

Alaska Fisheries, Seafood and Maritime

WORKFORCE DEVELOPMENT PLAN

Towards a strong and sustainable fisheries,
seafood and maritime workforce in Alaska

DRAFT FOR REVIEW ::: October 18, 2013



Developed by representatives of

- ::: Fisheries, Seafood and Maritime Industry Sectors
- ::: Alaska State and Federal Agencies
- ::: University of Alaska

Facilitated by



TABLE OF CONTENTS

Executive Summary	3
Participants	3
Process	3
Overall Fisheries, Seafood, and Maritime Workforce Development Strategies	4
Priority Occupations	5
Cross Cutting & Foundational Skills	6
Participants	7
Introduction & Overview	9
Alaska’s Fisheries, Seafood and Maritime Industry	9
A Workforce Development Plan for the Fisheries Seafood and Maritime Industry	11
Who will use the FSM Workforce Development Plan	12
Anticipated Outcomes and Impacts	13
Methodology	15
The Fisheries, Seafood and Maritime Initiative: Mission and Goals	15
Overall Report on Education & Training Gap Analysis for the FSM Workforce	16
Needs Assessments	16
Next steps	18
Overall Fisheries, Seafood, and Maritime Workforce Development strategies	19
Other workforce development priorities for Future FSM Coalition work	21
Priority Occupation and skillsets	23
Industry Priority Occupations	23
Fisheries Sector Priority Occupations	24
Seafood Processing Sector Priority Occupations	30
Maritime Occupations and Skills	43
Research, Conservation and Management Priority Occupations	58
Cross-Cutting & Foundational Skillsets	79
Appendix A: Overall Strategies	82
Appendix B: Suggested Criteria for Evaluating Occupations	84
Works Cited	86

EXECUTIVE SUMMARY

As Alaska's largest private sector employer, the Fisheries, Seafood, and Maritime (FSM) industry is a large part of Alaska's identity and a vital industry for the state. The Alaska Fisheries, Seafood and Maritime Workforce Development Plan was developed by industry, educators, and state government. It calls for directing energy and resources from these stakeholders into carefully thought out strategies to increase the number and performance of Alaskans working in this industry, and to enhance and support Alaska's strong dependence on the marine and coastal environment.

Industry representatives observe and data indicate a "graying of the fleet," or many employees nearing retirement. Additionally, there is a high level of non-resident employment within the FSM sectors. There is no current statewide strategy to communicate about occupations and careers in the industry, to provide training and professional development for them in a coordinated manner, and to encourage recruitment and retention. This plan seeks to address these challenges by identifying both overall strategies to develop the industry's workforce as well as priority occupations within each sector and strategies to develop them. The plan also identifies important cross-cutting skills for occupations across the sectors within the industry; with the high seasonality and remoteness of occupations in the FSM industry, there are many common skills required by various occupations.

Participants

Many individuals contributed to the development, review, and refinement of this plan. Stakeholders were organized in two committees: The Industry Advisory Committee (IAC) is comprised of key industry representatives as well as industry association representatives. The University of Alaska Working Group is comprised of UA representatives from across the state. There were also four working groups, one for each sector (fishing; seafood; maritime; and research, conservation, and management). The workgroups conducted needs assessments and worked on occupation-specific strategies within their sectors.

Process

In May, 2012, the McDowell Group conducted an Education and Training Gap Analysis, which provided important baseline data from which to build this plan. The report includes summaries of discussions and interviews with industry leaders and training providers, results of an online workforce needs survey, and employment and training data.

Next, each of the sectors (fisheries; seafood; maritime; and research, conservation, and management) conducted occupational needs assessments. While specific methodology differed between sectors, they all essentially conducted surveys and interviews with industry

representatives in order to identify the occupations within that sector that demanded the most, and/or immediate focus.

A coordinator for the University of Alaska Fisheries, Seafood, and Maritime Initiative (FSMI) program, Michele Masley, conducted much of the baseline research and facilitated the Occupational Needs Assessments. Information Insights, Inc., and Alaskan public policy research and management consulting firm, compiled the plan. Drafts were made available to stakeholders for review and comment.

