – original draft, Writing – review & editing. JV: Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. Funding was provided by the Norwegian Seafood Research Fund (FHF, project 901824) and UiT The Arctic University of Norway. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Acknowledgments

During the preparation of this work the author(s) used ChatGPT 4.0 in order to edit language. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- Ahmer, S. N. (2023). Har eid tre sjarker, men kom ikke inn på fiskerfaget: – Det virker som skolen ikke er for alle. Bergen, Norway: Fiskeribladet.
- Andreatta, S., and Parlier, A. (2010). The political ecology of small-scale commercial fishermen in Carteret County, North Carolina. *Hum. Organ.* 69, 180–191. doi: 10.17730/humo.69.2.u41204x144664240
- Berger, P. L., and Luckmann, T. (1967). The social construction of reality: A treatise in the sociology of knowledge. Harmondsworth: Penguin.
- Blaker, M. (2019). Nektet å svare på spørreundersøkelser: Måtte ringe flere hundre tusen personer for å få 5000 svar. Nettavisen. Available online at: <https://www.nettavisen.no/nyheter/nektet-a-svare-pa-sporundersokelser-matte-ringe-flere-hundre-tusen-personer-for-a-fa-5000-svar/s/12-95-3423874463> (Accessed 3 April, 2025).
- Calderón-Contreras, R., and White, C. S. (2020). Access as the means for understanding social-ecological resilience: bridging analytical frameworks. *Soc. Nat. Resour.* 33, 205–223. doi: 10.1080/08941920.2019.1597233
- Cramer, L. A., Flathers, C., Caracciolo, D., Russell, S. M., and Conway, F. (2018). Graying of the fleet: perceived impacts on coastal resilience and local policy. *Mar. Policy* 96, 27–35. doi: 10.1016/j.marpol.2018.07.012
- Cutler, M., Silva, A., Gentile, L., and Colburn, L. (2022). Tracking shifts in the vulnerability and resiliency of commercial fishing vessel crew and hired captains in New England and the mid-Atlantic. *Mar. Policy* 138:104980. doi: 10.1016/j.marpol.2022.104980
- DIKU (2024). Søker tall til høyere yrkesfaglig utdanning ved fagskoler. Oslo, Norway: HK-dir.
- DoF. (2017). Lønnsomhetsundersøkelsen for 2015. Fiskeridirektoratet. Available online at: <http://www.fiskeridir.no/Yrkesfiske/Statistikk-yrkesfiske/Loennsomhet/Tidsserier> (Accessed 06 February, 2017).
- DoF (2021). “Høring-forslag om innføring av eierkonsentrasjonsregler i Kystfiskeflåten. Hearing – proposal for introduction of ownership rules for coastal fishing vessels”. In: Directorate of Fisheries. Directorate of fisheries 2021 (Bergen, Norway: DoF).
- DoF. Lønnsomhetsundersøkelse for fiskeflåten 2022. (2023). Fiskeridirektoratet. Available online at: <https://www.fiskeridir.no/Yrkesfiske/Tall-og-analyse/Loennsomhet/aarstabeller> (Accessed August 14, 2024).
- DoF. Directorate of Fisheries. (2024a). Fiskermanntallet. Available online at: <https://www.fiskeridir.no/Yrkesfiske/Tall-og-analyse/Fiskere-fartoy-og-tillatelser/Fiskermanntallet/fiskere-fra-manntallet> (Accessed August 01, 2024).
- DoF. (2024b). Lønnsomhetsundersøkelsen for fiskeflåten-årstabeller (Profitability analysis for the fishing fleet). Available online at: <https://www.fiskeridir.no/Yrkesfiske/Tall-og-analyse/Loennsomhet/aarstabeller> (Accessed February 15, 2024).
- DoF (2024c). Merkerregisteret. Bergen, Norway: Directorate of Fisheries. (Accessed February 15, 2024).
- DoF. Tildeling av rekrutteringskvoter (Awarding recruitment quota bonus). DoF. (2024d). Available online at: <https://www.fiskeridir.no/Yrkesfiske/Nyheter/2024/tildeling-av-rekrutteringskvoter> (Accessed October 08).
- DoF. (2025). Fisher registry [Fiskermanntallet]. Available online at: <https://www.fiskeridir.no/statistikk-tall-og-analyse/data-og-statistikk-om-yrkesfiske/fiskere-i-fiskermanntallet> (Accessed January 05, 2024).
- DoF. Ungdomsfiskeordningen. DoF. Available online at: <https://www.fiskeridir.no/Yrkesfiske/Tema/ungdomsfiskeordningen> (Accessed October 08, 2024).
- Donkersloot, R., and Carothers, C. (2016). The graying of the Alaskan fishing fleet. *Environ. Sci. Policy Sustain. Dev.* 58, 30–42. doi: 10.1080/00139157.2016.1162011
- Engø, T. (2024). “Disse 378 er påmeldt ungdomsfiskeordningen. Fiskerimagasinet, 2024” in Disse 378 er påmeldt ungdomsfiskeordningen-Fiskerimagasinet. Blue Oceans Media Ltd.
