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Fish, funding, and food systems: a review of the U. S. Department of Agriculture's recent history of grant funding in support of the seafood sector (2018–2023)

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Introduction: Seafood is an important source of healthy animal protein, making it a valuable part of the food system in the United States.

Methods: We assembled a database of 146,720 grants awarded by the U.S. Department of Agriculture (USDA) from 2018 to 2023. Our database included all grants awarded by the four USDA agencies primarily responsible for grant-making activities designed to enhance domestic food systems. We reviewed the extent to which these grants have supported the seafood sector, including wild capture fisheries and aquaculture. Using interviews with individuals involved in different dimensions of the seafood economy that have applied for USDA grants, we augment our review.

Results: Of the \$31.2 billion in funding awarded, only \$261.7 million ($n = 768$) went to support projects associated with the seafood sector, representing 0.52% of the grants during the 6-year study period. Our analysis shows USDA's recent grant portfolio has included projects related to aquatic and marine foods, but that overall funding has been limited.

Discussion: Our review offers insights into why USDA funding is important to the seafood sector, barriers that are limiting the seafood sector's access to USDA grants, and recommendations for how to better support the seafood sector moving forward.

KEYWORDS

federal funding, fisheries, food systems, seafood, USDA

1 Introduction

Increasing attention is being directed towards food systems, which can be defined as the complex networks of people, institutions, places, and activities that are involved in the production, processing, transportation, and consumption of food, and the diverse and often uneven benefits they confer to society (Tendall et al., 2015; FAO, 2024c). This focus, in part, has been motivated by concerns about the fragility of global supply chains (Cottrell et al., 2019; Kummur et al., 2020), the rising cost of food (FAO, 2024a), and inflated levels of hunger and food insecurity (FAO, 2024b). Although these issues are often most acute in low- and middle-income nations, countries like the United States have not been immune to them. The Consumer Price Index, produced by the

U. S. Bureau of Labor Statistics, for example, shows that the price of food in the United States has risen sharply in the past year¹ (BLS, 2024). Meanwhile, 12.8% of households in the country are experiencing food insecurity (Rabbitt et al., 2023).

While multiple federal entities play a role in supporting healthy and resilient food systems in the United States, none is more central than the U. S. Department of Agriculture (USDA). Established in 1862, USDA was created to serve the nation's farming and agricultural sector (USDA, 2025). In the century and a half since its formation, the scale and scope of the department has expanded (Effland, 2019), morphing from an agricultural agency to one focused more broadly on food systems (Soth, 1990). This evolution is reflected in the current mission of USDA, which is “[t]o serve all Americans by providing effective, innovative, science-based public policy leadership in agriculture, food and nutrition, natural resource protection and management, rural development, and related issues with a commitment to deliverable equitable and climate-smart opportunities that inspire and help America thrive” (USDA, 2022a).

USDA supports its mission through a multibillion-dollar annual budget (\$213.2 billion in FY24) and a complex organizational structure of over 20 agencies with approximately 100,000 staff, working domestically and internationally across the food system—from production to consumption (USDA, 2022a, 2022b). In addition to carrying out its work through internal programming, the department also administers externally-directed loans, cooperative agreements, tax credits, and grant programs that aim to advance “[a]n equitable and climate smart food and agriculture economy that protects and improves the health, nutrition and quality of life of all Americans, yields healthy land, forests and clean water, helps rural America thrive, and feeds the world” (USDA, 2024b). These initiatives range from rural infrastructure grants like the Rural Energy for America Program, which “helps increase American energy independence by increasing the private sector supply of renewable energy” to the Gus Schumacher Nutrition Incentive Program that aims to increase human health and nutritional wellbeing.

Within USDA, four agencies share primary responsibility for administering grant programs that fund initiatives related to food systems in the United States (USDA, 2025). The Agricultural Marketing Service (AMS) “administers programs that create domestic and international marketing opportunities for U. S. producers of food, fiber, and specialty crops... [and] provides the agriculture industry with valuable services to ensure the quality and availability of wholesome food for consumers across the country and around the world.” As part of this work, AMS houses the Local and Regional Foods Division, which oversees the USDA Regional Food Business Center Program and the Local Agriculture Market Program. The Food and Nutrition Service (FNS) complements AMS by overseeing programs related to health and nutrition, such as the Patrick Leahy Farm to School Grant Program, which provides funds to increase local food in school meal programs. These agencies are additionally augmented by the National Institute of Food and Agriculture (NIFA), which provides funding for research, education, and extension programs

that advance agriculture-related sciences. Finally, Rural Development (RD) offers a range of services to address the needs of rural communities. While RD does work beyond that related to food systems, it administers several large grant programs, including the Value-Added Producer Grant Program, which “helps agricultural producers enter into value-added activities related to the processing and marketing of new products.”

The extent to which aquatic and marine foods and those who harvest, grow, process, distribute, and market them (hereafter referred to as the “seafood sector”)² fall under the purview of USDA or are supported by its technical assistance, research, and funding has changed through time. Over the past 50 years, a particular focus has been on integrating aquaculture-related activities into USDA's portfolio. In 1978, for example, Executive Order 12039 (2016) made the Secretary of Agriculture the permanent chairman of a newly established Joint Subcommittee on Aquaculture.³ Two years later, with the passage of the National Aquaculture Act of 1980, USDA was institutionalized as the “lead” federal agency for “the coordination and dissemination of national aquaculture information” (16 USC 2805, 1985). To a lesser extent, efforts have also been made to ensure that the commercial fishing sector is eligible for certain USDA grants (see, for example, 78 FR 70261, 2013).

Despite 50 years of progress and recognition that aquatic and marine foods make important contributions to the food and nutrition needs of the nation (Oyikeke et al., 2024), the seafood sector remains somewhat disconnected from USDA. This reality is reflected, for example, in a recent report published by the US Government Accountability Office that found that seafood represents only 1–2% of the animal protein USDA has purchased for its National School Lunch Program (NSLP) (US GAO, 2022). Inconsistencies like this have spurred calls for further integration of the seafood sector into USDA's activities by both researchers and policymakers (e.g., Pingree, 2024; Ringer et al., 2024), including the 2025 Executive Order titled, *Restoring American Seafood Competitiveness*.

This research aims to contribute to the ongoing policy discussions by better understanding the extent to which USDA has supported the seafood sector through its recent history of grant making. While prior research has examined the federal government's funding of aquaculture (Love et al., 2017), funding levels for the seafood sector more broadly have not been studied. One recent exception is an analysis by Szymkowiak and Rhodes-Reese (2022) that explored the discrepancy between programs for new and young farmers and seafood harvesters. To address this gap, we assembled and analyzed a database of the grants awarded by AMS, FNS, NIFA, and RD. We then evaluated the extent to which these grants have supported activities related to wild capture fisheries and aquaculture. Finally, we conducted semi-structured interviews with a subset of grant recipients to understand why organizations associated with the seafood sector are pursuing USDA grant funding, the barriers they have observed, and recommendations for strengthening the seafood sector's engagement with existing USDA grant programs moving forward.

¹ Food prices in the United States rose 2.1% during the 12-month period from May 2023 to May 2024.

² We use the term “seafood” in this paper to include all aquatic and marine foods, including animals and plants, that are harvested through aquaculture, wild-captured, or hybrid modes.

³ Today, it is the Subcommittee on Aquaculture.