On October 31, the Industry Advisory Group and other stakeholders will gather to further develop the overall strategies outlined below, as well as develop work plans for accomplishing the occupation-specific strategies outlined within the sectors.

Overall Fisheries, Seafood, and Maritime Workforce Development Strategies

1. Grow Career Awareness
2. Develop Career Pathways
3. Improve Access to Employment
4. Train Alaskans for Fisheries, Seafood, and Maritime Employment
5. Improve Industry Engagement and Accountability

Priority Occupations

Fisheries

- Commercial Seafood Harvesters
- Shoreside Support Businesses
- Shellfish Farmers

Seafood Processing

- Engineers
- Refrigeration
- Production Managers
- Electricians
- Can Machinists
- Quality Controls
- Boiler Technicians
- Plant Managers
- Deckhands

- Analyst / Programmer and Database Managers

- Engineers

- Environmental Program Managers

- Fisheries Economists

- Fisheries Analysts

- Fisheries Management Specialists

- Hatchery Managers

Maritime (Skillsets, not occupations)

- Shipbuilding and Repair

- Shoreside Support

- Passenger Service

- Management

- Unlicensed and Licensed Deck and Engine Personnel

- Licensed and Unlicensed Vessel

- Engineers, including QMED

- Diesel Mechanics, Gasoline Engine

- Mechanics, Port Engineers, Other

- Equipment Maintenance and Repair Specialists

- Marine-specific Electronic and Computer Engineers and Technicians

- Vessel Captains, Ship Captains, Ships

- Officers, Towboat Captains, Tour Boat Captains

- Civil Engineers, Structural Engineers, Coastal Engineers

Research, Conservation and Management

- Biometricians

- Fish and Wildlife and Hatchery Technicians

- Fishery Biologists

- Fish and Game Coordinators

- Fisheries Scientists

Cross Cutting & Foundational Skills

In analyzing the Occupational Needs Assessments and the FSM Education and Training Gap Assessment, it became clear that there are skillsets within the industry that cut across many or all sectors:

- Managerial/Executive
- Architectural Design/Engineering
- Vessel Operation
- Marine Industrial Trades (Generalist; Mechanical; Electrical)
- Scientific (Regulatory; Specialized, Applied)

Employees with these transferrable skills are able to work in a variety of occupations within the industry. Prioritizing these skill sets and weaving them in to a variety of programs may be strategic in developing a more cross-trained, efficient workforce.

Also of note in both the FSM Education and Training Gap Analysis and the Occupational Needs Assessment was the need expressed by industry employers for workers to have a solid foundational skillset – or soft skills. This job readiness component is particularly important in this industry because of the seasonality and remote locations of the work. Some of the skills may require formal training and a technical certification, but most of them do not. Employers also noted that job readiness training often can serve a related function of screening prospective workers for attitude, drug and alcohol use, and other skills or attributes related to job performance.¹

¹ FSM Education and Training Gap Analysis (<http://www.alaska.edu/files/fsmi/FSMFinalReport5-14-12.pdf>)

PARTICIPANTS

This FSM Initiative (FSMI) has been governed by two committees: the Industry Advisory Committee (IAC) comprised of key industry representatives and industry association representatives and the University of Alaska Working Group comprised of UA representatives from across the state.

FSM Industry Advisory Committee	Kris Norosz, Icicle Seafoods Inc. (FSMI Industry Co-Chair with Fred Villa)
	Wanetta Ayers, Alaska Dept. of Labor and Workforce Development (AKDOLWD-AWIB)
	Aggie Blandford, Western Alaska Community Development Association (WACDA)
	Candice Bressler, Alaska Dept. of Fish and Game (ADF&G)
	Tim Clark, Staff to Rep. Edgmon
	Julie Decker, United Fishermen of Alaska
	Russell Dick, Haa Aani, LLC
	Rep. Bryce Edgmon, Alaska State House
	Kurt Hallier, Conoco Phillips
	Senor Lyman Hoffman, Alaska State Senate
	Oliver Holm, Commercial Fisherman, Kodiak
	Stephanie Madsen, At-Sea Processors Association
	Helen Mehrkens, Alaska Dept. of Education and Early Development (AKDEED)
	Vince O'Shea, Pacific Seafood Processors Association
	Steve Reifentstuh, Northern Southeast Regional Aquaculture Association
	Jim Scholz, Samson Tug and Barge
	Mike Shiffer, Alaska Dept. of Labor and Workforce Development (AKDOLWD)
	Pearl Strub, Bristol Bay Economic Development Corporation (BBEDC), AWIB Boards, Processor
	Doug Ward, Alaska Ship and Drydock
	Amy Wilson, Alaska Marine Highway System, DOTPF
	* Glenn Haight, DCCED was a participant in the IAC and has since moved to a new position.
	Paula Cullenberg, UAF Alaska Sea Grant (FSMI Co-Chair)