- Gerrard, S. (1993). “Æ kan tenkte meg å bli her, men ikke for enkrer pris” in Ungdom i lokalmiljø. eds. K. Heggen, J. O. Myklebust and T. Øia (Oslo: Samlaget), 20–38.
- Gerrard, S., and Kleiber, D. (2019). Women fishers in Norway: few, but significant. *Maritime Stud.* 18, 259–274. doi: 10.1007/s40152-019-00151-4
- Hagevik, E. M. (2006). Beinhard kamp om arbeidskraft. *Haugesunds Avis* (Web issue). Available online at: <http://www.h-avis.no/apps/pbcs.dll/article?AID=/20061005/NYHET/110050023/1123/RSS> (Accessed October 05, 2006).
- Hamilton, L., and Otterstad, O. (1998). Demographic change and fisheries dependence in the northern Atlantic. *Hum. Ecol. Rev.* 5, 16–22.
- Haugen, B. I., Cramer, L. A., Waldbusser, G. G., and Conway, F. D. L. (2021). Resilience and adaptive capacity of Oregon's fishing community: cumulative impacts of climate change and the graying of the fleet. *Mar. Policy* 126:104424. doi: 10.1016/j.marpol.2021.104424
- Hetland, P. (1984). “Å bli fisker – formell og uformell sosialisering i fisket” in I samme båt – Sysselsettingssystemer i fiskerinæringen. eds. S. Wadel and C. Jentoft (Oslo: Universitetsforlaget), 36–46.
- Høst, J., and Christiansen, J. (2018). Nordic fisheries in transition –future challenges to management and recruitment. Copenhagen, Denmark: Nordic Council of Ministers.
- Jentoft, S., and Wadel, C. (1984). “Det lokale samspillet-sysselsettingssystemet” in I samme båt-Sysselsettingssystemer i fiskerinæringen. eds. S. Jentoft and C. Wadel (Drammen: Universitetsforlaget), 14–34.
- Johnsen, J. P. (2004). Fiskeren som forsvant? Avfolking, overbefolkning og endringsprosesser i norsk fiskerinæring i et aktør-nettverk-perspektiv. Trondheim: Tapir akademisk forlag.
- Johnsen, J. P. (2020). “Small-Scale Fisheries in Europe: Status, Resilience and Governance” in Small-scale fisheries governance in Norway: Hierarchy, institutions and markets. eds. J. J. Pascual-Fernández, C. Pita and M. Bavinck (Cham: Springer International Publishing), 439–461.
- Johnsen, J. P., and Jentoft, S. (2017). “Transferable quotas in Norwegian fisheries” in Fisheries, quota management and quota transfer. ed. G. M. Winder (Cham: Springer), 121–139.
- Johnsen, J. P., and Sørensen, S. U. (2018). The regulative lock-in: the challenge of establishing Sami fisheries governance in Norway. *Maritime Stud.* 17, 253–261. doi: 10.1007/s40152-018-0119-3
- Johnsen, J. P., and Vik, J. (2008). Mellom marked og nettverk: Om fiskerirekruttering og sysselsettingssystemer i fiske. Trondheim: Bygdeforskning. doi: 10.1186/2212-9790-12-4
- Johnsen, J. P., and Vik, J. (2013). Pushed or pulled: understanding fishery exit in a welfare society context. *MAST* 12, 1–20.
- Johnson, T. R., and Mazur, M. D. (2018). A mixed method approach to understanding the graying of Maine's lobster fleet. *Bull. Mar. Sci.* 94, 1185–1199. doi: 10.5343/bms.2017.1108
- Lebedef, E. A., and Chambers, C. (2023). Youth and newcomers in Icelandic fisheries: opportunities and obstacles. *Marit. Stud.* 22:34. doi: 10.1007/s40152-023-00326-0
- Lee, C., Lee, B., Choi, I., and Kim, J. (2023). Exploring determinants of job satisfaction: a comparison between survey and review data. *SAGE Open* 13:21582440231216528. doi: 10.1177/21582440231216528
- Løvås, G. G. (2018). Statistikk: for universiteter og høyskoler. Oslo, Norway: Universitetsforlaget.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2025.1401587/full#supplementary-material>

- Maynou, F., Morales-Nin, B., Cabanellas-Reboredo, M., Palmer, M., García, E., and Grau, A. M. (2013). Small-scale fishery in the Balearic Islands (W Mediterranean): a socio-economic approach. *Fish. Res.* 139, 11–17. doi: 10.1016/j.fishres.2012.11.006
- Ministry of Industry and Fisheries (2003). “Forskrift om spesielle kvoteordninger for kystfiskeflåten” in FOR-2003-11-07-1309 (Oslo, Norway: Lovdata.no).
- Ministry of Industry and Fisheries (2023). “Forskrift om regulering av fisket etter torsk, hyse og sei nord for 62° N i 2024” in FOR-2023-12-20-2331 (Oslo, Norway: Lovdata.no).
- Ministry of Trade Industry and Fisheries (2022). “Forskrift om tildeling av rekrutteringskvotebonus (Regulations on the allocation of recruitment quota bonus)” in FOR-2022-11-29-2042 (Oslo, Norway: Lovdata.no).