2 Materials and methods

2.1 Evaluating USDA grant funding for seafood

To evaluate the history of grant-making by USDA in support of the seafood sector, we assembled a database of the grants awarded by AMS, FNS, NIFA, and RD covering a 6-year period (2018–2023) (Supplementary Table 1). An initial scan of agency websites was conducted to generate a list of grant programs. These emergent lists were subsequently distributed to representatives at each of the four granting agencies for review and validation. The federal website, [USASpending.gov](https://www.usaspending.gov), was then used to compile information about each grant program, including the grant program area, name of the organization that received funding, total amount of funding awarded, state, year, project title, and project description.⁴ In cases where there were missing data fields, we filled in gaps using online data portals on agency websites, or we made data requests to the granting agency (Table 1). While most grant information was accessible in table-structured (Comma-Separated Values) format, some grant information was only available in Portable Document Format (PDF) and had to be manually entered by our research team. Grants in the resulting database were then evaluated to determine if they included enough descriptive information to be able to assess whether or not they were associated with the seafood sector. Grants associated with school lunch programs and supplemental nutrition did not provide adequate information and were therefore removed from our analysis, but have been maintained within our database to ensure completeness.

All remaining grants in our database were subsequently analyzed for keywords associated with fisheries and aquaculture using an R script we created that scanned each grant program as well as the organization name, project title, and project description. The following search terms were used: “seafood,” “fillet,” “marine,” “aquatic,” “fisher,” “fisherman,” “fishermen,” “boat,” “vessel,” “fisheries,” “fish,” “finfish,” “trout,” “salmon,” “salmonid,” “halibut,” “tuna,” “cod,” “walleye,” “shellfish,” “oyster,” “clam,” “scallop,” “crustacean,” “lobster,” “shrimp,” “crab,” “aquaculture,” “mariculture,” “catfish,” “tilapia,” and “seaweed.” Projects that included one or more of these search terms were then reviewed manually by the project team to validate their relevance. During this review process, projects were also evaluated to determine if they were related to aquaculture, wild capture fisheries, or seafood in general. We also reviewed each grant to determine what segment of the supply chain they were affiliated (“Production,” “Processing,” “Aggregation and Distribution,” “Marketing,” and “Technical Assistance, Education, and Outreach”) and the organizational structure of the grantee (“Cooperative,” “Native American Tribal Government,” “Non-profit,” “School District,” “Business,” “State Government,” and “University”).

2.2 Identifying enabling and disabling factors and opportunities for improvement

To augment our analysis of USDA grants, semi-structured interviews were conducted with individuals affiliated with the seafood sector with direct experience applying for USDA grants. Interviews were approved by

the University of Maine Institutional Review Board (# 2024-03-11) and conducted to contextualize the results of our quantitative analysis and to gain perspectives on how to improve grant funding opportunities for the seafood sector. Participants were identified using our grant database and a purposeful, non-random sampling approach (Palinkas et al., 2015) was used to select representatives from diverse types of organizations based in different parts of the United States. Participants included people affiliated with universities, non-profit organizations, and private businesses. We intentionally targeted people who had received one or more seafood-related grants from USDA because we were specifically interested in learning from people who could speak from direct experience applying for funding. Participants also had experience applying for USDA grants that were not funded. Finally, we considered participants based on the types of grants that they had received to ensure we heard from people who had experience with different grant programs and their associated agencies. Interviews were conducted via an online video conferencing service called Zoom. Members of the research team took detailed notes during the interviews. Each interview was also audio recorded and then transcribed using the AI software, Otter AI. Notes from interviews were then reviewed by the project team to create an emergent list of factors that are enabling and disabling people from accessing USDA funding. Transcripts were then reviewed and coded by the research team to further refine emergent themes.

3 Results

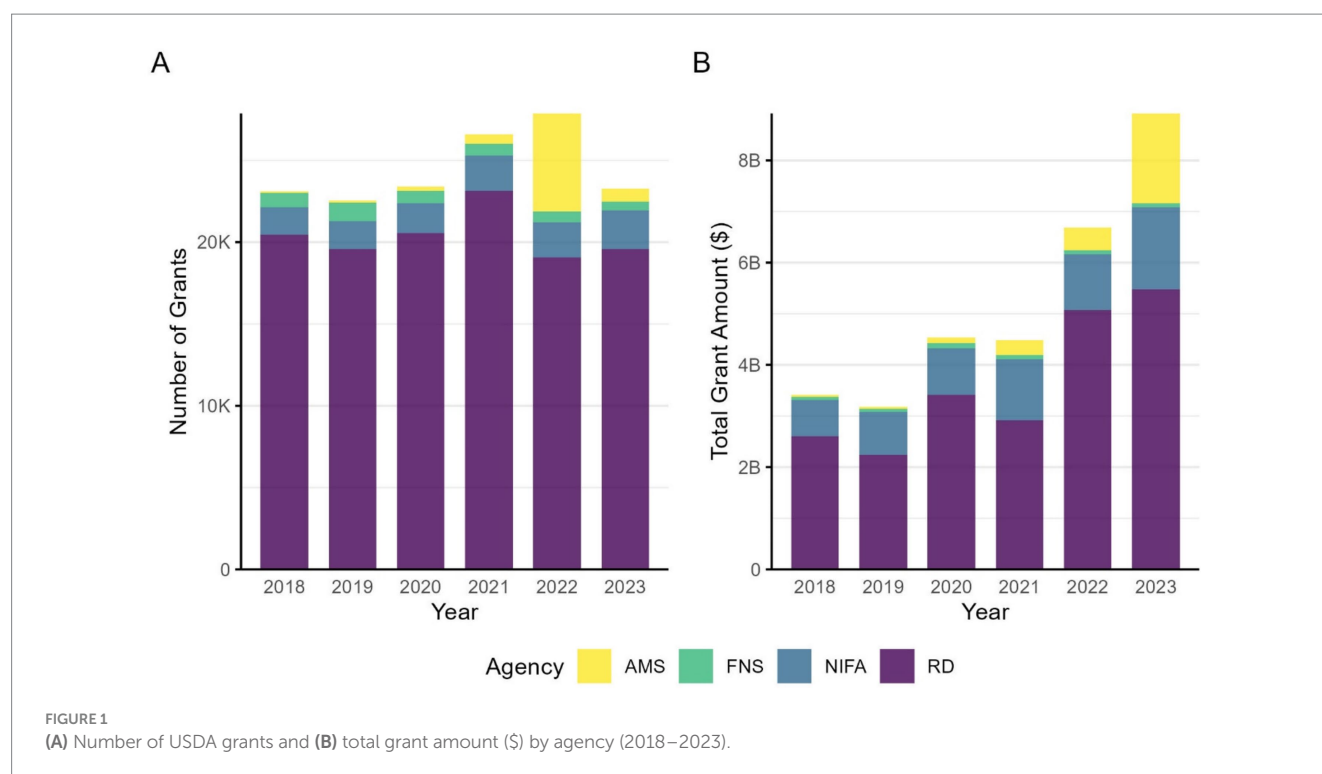
3.1 USDA grant funding for seafood

We assembled data from 297 grant programs awarded by AMS, FNS, NIFA, and RD during our study period from 2018 to 2023 (Figure 1) (Advani et al., 2024). Among these were 12 grant programs associated with school lunch programs and nutrition (e.g., National School Lunch Program), which we removed from our analysis due to data limitations. The remaining 285 grant programs included 146,720 grants totaling \$31.2 billion (USD). The mean annual total across the 6-year period was \$5.203 billion (USD). The number of grant awards ranged from 22,524 to 27,862 per year, with a period high occurring in 2022. RD accounted for the largest portion of grants by count (83%), while FNS accounted for the fewest (3%).