FSM UA Working Group	Fred Villa, UA Statewide, Workforce Programs(FSMI Co-Chair)
	Torie Baker, UAF Alaska Sea Grant Marine Advisory Program
	Barbara Bolson, UAA Kodiak Campus
	Mike Castellini, UAF School of Fisheries and Ocean Sciences
	Rick Caulfield, UAS Provost
	Keith Criddle, UAF School of Fisheries and Ocean Sciences
	Mark Herrmann, UAF School of Management
	Terry Johnson, UAF Alaska Sea Grant Marine Advisory Program
	Gunnar Knapp, UAA Institute of Social and Economic Research
	Deborah McLean, UAF Bristol Bay Campus
	Bonnie Nygard, UAA Workforce Development
	Mary Pete, UAF Kuskokwim Campus
	Pete Pinney, UAF College of Rural and Community Development
	Karen Schmitt, UAA Community and Technical College
	Carol Swartz, UAA Kachemak Bay Campus
	BJ Williams, UAA Prince William Sound Community College

Four subcommittees were formed to assess occupational needs and strategies and included other industry members and educators. Members of those working groups are listed below.

Work Group	Members
Fisheries	Torie Baker, UAF Alaska Sea Grant Marine Advisory Program (Co-chair), Paula Cullenberg, (Co-chair), Oliver Holm, Julie Decker, Anthony Lindoff (Haa Aani LLC), Eric Jordon (fisherman, Sitka), Buck Laukitus (fisherman, Homer), Pearl Strub
Seafood	Gunnar Knapp, UAA, Insitute of Social and Economic Research (Chair), Aggie Blandford, Stephanie Madsen, Vince O'Shea, Kris Norosz, Jean Falconer (ISER)
Maritime	Terry Johnson, UAF Alaska Sea Grant Marine Advisory Program (Chair)
	Jason Custer, City of Saxman
	Kurt Hallier, Conoco Phillips
	Doug Ward, Alaska Ship and Drydock
	Amy Wilson, Alaska Marine Highway System
Research and Conservation	Michele, Masley (UA FSM past coordinator, Chair) Mike Castellini,
	Candice Bressler, Alaska Dept. of Fish and Game
	Ad hoc contributions from other research/conservation and organizations

INTRODUCTION & OVERVIEW

Alaska's Fisheries, Seafood and Maritime Industry

The Fisheries, Seafood, and Maritime (FSM) Industry comprises several sectors that have not necessarily thought of themselves collectively as a common workforce. However, many of the occupations within the FSM sectors require cross-cutting skills and, many Alaskan workers, particularly outside of urban hubs, are engaged in more than one FSM occupation throughout the year. This is a vital industry for Alaska. In terms of numbers of workers employed, the commercial fishing and seafood industry is the state's largest private sector employer according to a recent report commissioned by the Alaska Seafood Marketing Institute and completed in July 2013 (ASMI).

Other traits that tie these sectors together as a workforce while differentiating them from other industries in Alaska are seasonality, remoteness of the workplace, and the high percentage of workers who are self-employed. While communities such as Kodiak and Unalaska have active fisheries almost year round, most Alaska fishing communities are seasonal with significant population peaks during the summer. Non-fisheries maritime businesses more commonly operate year round, although Alaska's weather impacts many of these. Many of the prime areas for fisheries and seafood are proximate to small rural communities that are not on the road system. The maritime trades are closely tied to the other sectors so much of the employment is located in the same remote areas.