- Ministry of Trade Industry and Fisheries (2023). “Forskrift om regulering av fangst av kongekrabbe i kvoteregulert område øst for 26 grader øst mv. i 2024” in FOR-2023-12-20-2240 (Oslo, Norway: Lovdata.no).
- Ministry of Trade Industry and Fisheries (2021). Forskrift om regulering av fisket etter torsk, hyse og sei nord for 62° N i 2021. Oslo: Regjeringen.no.
- Muratore, C. A. Addressing the ‘graying of the Fleet’. Rappahannock Record. (2024). Available online at: <https://rrecord.com/addressing-the-graying-of-the-fleet/> (Accessed August 24, 2024).
- Nyheim, J. (2024). Fisker lønn – hvor mye tjener en fisker i Norge?. Available online at: <https://finanskontroll.com/fisker-lonn/#:~:text=L%C3%B8nn%20per%20kj%C3%B8nn%20for%20fiskere&text=If%C3%B8lge%20de%20nyeste%20tallene%20tjener,kolleger%20tjente%203920900%20NOK> (Accessed November 03, 2024).
- Olaisen, S. R., and Staberg, M. (2024). Politisk usemje om Jesper (18) bør kunne tene 1 million som lærer. Bø, Vesterålen, Norway: NRK.
- Paulgaard, G. (1993). “Nye tider-nye tonar” in Ungdom i lokalmiljø. eds. K. Heggen, J. O. Myklebust and T. Øia (Oslo: Samlaget).
- Richardsen, B. (2021). Åpen gruppe som rekrutteringsarena for fiskeri-Vil åpen gruppe kunne fungere som en rekrutteringsvei for unge fiskere i dagens fiskerisysselsettingssystem? Master, Fakultet for Biovitenskap, fiskeri, og økonomi, Norges fiskerihøgskole, UiT.
- Ringer, D., Donkersloot, R., and Carothers, C. (2024). Charting a new course: ungraying the fleet and comprehensively supporting fishing livelihoods and communities. *Front. Sustain.* 5:1394083. doi: 10.3389/frsus.2024.1394083
- Sønvisen, S. A. (2013). Coastal communities and employment systems-networks and communities in change. Tromsø, Norway: Norges Fiskerihøgskole, UiT-The arctic university of Norway.
- Sønvisen, S. A., Johnsen, J. P., and Vik, J. (2011). The coastal employment system-what it was and what it is. *MAST* 10, 31–56.
- Sønvisen, S. A., Johnsen, J. P., and Vik, J. (2017). Mellom nettverk og marked II: Om fiskerirekruttering og sysselsettingssystemer i fiske. Trondheim, Norway: Bygdeforskning.
- Sønvisen, S. A., Johnsen, J. P., and Vik, J. (2023). Mellom nettverk og marked III: Om fiskerirekruttering og sysselsettingssystemer i fiske Norges fiskerihøgskole. Tromsø: UiT.
- Stein, J. (2019a). The striking similarities between northern Norway and northern Sweden. *Arct. Rev. Law Polit.* 10, 79–102. doi: 10.23865/arctic.v10.1247
- Stein, J. (2019b). What happened in northern Norway? A comparative and quantitative analysis of political and demographic development in northern Norway from 1950 to 2015. A dissertations for the degree of Philosophiae doctor – August. Tromsø, Norway: Faculty of Humanities, Social Sciences and education, UiT the Arctic University of Norway.
- Stubberud, A. (2025). Salg av fiskekvoter og fiskebåter. Available online at: <https://kvotemegling.no/fiskekvoter-til-salg/> (Accessed January 25, 2024).
- Szymkowiak, M., and Rhodes-Reese, M. (2022). A livelihoods assessment of new entrants within the US fisheries agriculture continuum. *J. Rural. Stud.* 95, 15–25. doi: 10.1016/j.jrurstud.2022.07.024
- The Office of the Auditor General (2020). Undersøkelse av kvotesystemet i kyst-og havfisket. Riksrevisjonen. Norway: Oslo.
- Vik, J., Johnsen, J. P., and Sønvisen, S. A. (2011). “Kysten i endring: Om fiskeripolitikken som distrikts og lokalsamfunnspolitikk” in Rurale brytninger. eds. M. S. Haugen and E. P. Stræte (Trondheim: Tapir Akademisk Forlag).
- White, C. S. (2015). Getting into fishing: recruitment and social resilience in North Norfolk’s ‘Cromer crab’ fishery, UK. *Sociol. Ruralis* 55, 291–308. doi: 10.1111/soru.12101
- White Paper no. 32 (2018–2019). Et kvotesystem for økt verdiskaping — En fremtidsrettet fiskerinæring. Oslo, Norway: Regjeringen.no.
- Wiborg, A. (2000). “Høyskolestudenter fra distriktene-i spenningsfeltet mellom by og land, arbeid og tilhørighet” in Fra bygd og fjord til kafebord? eds. M. Husmo and J. P. Johnsen (Trondheim: Tapir), 79–99.
- Wink, A., Hadland, J., and Laurent, B. (2007). Alaska’s fishermen. Alaska, US: Alaska Economic Trends.