The number of grants awarded per year was relatively stable over our study period, while the amount of funding increased (161.5%) (Figure 1). Except for FNS, which observed peak funding in 2020, the other three agencies awarded the most grant funding in 2023. By total value, RD had the largest increase in funding (\$5.47 billion) during the study period, while AMS had the largest increase by percentage (293%). The latter increase was driven by multiple new grant programs created within USDA with congressional funding associated with COVID-19 pandemic relief, including the Regional Food Business Center Program (\$420 million).

Of the 146,720 grants included in our database, only 768 of them (\$261.7 million) were directed towards seafood-related projects, accounting 0.52% of the grants during the 6-year study period (Table 2 and Figure 2). By contrast, \$30.97 billion was granted to projects associated with other segments of the food system or more broadly. Of the 768 grants, the largest portion of these projects was supported by AMS's Agricultural Worker Pandemic Relief and Protection Program (153 grants), within which was nested the Seafood Processors

⁴ Both competitive and non-competitive grants were included in the analysis.



Pandemic Response and Safety Block grant program. The agency with the fewest seafood-related projects supported was FNS (7 grants). The most funding for seafood-specific projects occurred in 2023, when 140 projects were awarded, totaling \$67.38 million (Figure 2).

Funding for seafood-related projects was distributed to all but five landlocked states across the United States (Figure 3). Maine, Washington, Alaska, and Mississippi received the most seafood-related grants by number, with Maryland, Washington, and Maine receiving the most funding. The high level of funding for Maryland can be attributed to two \$10,000,000 AFRI Sustainable Agricultural Systems grants focusing on oyster farm management and salmon aquaculture. Of the total funding amount, 78% of funding dollars focused on aquaculture, 3% on wild capture fisheries, and 19% do not specify (or indicate both) (Figure 4). Between 2018 and 2023, aquaculture funding nearly tripled (from \$20,072,614 to \$53,604,286), while support for wild capture fisheries remained lower (from \$518,284 to \$1,646,008).

Funding largely went to support production-related activities in the supply chain (48%), with NIFA funding the greatest number of these grants (Figure 5). The second largest investment went to processing (29%) and was supported by AMS's Seafood Processors Pandemic Response and Safety Grant program. Businesses were the most commonly funded entities (53%) followed by universities (32%) (Figure 6). The majority of NIFA grants related to seafood were awarded to universities (62%).

3.2 Insights from sector stakeholders

To add context to our quantitative analysis of USDA grant funding, we conducted 15 semi-structured interviews with 19 people. Together, these participants had received 18 USDA grants

that focus on fisheries and aquaculture. Multiple participants also had experience applying for USDA grants that were not funded. Nearly half of the participants were associated with businesses, while the other half were affiliated with non-profit organizations. The organizations that these participants were affiliated with were based in 10 states across the United States and had diverse histories, including a start-up business backed by venture capital, a large state university, a fishing association, several seafood companies, and independent consultants. Each interview was conducted between April and July 2024 and lasted approximately 1 h. Interviews were not meant to be representative of the entire population of grant recipients, but offer context about what is motivating organizations to apply and the factors and barriers to accessing USDA grant funding (Table 3). The interviews also provided perspectives on how to improve grant funding programs in the future to better support the broader inclusion of fisheries and aquaculture.

3.2.1 Motivations for applying for USDA funding

There was a wide range of reasons given for why individuals and organizations are applying for USDA funding to support fisheries and aquaculture, including both economic and non-economic motivations. For some, USDA funding was viewed as a strategic business choice and as an opportunity to leverage federal funding to grow or expand their operations. To this point, one participant [I03] explained, "Somebody in [my state] had mentioned that there was this grant opportunity that existed for the type of business that we had. I looked into it and saw the amount of money you could get and what it could be applied towards and I was like, 'wow, that's incredible.' I mean, to just get up to a \$250,000 loan that does not have to be repaid is a game changer for small and emerging brands." Other participants also described USDA funding through a financial lens, but articulated it more as a critical lifeline and type of subsidy that is increasingly necessary for survival, than as a way to expand their business.

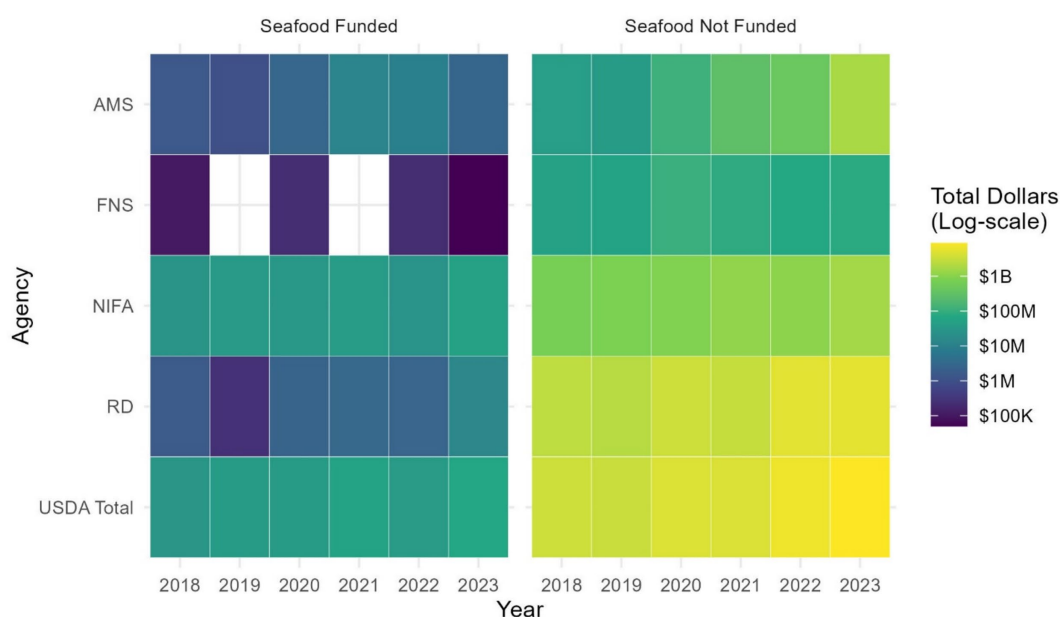


FIGURE 2

Heatmap of total value (\$) of grants by agency and overall for each year comparing grants funding seafood projects versus other types of projects (2018–2023). Log-transformed US Dollar amounts for comparability.

“A lot of successful farmers are extremely dependent on the government to keep them propped up,” stated a participant [I06]. “It’s a very sad statement, but it’s the truth. [Seafood] farming has gotten worse, and worse, and worse, and worse [because of competition with foreign imports]. The last 3 years have been awful. The whole concept of subsidies for agriculture has just basically slapped me in the face and said, ‘you know what, if it’s out there, and it’s available, and it’s legit, you better pursue it.’ Farming [seafood] has become such a challenge that it essentially takes programs like [the Value-Added Producer Grant] to hold it together.” Similarly, another participant [I09] explained, “We have been doing this for [more than a decade], continually looking for a competitive advantage, and doing it with integrity, not the way most businesses do it, which is cheating the system. As you know, the reason why seafood is fraught and [there is] mislabeled fish is because that’s how they are deriving their competitive advantage. It’s how they are able to make the economics work in an unfair, unlevel playing field. For us, the way in which we are making it work is finding government help.” A third participant [I15] simply said: “In our case, [the grant from USDA] was the reason that we still exist.”