The fishing, seafood, and maritime (FSM) industry is a large part of Alaska's identity and a significant piece of Alaska's economy. The FSM workforce is composed of more than 68,000 workers and 500 firms (which does not include sole proprietorship and small operations).² Forty seven percent are Alaskan residents, the majority (92%) of them is employed by commercial fishing, seafood processing, and non-profit hatcheries. Top employers in the FSM sectors include commercial fishermen (as a group of small business owners), then seafood processors, ADF&G (with around 1,800 employees), AMHS (with about 1,300 personnel), the Vigor Alaska operating the state owned Ketchikan Shipyard (with about 200 staff), US Coast Guard and many others.

Thousands of Alaskans participate in seafood harvesting annually, contributing to Alaska's economic well-being. While we do not try and put a dollar value on subsistence in this plan, we recognize that many of the strategies for supporting the workforce will also support knowledge, skills and abilities used by subsistence hunters and fishermen.

² FSM Education and Training Gap Analysis (<http://www.alaska.edu/files/fsmi/FSMFinalReport5-14-12.pdf>)

Fisheries

Fisheries in this plan refers to commercial seafood harvesters, including fishermen and those who are employed in shellfish farming. Commercial seafood harvesting is the second largest private employer in the state with 32,200 harvesters in 2011; over 9,900 permit holders made at least one landing. Crewmembers number 22,000 (DOLWD Nov 12). Over 8,000 vessels are registered in the State of Alaska for commercial fishing; approximately two-thirds are owned by Alaska residents and one-third by nonresidents. The construction, maintenance and upgrade of these vessels represent a source of high-demand and high-paying service jobs for Alaskans.

Over 17,300 Alaska residents are involved in harvesting, representing 56% of harvesters (44% are non-residents). In many areas historical ties, particularly to Washington and Oregon residents, remain strong. Finally, Alaska seafood is currently considered a growth industry. World and domestic demand for products from wild caught and sustainably managed fisheries is increasing; Alaska is a long-time leader in this sector.

Seafood Processing

Seafood processing in this plan refers to the processes between when seafood is harvested and when it is delivered to a customer, including activities like filleting, freezing, canning, and smoking. Alaska's seafood processing industry processes 5 billion pounds of fish and shellfish each year, which is more than 55% of the United States' total catch.³ There are over 300 firms of varying size in Alaska, ranging from small "mom and pop" businesses to multimillion dollar operations. The Alaska seafood processing industry directly employed 27,100 workers in Alaska.⁴

Produced by Alaska-based research firm The McDowell Group, the *Economic Value of the Alaska Seafood Industry* finds that in 2011, the combined value of Alaska seafood exports and the retail value of Alaska seafood sold in the U.S. was an estimated \$6.4 billion.

Maritime

Alaska's maritime sector is large and diverse, comprising hundreds of large and small businesses with thousands of workers in hundreds of occupations, and no unifying sector identity other than association with the sea. Unlike fisheries and seafood, the maritime sector collectively has not been designated an industry sector in Alaska and have not been the focus of an industrial or economic study, so there is no baseline information on employment numbers, percentage of employees who are Alaska residents, worker turnover, sector contribution to the state economy, or other factors pertinent to development of a workforce plan.

A partial list of industries included in this sector in Alaska includes:

- Shipbuilding, ship repair, boat building, boat repair, engine and vessel systems maintenance
- Marine passenger transportation, including ferries, tour boats, water taxis
- Cargo ship and vessel operations, including container, tug and barge, lighterage, fuel transport
- Towing, salvage and vessel assist
- Ports and harbors, marinas
- Marine and coastal engineering, design, construction, inspection and management
- Marine environmental response

³ UAF Marine Advisory Program: <http://seagrant.uaf.edu/map/seafood/index.html>

⁴ Economic Value of the Alaska Seafood Industry, McDowell Group, 2013

- Net and gear design and construction, deck machinery design and construction
- Marine research vessel operations
- Naval and Coast Guard support activities (not including uniformed personnel)
- Oil and gas exploration, support and supply
- Fuel distribution and sales
- Marine equipment and supply

An important characteristic of this sector in Alaska is that while there are a relatively large number of occupations, the number of individuals employed in each is relatively small. There are several reasons:

Most maritime industry employers in the state are small businesses—tug and barge companies, local ports and harbors, small boatyards and marine repair companies, for example. The largest single employer to participate in the survey was the Alaska Marine Highway System, with 975 total workforce, but most are in the range of a dozen workers or fewer.

Many jobs (as opposed to occupations) are seasonal or intermittent, corresponding to cycles in operating seasons, demand for repair work, or budgetary considerations. A single individual may work in several occupations during the course of a year, going where the demand is. A boat repair facility may have a welder, electrician, fiberglasser, hydraulics technician, carpenter, diesel mechanic and crane operator, who all may be the same person.

The labor market for the FSM industry is national and international. Workers with skills and qualifications flow in and out of Alaska in response to opportunity, and Alaskans are working elsewhere in the nation and the world.

Research, Conservation, and Management

The research, conservation and management sector is a significant and critical part of the fisheries, seafood and maritime workforce in Alaska. Employees typically work for a governmental and/or regulatory body such as the Alaska Department of Fish and Game or a number of federal agencies such as National Marine Fisheries Service, the North Pacific Fishery Management Council, the US Fish and Wildlife Service, the US Forest Service, the National Park Service and the Bureau of Land Management. In addition, occupations in research, conservation and management may work for private consulting firms, nongovernmental organizations, CDQ groups or other regional Native nonprofits.

A Workforce Development Plan for the Fisheries Seafood and Maritime Industry

A workforce development plan is a tool to guide industry, government and educators in working together to ensure that Alaskans gain the most value from their work and to ensure that the next generation of Alaskans can access high skill, high paid positions here in our state.

Current data indicate a “graying of the fleet” in Alaska’s commercial fishing population⁵. Seafood processing companies notice similar conditions. The Alaska Department of Fish and Game, one of the largest employers

⁵ Alaska State Legislature: <http://housemajority.org/spon.php?id=27hcr18-276>

in this industry, has noted that one-third of their senior employees will be retiring soon and the salaries and retirement benefits do not entice new entry.

With a high non-resident level of employees in the FSM sectors, the state of Alaska can and should focus on ensuring that more Alaskans fill these positions.

Currently lacking is a statewide strategy to communicate about these occupations, to provide training and professional development for them in a coordinated manner, and to encourage recruitment and retention.

Defining the Fisheries, Seafood and Maritime Workforce for this plan

Starting in 2011 representatives of Alaska’s fisheries, seafood and maritime (FSM) sectors, in collaboration with representatives of state agencies and the University of Alaska, have been working toward development of a workforce development plan for the industry collectively. The purpose of the plan is to develop and build partnerships between industry, training organizations, and policy makers that enable and encourage Alaskans to find lucrative and rewarding work and careers in the FSM industry, and for these employers to find well-qualified Alaskans who meet their needs.

This Workforce Development Plan for the FSM industry provides an analysis of priority occupational needs and workforce development strategies for Alaska’s fisheries, seafood and maritime industries. Its development is based on information collected and analyzed by representatives of Alaska’s fisheries, seafood and maritime sectors and Alaska state agencies, with facilitation by the University of Alaska. The report was compiled by Information Insights. The analysis also makes use of information compiled in an earlier report entitled *Education and Training Gap Analysis for the Fisheries, Seafood, Maritime Workforce* prepared in 2012 by the McDowell Group.

Many of the occupations within the FSM industry require skillsets that are applicable to other occupations in the industry; these are referred to in this plan as cross-cutting skills.

An approach that strives to develop the skills, abilities, and knowledge in order to prepare workers for a range of occupations within the FSM workforce will benefit both employers and employees as well as the communities where these occupations are centered.

The goals of the FSM Industry Workforce Development Plan are to:

- | |
|--|
| <ol style="list-style-type: none">1. Sustain and enhance the economy and communities of Alaska by developing a responsive workforce that enables the fishing, seafood and maritime sectors to stay vibrant and substantial contributors to the state.2. Support Alaska’s workforce, particularly in coastal communities, in discovering and preparing for the wide range of employment opportunities in the fishing, seafood and maritime industries. |
|--|

Who will use the FSM Workforce Development Plan

This plan is intended to serve as a guide and resource for employers, prospective employees, state policy makers and educators. Implementation of the plan will be the next step and will take continued collaborative

work by each of these groups to determine priority actions, who can do them, and how to find the resources to make them happen.