While economics is a clear motivating factor for those pursuing USDA grants, our interviews suggest that organizations are not strictly motivated by the direct financial benefits they gain from the grants. In one instance, a participant [I05] described how a grant gave the organization access to additional technical assistance from USDA. “They brought in an engineering team to oversee and assist with that. I have to say, initially, I thought, ‘Oh, this is gonna be super cumbersome.’ Of course, there was a lot of paper that needed to move and I’s and T’s and all of that, which is fine. But what was really positive was that they had the engineering staff to assist us and they helped walk us through the process really well. They picked up on things that we would not have otherwise picked up on.” Another participant [I15] talked about how their grant had given them a platform to engage with USDA. “It’s not just about the money, right? You have this audience with the USDA. I have to talk to them about how our grant worked

out, and that gives me an opportunity to tell them [about seafood]. And they all take that to Congress, and then Congress will act to help those issues. So it really goes far beyond the proceeds.” For another participant, pursuing funding from USDA was motivated by their desire to be viewed as credible. “I could have done the whole thing without money,” the participant [I01] explained. “The reason I went after money was to help legitimize [the work] in some ways... A lot of the times I’ve written grants, it’s not even for the money. It’s because if you do not have a grant, you are not even taken seriously.” This latter point may be particularly salient for new entrants, women, and historically underrepresented peoples who are trying to establish themselves in the seafood sector.

3.2.2 Disabling factors

Participants identified several barriers that are impacting their ability to apply for USDA grants. One general concern, though not necessarily unique to the seafood sector, but a recurring theme in the interviews, was that it is time-consuming and costly for organizations to navigate USDA and identify funding opportunities that are appropriate for them because of the scale and complexity of the department. “One of the challenges for me is I tend to get really bogged down in the weeds. We’re a small farm [that is] busy doing anything and everything. I know that I’ve gotten emails from USDA in the past about available grants and so forth, but I’ve never really followed up” [I13]. Similarly, participants described how it is difficult to learn about the opportunities that exist within USDA, especially if you are new to writing grants. “I was on a call yesterday for a grant and the acronyms that they are using during the call. It’s exclusive, right? It’s like I knew that it was a Notice of Funding Opportunity. But, NOFO? Even being on that call. I was thinking about this today, too, like how that could feel intimidating. What are they saying? I do not understand, you know?” [I06]. USDA proposals are also complex. As one participant put it, “USDA is probably the highest bar for complexity. I would not ask our

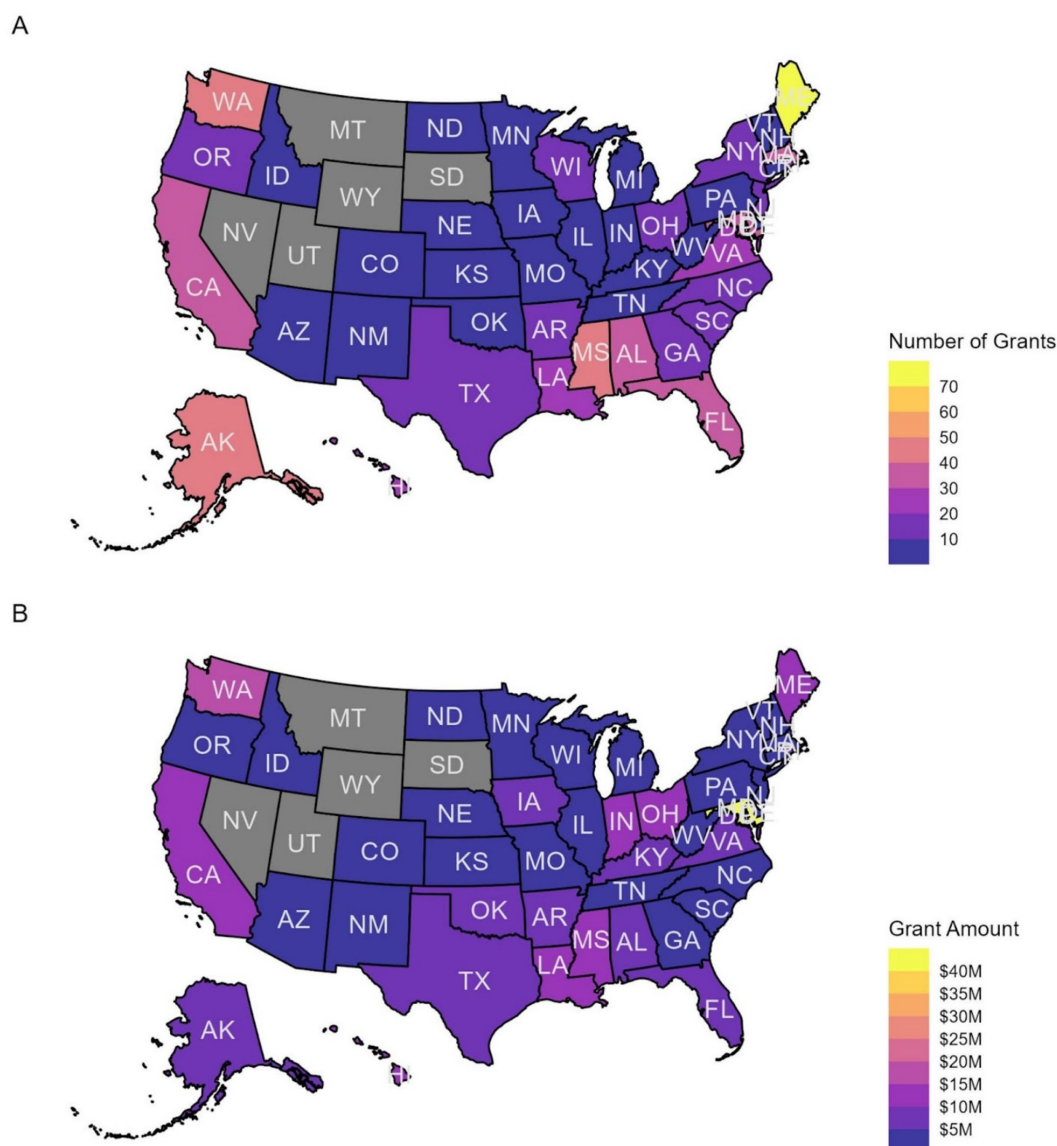


FIGURE 3

Maps showing (A) Number of USDA grants and (B) total grant amount (USD) for seafood-related projects by state (2018–2023). States in grey have no grant programs that directly support seafood.

staff to attempt to write a USDA grant” [I02]. Echoing this viewpoint, another participant [I11] observed, “I would not even attempt a federal grant without a good grant writing team. It’s just too cumbersome.” Another participant [I03] reflected on the cost of writing proposals. “I tracked my hours for the most recent grant that I wrote. I think it was between 40 and 60 h in total that it took to actually write the whole thing, start to finish, [with] all the paperwork submitted through [Grants.gov](#), etc. When you are also running a business, that’s a big chunk.” In addition to the upfront costs associated with writing grants, USDA caps overhead on some grants, which creates a problem for some organizations. “That’s a big challenge for us,” one participant [I11] explained. “We lose money on federal grants, and then we have to find it somewhere else.” These challenges are coupled with the complexity of administering USDA grants. As one participant reflected, “Learning the reporting mechanisms is something [we had] to get some help with. It’s not obvious, and it’s not something that is really available for an

average person” [I10]. Match requirements also pose a barrier. “The reason I applied is that USDA said [in the application] some of the grants would not have to meet one to one match... I was hoping that I would be one of the lucky people, [but] they saddled me with a one-to-one match and that’s incredibly difficult because I’m already fishing. Where am I going to pull in kind time to match this? [I01].” Further, there is a lag between the time when an organization is notified and when the money becomes available. This lag can create a mismatch between grant deliverables and reality because by the time funding arrives, circumstances have often changed. As one participant shared, “We got into a little tiff [with USDA] a couple of times. where they were either moving so slow, or had so many stipulations that we, we got quite a way down the road with them on a project and then we said, well, it’s just going to be cheaper to do it with private money or whatever money... There’s more than one way to skin a cat. We’ve decided to do it the more expedient way. They get a little upset, because

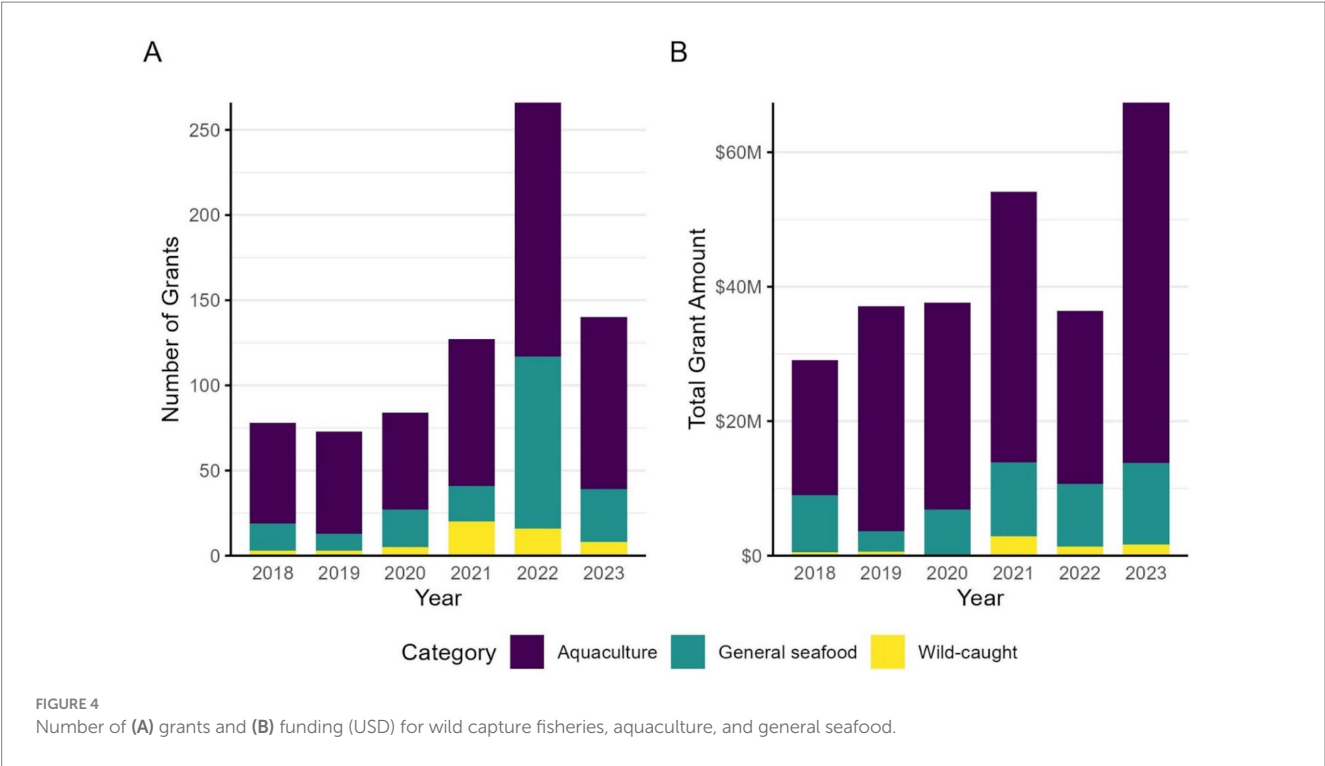


FIGURE 4
Number of (A) grants and (B) funding (USD) for wild capture fisheries, aquaculture, and general seafood.

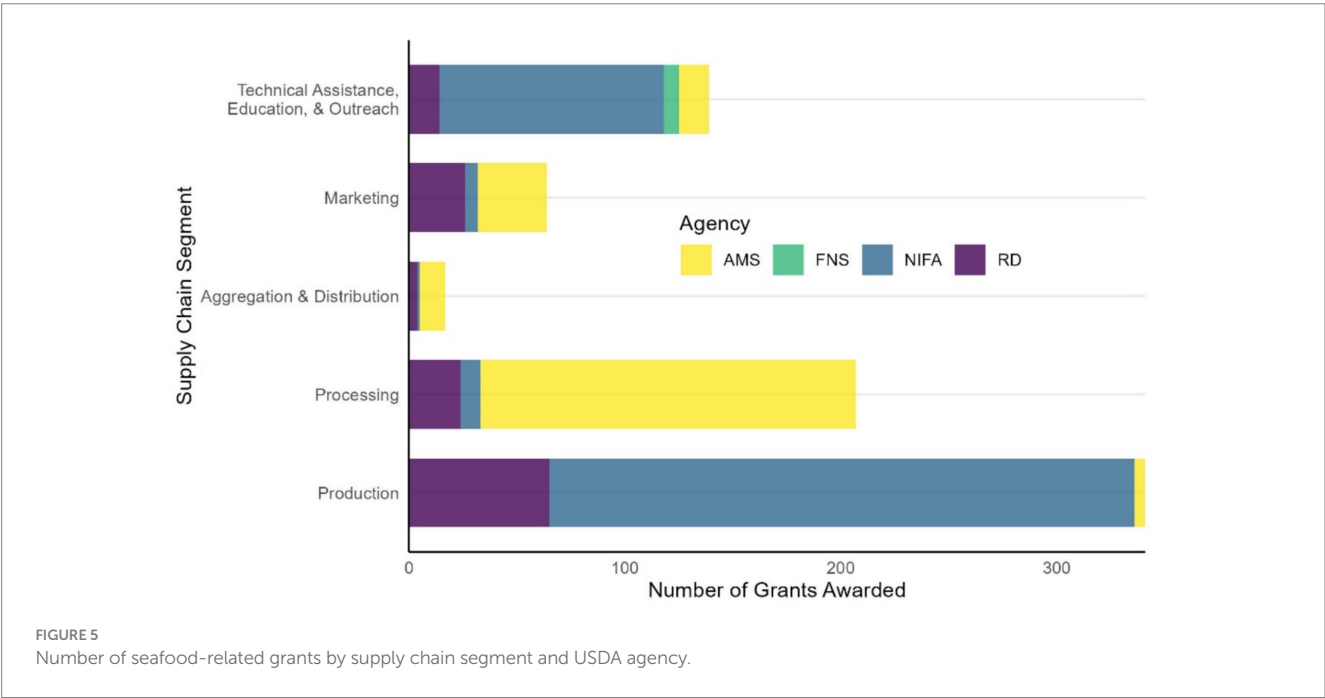


FIGURE 5
Number of seafood-related grants by supply chain segment and USDA agency.

I think they had us on the books as a success and then we yanked it out from under them, literally” [I05]. In another instance, a participant described how it impacted their staffing. “You get an award announcement in [month one], and your budget starts [months three], but you are not getting your funding until [month seven]. That’s been a real problem for us. We could not hire and we did not have float money” [I02]. Further emphasizing this point, the participant observed, “We’re working with businesses, and there’s a speed of business. What’s relevant at the moment that you are writing the grant can become largely

irrelevant by the time you are awarded. We have this great idea to do this thing, or we really need to get a [piece of equipment] in here. We’re going to write that into our grant. Then you find that you have already filled that need and now you get approved. That’s part of the USDA problem, in my opinion. The timelines are not concurrent with the pace of the food systems movement” [I02].

Beyond these general barriers, there are also seafood-specific factors that have limited engagement by those associated with fisheries and aquaculture. Chief among them is that not all segments of the

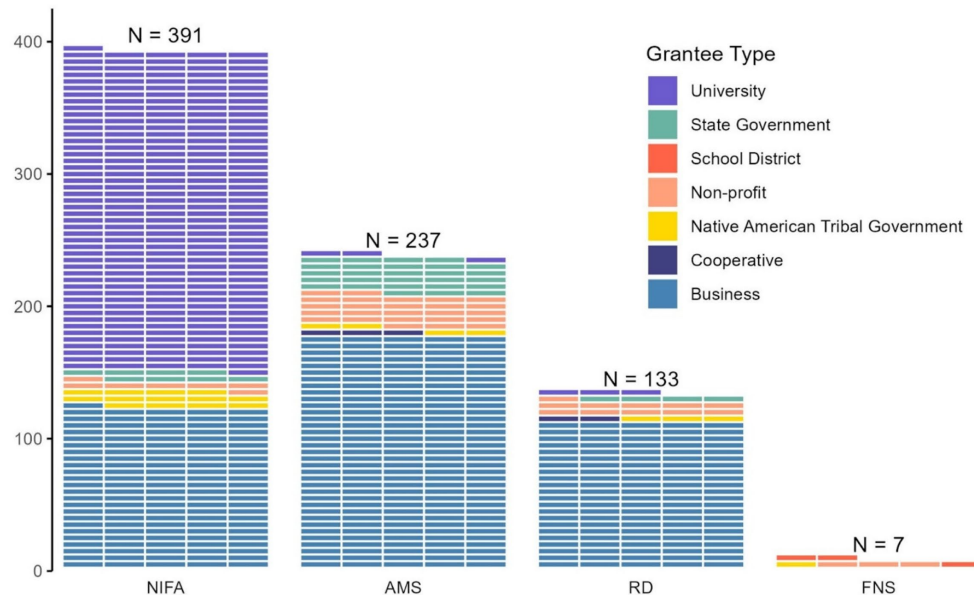


FIGURE 6
Number of seafood-related projects funded based on organizational type. Each line represents one grant.

seafood sector are eligible for USDA grants, creating ambiguity and confusion within the seafood sector, technical assistance providers, and even staff within USDA. As one participant shared, “the first grant I wrote was a USDA grant, for my captain at the time. I went to the trouble of writing and submitting a grant only to find out that wild seafood is not eligible” [I01]. Another factor relates to the geographic definition of “local” that USDA uses to define eligibility [I08]. The definition that USDA uses specifies that product must be sold within 400 miles of where it is harvested. While this definition may be suitable for terrestrial agriculture, most seafood production in the United States occurs in rural and remote places that are often far from urban centers. Similarly, for one grant, USDA requires that at least 51% of raw materials be produced by the applicant. As with the definition of local, this threshold can be challenging for small- and mid-sized seafood operations because of the way the fishing sector is managed. For example, in Alaska, many salmon harvesters who direct market salmon do not have access to processing equipment, so they must sell their catch to a processor and buy back the product that they sell. Therefore, harvesters cannot guarantee that the salmon they are selling is the salmon they caught. This issue is further compounded by the fact that fisheries are rarely a full-time occupation anymore, and so many people who work in the sector have to supplement their income with other work. As one person explained, “I spent probably a month of like full-time work writing this grant proposal. We lined up a facility to do it. We lined up a consultant through the facility. We had the grant ready to go. And we had to back out at the last minute because they require 51% of your income to be from harvesting. At the time, most of my income was coming from seafood processing in [the state where I work]. I wasn’t eligible on my own” [I01].

There are also more subtle issues with the way USDA grants are designed that create barriers to participants in the seafood sector. For example, multiple participants highlighted the disconnect between the evaluation metrics that USDA uses for grants and their lived experiences in the seafood sector. To this point, one participant

observed, “The kinds of metrics that they want you to reference are so specific, and they do not really fit. And so you are like, ‘I do not know how many people under the age of 15 are going to be educated by this marketplace website.’ That does not make sense. That’s not a metric I’m willing to track [because it is not relevant to me], but you have to make it up. You end up kind of just filling in blanks arbitrarily.” On the theme of salience to the seafood sector, another participant pointed out that the grant they received requires people to attend an in-person conference that was geared towards terrestrial agriculture. “I do not know if this is just the particular [grant I received], but they require attending an annual meeting and presenting on your work. It coincides with ag econ conference. I think traditionally the people who get funding through this program are going to that conference anyway. But this is not a conference I typically go to, and that expectation was not in the RFP, so it’s not something I budgeted for [I12].”

These barriers are compounded by the fact that USDA appears to sometimes treat seafood differently than other food products, even when seafood producers are technically eligible to apply. To this point, one participant shared an experience in which their proposal was rejected because the project focused on seafood. “We mobilized a group around [a project] idea and submitted a proposal [to USDA]. It was Maine, Pacific Northwest, and Alaska and the focus was on seafood and seafood systems... They did not even send [our program] out for review. There is a disconnect. They said seafood is only one product and therefore does not count. There’s a bit of educating to be done.”

3.2.3 Emergent recommendations

3.2.3.1 Review and update USDA grant programs to ensure inclusivity and salience to the seafood sector

USDA’s grant programs and their associated eligibility requirements, evaluation metrics, and assumptions about how food systems operate reflect the intricacies of land-based farming in the United States. While these intricacies serve those who participate in

TABLE 1 Shortlist of USDA agencies, grant programs, number of grants awarded (2018–2023), and data source for which detailed data exists within our database.

Agency	Grant program	Number granted	Data source
Agricultural Marketing Service	Agricultural Worker Pandemic Relief and Protection Program	6,085	USAspending, AMS website
	Specialty Crop Block Grant Program - Farm Bill	453	USAspending
	Farmers Market Promotion Program	344	LAMP Navigator
	Local Food Promotion Program	340	LAMP Navigator
	Meat and Poultry Interstate Shipment And Inspection Readiness Program (Isirp)	174	USAspending
Food and Nutrition Service	Food Distribution Program on Indian Reservations (FDPIR)	3,786	FDPIR website
	Farm to School Grant Program	934	Farm to School webpage
National Institute of Food and Agriculture	Sustainable Agriculture Research and Education (SARE)	2,501	SARE
	AFRI Predoctoral Fellowships	409	NIFA Data Gateway
	AFRI Post-Doctoral Fellowships	280	NIFA Data Gateway
	Animal Health and Production and Animal Products	392	NIFA Data Gateway
	Beginning Farmer and Rancher Development Program	276	NIFA Data Gateway
	Miscellaneous Research Projects	208	NIFA Data Gateway
	Regional Food Safety Modernization Act (FSMA) Center	162	NIFA Data Gateway
	Plant Health and Production and Plant Products	159	NIFA Data Gateway
Rural Development	Rural Energy for America Program Renewable Energy Systems and Energy Efficiency Improvement Loans and Grants	9,036	Rural Data Gateway
	Miscellaneous Grants	6,103	Rural Data Gateway
	Rural Business Development Grants (RBDG)	2,293	Rural Data Gateway
	Water and Environment Program Direct Grants	1,745	Rural Data Gateway
	Value-Added Producer Grants	1,429	Rural Data Gateway
	Economic Impact Grants (<i>Cf</i>)	681	Rural Data Gateway
	Search - Special Evaluation Assistance for Rural Communities and Households Grant	418	Rural Data Gateway
	Rural Microentrepreneur Assistance Program (RMAP)	397	Rural Data Gateway
	Emergency Water Assistance Grant	208	Rural Data Gateway
	Rural Economic Development Loan and Grant (REDLG)	204	Rural Data Gateway
	Rural Cooperative Development Grants (RCDG)	188	Rural Data Gateway
	Predevelopment Planning Grant (Water and Env. Program)	185	Rural Data Gateway
	Tribal College Grants (<i>Cf</i>)	179	Rural Data Gateway
	Community Development Grants	171	Rural Data Gateway
	Technical Assistance and Training Grant (Water and Env. Program)	157	Rural Data Gateway

For a full list of grant programs used in our analysis, please see the [Supplementary Table 1](#).

terrestrial agriculture, they are not fully transferable to fisheries and aquaculture production. “USDA is oriented toward chicken, pork, and beef,” reflected one participant [I14]. “It really does not work for us.” Even in cases where the seafood sector is eligible for a specific grant, a common sentiment among participants is that the requirements and evaluation metrics do not align with the realities of the seafood sector. “For someone like me,” explained a participant [I07], “the most painful part of writing these grants is being asked to deliver a level of certainty that is physically impossible. You’re basically writing creative fiction.” Another participant offered a story about how they wrote their proposal about aquaculture to be eligible for funding, even though the work did not fully align with their business. “[We applied for] funding

from USDA that was supposed to go into the food system, and the only seafood that was qualified for that funding was aquaculture. So we wrote this grant proposal that’s all about how we are going to support more aquaculture in the region [I08].” In another case, a participant equated their experience to “trying to jam a square peg into a round hole” [I01]. Using the same metaphor, another participant reflected on their resolve to access USDA funding: “We’re going to put [our proposal] in the square hole. We’re going to find a way to make it work” [I02]. While this strategy has evidently worked for some organizations, these grant programs could be made more accessible if existing programs were systematically reviewed and their eligibility requirements, evaluation metrics, and assumptions about how food systems operate were

TABLE 2 USDA grants supporting fisheries and aquaculture relative to other sectors of the food system (2018–2023).

Agency	Seafood- focused grants (n = 768)	Amount (Million USD)	Other grants (n = 145,952)	Amount (Million USD)
Agricultural Marketing Service	237	28.71	7,556	2,661.17
Food and Nutrition Service	7	0.57	4,715	452.86
National Institute of Food and Agriculture	391	208.3	11,494	6,148.52
Rural Development	133	24.16	122,187	21,694.36

updated to better align with the needs of the seafood sector in the same way that these programs have been crafted to reflect the needs of the terrestrial agriculture sector. As one participant [I01] noted, “There needs to be something out there that incentivizes actual creativity and experimentation. That does not exist anywhere yet.” Adding to this perspective, another participant [I14] suggested, “There needs to be a structural reform within the USDA... They do not really have anybody in the organization who is invested in fish. It’s always second [or] third tier. There’s nobody whose job requires them to get a certain percentage of funding for fish. There’s not a silo of fishery bureaucrats, like there is with beef.”

3.2.3.2 Clarify eligibility for the seafood sector across grant programs

USDA’s conception of a food system—and in particular what does not count—is creating confusion within the seafood sector. As one participant asked, “Am I even eligible to apply as a fisherman or fishing organization? Every now and then you’ll see a reference that aquaculture is okay, but it’s when you talk to people [at USDA], they say, ‘Oh, yes, if you are a commercial fisherman, you are eligible for this.’ But it’s not actually written anywhere. Having to take that initial step is enough of a hurdle that a lot of people do not even bother. They read it. And they are like, ‘No.’ [I14].” Another participant echoed that sentiment, recommending that USDA “make it more clear that these grants can be applied for by seafood businesses or not applied for because it’s very vague” [I02]. Other participants went further, recommending that USDA create additional grant programs that are specific to the seafood sector. “I would love to see just more seafood-specific grant programs as well that really target our coastal areas and recognize the value of seafood to the nation as a whole” [I02]. At least one participant concluded [I13] “we also believe that USDA, by mission, should be celebrating our work.”

3.2.3.3 Invest in technical assistance and boundary organizations

While USDA funding has the potential to provide an important source of funding for the seafood sector, accessing funding appears to be a challenge. A common sentiment among the people we interviewed was that technical assistance is key. This viewpoint was reflected in one participant’s story about how they learned about the funding. “I heard about it from the Local Catch Network. [The grant was posted] on their list serve. I signed up for some office hours, and I spoke to someone on the West coast. They said something that stuck with me that was like, it’s a bunch of hoops to jump through which, like I knew about from working in the Federal Government. Learn how to jump through the hoops, right? He was like, you know, it’s six figure funding and there’s limited six-figure funding for the type of work that we do.” Others described wanting more opportunities to learn about funding opportunities. As one

person reflected [I13], “You get brain burnout, just looking sometimes.” They continued, “[The] ability for somebody or some organization to do that translation... Like, tell me what your problems are, tell me what you are thinking about. And say, ‘Oh, this is like a cool opportunity that might actually be useful to you.’” Similar comments were made by other participants who suggested [I01]: “It would be really nice if there was a bank of technical assistance experts or extension agents, people who wanted to collaborate directly with the fishing industry on priorities identified by the fishing industry [and could do] the parts of it that the fishing industry cannot easily provide with just the grant writing and the [SAM.gov](#) account and the data analytics part of it.” Another participant concluded: “The role of boundary organizations is so critical in this, especially in a rural and poor area where the towns do not even have town managers and so on. So I think that that’s where the problem is that USDA does not necessarily have the bandwidth, maybe, to do all the interpretation and handholding.”

4 Discussion

We assembled a database of 146,720 grants awarded by USDA from 2018 to 2023. Our database included all grants awarded by four agencies within USDA that are primarily responsible for grant-making activities associated with domestic food systems. We evaluated the extent to which these grants have supported the seafood sector, including wild capture fisheries and aquaculture, and found that only 768 (\$261.7 million) went to projects associated with the seafood sector, representing 0.52% of the grants during the 6-year study period.

To make sense of our findings, it is worth considering the level of funding for seafood within the broader context of overall domestic food production. The most recent U. S. Agricultural Census (2022) estimates that the total value of the agricultural sector in the United States is \$541 billion ([USDA, 2024a](#)). After removing non-edible products such as hay, flowers, and tobacco, approximately 62% of this value is directly associated with food production for human consumption. By comparison, wild capture fisheries (\$5.883 billion) and aquaculture production (\$2.227 billion) total \$8.153 billion (2022) ([NMFS, 2024a](#); [USDA, 2024a](#)). Taking the relative scale of wild capture fisheries and aquaculture into consideration, we would expect that roughly 2.42% of USDA’s grant portfolio (equal to approximately \$755.5 million) would go towards seafood-related projects if there was funding parity. Our findings suggest that current funding levels are roughly five times lower than this figure. Although our estimate of the edible portion of the agricultural sector is only a general approximation and could be further refined with a more in-depth analysis of food production in the United States, it suggests, at least qualitatively, that seafood is underrepresented in USDA’s current grant portfolio.

TABLE 3 Summary of the motivating and disabling factors for applying for USDA grant funding, along with emergent recommendations for future improvements.

Factors and recommendations	Description	Section
Motivating factors	Direct financial support to grow a business	3.2.1
	Direct financial support to sustain a business	3.2.1
	Direct financial support to level the playing field against perceived fraud	3.2.1
	Access to technical assistance	3.2.1
	Opportunity to build relationships with federal government staff	3.2.1
	Credibility among peers	3.2.1
Disabling factors	Time and cost of finding and applying for salient funding opportunities	3.2.2
	Difficulty of identifying appropriate funding opportunities	3.2.2
	Difficulty of understanding applications	3.2.2
	Restrictions on overhead	3.2.2
	Complexity of administering federal grants	3.2.2
	Understanding of and access to match funding	3.2.2
	Lag between application submission and access to funding	3.2.2
	Definition of “local” (400 miles)	3.2.2
	Confusion about whether or not seafood is ineligible	3.2.2
	Ineligibility of wild capture fisheries	3.2.2
	Amount of product (51%) producers are required to use	3.2.2
	Disconnect between evaluation metrics and the lived experiences of applicants	3.2.2
	Misalignment between grant requirements and fishing practices	3.2.2
	Misinformation about the seafood sector and how it functions	3.2.2
Emergent recommendations	Clarify eligibility for the seafood sector across grant programs	3.2.3
	Invest in technical assistance and boundary organizations	3.2.3
	Review and update USDA grant programs to ensure inclusivity and salience to the seafood sector	3.2.3

One logical explanation for the unevenness in funding is that other federal agencies may be responsible for filling the seafood funding “gap” with their seafood-specific grant programs. A scan of other salient federal agencies, however, suggests this may not be the case. The National Marine Fisheries Service (NMFS), for example, which is responsible for managing federal fisheries in the United States and arguably the most logical federal agency beyond USDA to provide grant funding to support the seafood sector, oversees several grant programs. The Saltonstall-Kennedy Grant Program, which is designed “to promote U. S. fisheries by assisting the fishing community to address marketing and research needs,” is the most salient program for work related to enhancing seafood and food systems. Although this program is an important source of funding for those involved in fisheries and aquaculture, data from [USASpending.gov](https://www.usaspending.gov) shows that only \$119.4 million was awarded during the six-year period from 2018 to 2023 – much less than would be required to make up the funding differential that exists within the USDA grant portfolio. The Department of Energy (DOE) is another potential source of funding, but while it invested \$30.9 million in macroalgae aquaculture grants over the timeframe of our study, these projects appear to have been directed towards energy production as opposed to food for human consumption and therefore would not address the gap.

Of the funding that USDA has directed towards the seafood sector, it is notably skewed towards aquaculture. This finding is a

reflection of the work that USDA has done to integrate aquaculture into its portfolio through the Joint Standing Committee for Aquaculture and the National Aquaculture Act of 1980. Yet it stands in contrast to the scale of aquaculture production in the United States relative to overall food production or in comparison to wild capture fisheries. Aquaculture represents approximately 0.67% of the nation’s food production, while wild capture fisheries account for 1.75%. Thus, while aquaculture only represents 28% of total seafood production in the United States (by value), it received 78% of the seafood-related grants that USDA awarded between 2018 and 2023.

Our findings help to enumerate the gap in funding for seafood within USDA’s grant portfolio. We hypothesize that if there were further analysis of USDA’s grant portfolio, other funding gaps could be identified within other parts of the food system as well. From our vantage point, it is neither realistic nor strong public policy to strive for funding parity across all segments of the food system. Funding levels should be based on the different social, cultural, political, economic, and environmental benefits that different segments of the food system generate and reflect the needs of society. This observation is partly what makes the findings of this research interesting. To the extent that we accept that federal funding levels are a reflection of public policy, the dearth of USDA funding for seafood-related projects implies that seafood overall, and wild capture fisheries in particular, are either not viewed as important or are being overlooked. While

there are arguments to be made in support of both possibilities, we posit that the lack of funding is being driven by the latter. Seafood is not well integrated into broader food system discussions and their associated policies (Stetkiewicz et al., 2022), even though there is recognition that seafood is an important part of the food system (Golden et al., 2021) as reflected by the U. S. Food and Drug Administration's seafood consumption recommendations and the newly published National Seafood Strategy (NMFS, 2024b).

We posit that the reason seafood is being overlooked ultimately comes down to a “who's-on-first” dilemma between federal agencies where two agencies have overlapping responsibility, but neither are specifically focused on seafood or ensuring those working to strengthen seafood systems have the resources and technical assistance needed to maximize seafood's contributions to the nation's food system. While USDA is chiefly responsible for enhancing the nation's food systems, the National Marine Fisheries Service is responsible for managing living marine resources, including fisheries. In 1970, through the Nixon Administration's Reorganization Plan No. IV (35 FR 15627, 1970), the Bureau of Commercial Fisheries was relocated from the Department of the Interior to the Department of Commerce and renamed the National Marine Fisheries Service (Lee, 2010). The decision to migrate “responsib[ility] for all matters related to living marine resources” to the Department of Commerce was justified as part of broader government reforms designed to make the executive branch more efficient [see section 901(a) of title 5 of the United States Code (1977)]. Yet it is widely acknowledged that the decision to shift fisheries management into the Department of Commerce was made to diminish the power of Walter Hickel, the Secretary of the Interior at the time, who had become a political adversary of Nixon because of his public opposition to the Vietnam War (Mervis, 2012; Gonzales, 2014; Ghmouch, 2023). This political history has created an artificial boundary between wild capture fisheries and the rest of the food system. Stoll et al. (2015) have argued there is a need to pay more attention to fisheries “beyond the existing regulatory ‘wrack line’” to consider seafood distribution, but this is easier said than done, because the processes, systems, and human resources the National Marine Fisheries Service has in place were created to manage fish stocks in the water as opposed to working with the seafood sector to strengthen food systems. Meanwhile, USDA was created to support terrestrial agriculture and, at least outwardly, appears to defer to the National Marine Fisheries Service on wild capture fisheries.

4.1 Limitations and future work

We recognize several limitations of our study that should be taken into consideration when interpreting our results. First, the focus of this study was only on grant funding. However, USDA also distributes funding through other mechanisms such as state and cooperative agreements and contracts. Further research into the diverse types of funding would provide a more holistic understanding of USDA's funding portfolio. Similarly, we acknowledge that we focused on external grants. Therefore, our analysis did not capture the funding that USDA uses to support internal activities, which represents a large portion of the department's overall annual budget. Finally, we did not interview individuals who have applied for funding, but have not been successful. We anticipate that interviews

with this population of people could reveal additional insights about the barriers that limit access to federal funding as well as opportunities for improving existing systems.

5 Conclusion

Our review shows that projects associated with marine and aquatic foods are not well represented in USDA's existing grant portfolio. Using interviews with past grant recipients of USDA grants to support seafood-related projects, we offer insights into why USDA funding is important to the seafood sector, barriers that are limiting the seafood sector's access to USDA grants, and recommendations for how to better support the seafood sector moving forward. The research suggests that a clearer and more consistent coordination between USDA and other relevant federal agencies may help bring greater focus to seafood and its potential contributions to the nation's food system. The progress USDA has made to integrate aquaculture activities into its portfolio could provide a useful roadmap. Regardless of future policy decisions to invest in the seafood sector, those who participate in wild capture fisheries and aquaculture would benefit from having more clarity about how USDA and the federal government in general are defining food systems and the extent to which the seafood sector is eligible for funding opportunities as there is currently a high level of variability.

Data availability statement

The original contributions presented in the study are publicly available. This data can be found here: Open Science Foundation: <https://osf.io/ntwgc/> (Advani et al., 2024).

Ethics statement

The studies involving human participants were approved by the University of Maine Institutional Review Board (# 2024-03-11) and conducted for the purpose of contextualizing the results of our quantitative analysis and to gain perspectives on how to improve grant funding opportunities for the seafood sector. 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 written informed consent was not required by the University of Maine Institutional Review Board.

Author contributions

JS: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. SA: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing. ED: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Writing – review & editing. WG: Data curation, Formal analysis, Investigation,

Writing – review & editing. TO: Data curation, Formal analysis, Investigation, Writing – review & editing.

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Conflict of interest

JS is owner of the Georgetown Island Oyster Company, Maine, USA and has been the recipient of USDA grant funding in the past.

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The remaining 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.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2025.1558756/full#supplementary-material>

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