::: Employers :::

This plan provides employers with strategies for sustaining and improving their workforce. It identifies ways state policy, education and training and industry participation can result in stronger career pathways, recruitment of new workers and the retention and professional development of current workers. It gives employers a forum in which to communicate with the University of Alaska, regional training centers, state agencies and the Alaska State Legislature in a collective manner focusing on supporting and enhancing Alaska's workforce in these occupations.

::: State of Alaska :::

The plan assists the Alaska Workforce Investment Board (AWIB) and related state agencies in aligning and coordinating resources to support fisheries, seafood, and maritime industry workforce development. Five state agencies involved in this workforce plan include both sector employers (Alaska Department of Fish and Game and Alaska Department of Transportation) as well as support agencies including the Alaska Department of Education and Early Childhood Development, the Alaska Department of Commerce and Community Development and the Alaska Department of Labor and Workforce Development.

::: University of Alaska & Other Education and Training Providers :::

This plan assists the University of Alaska and other post-secondary education and training providers in responding to gaps in the education and training programs based on industry identified needs for workforce development. The plan provides strategies to improve access to training and education opportunities needed by Alaska's FSM workforce. Secondary school educators may use this plan to define high school or other K-12 programs that support the next generation FSM workforce.

::: Prospective Employees :::

Current and future FSM employees may use this plan for information on how to access education and training programs and understand high need employment opportunities in the fisheries, seafood, and maritime sectors.

Anticipated Outcomes and Impacts

The Alaska Fisheries, Seafood and Maritime Workforce Development Plan is a call to action by industry, educators and state government. Successfully directing the energies and resources of these stakeholders through the strategies outlined in the plan will not only increase the number and performance of Alaskans working in this sector, but will enhance and support Alaska's strong dependence on the marine and coastal environment for its economic well-being.

Expected outcomes include:

- Recognition of the fisheries, seafood, and maritime sectors as a significant FSM workforce in the state with cross-cutting knowledge, skills and abilities.

- Acknowledgement of the need for FSM industry workforce development planning by the University of Alaska, State of Alaska, Alaska State Legislature, FSM industry employers, and other stakeholders.
- Increased understanding of the significant number of high-skill, high pay employment opportunities in Alaska's FSM sectors.
- Recognition of FSM occupations that are high priority to employers.
- Identification of strengths and weaknesses in the system of providing education and training to meet high priority occupations in the FSM workforce.
- Development of partnerships to engage in ongoing work to implement this FSM workforce development plan.
- Information and recommendations to enhance current data gathering and reporting to support FSM workforce development evaluation.
- Motivation to continue the process and formalize the function and role of a FSM industry workforce development consortium.
- Understanding of Alaska's workforce development processes and alignment with the State of Alaska Career and Technical Education Plan.

Expected impacts include:

- Increased number of Alaskans in FSM occupations.
- The needs of FSM employers are increasingly met by skilled Alaskan workers.
- Increased numbers of Alaskans participate in FSM workforce education and training opportunities.
- Increased understanding by Alaskans about the range of employment opportunities in the FSM industry.
- Increased access for Alaskans, particularly coastal, rural and underserved populations, to information about education, training, and employment opportunities in the FSM industry.
- Continuous improvement in Alaska's education and training systems to communicate and provide in-state opportunities to meet industry-required skills, knowledge, and qualifications.
- Improved representation of the FSM sector in Alaska's workforce committees.
- Improved articulation of education and training programs, both credit and non-credit, among education and training providers.
- Streamlined processes for delivering programs without needless duplication.
- Leveraging resources and assets so stakeholders can strategically plan and invest in career and technical education related to FSM-related industry.

METHODOLOGY

The Fisheries, Seafood and Maritime Initiative: Mission and Goals

::: Mission :::

Engaging fisheries, seafood and maritime sectors and community partners to assess, develop and deliver programs, training and research that prepare Alaskans to meet current and emerging workforce, economic and scientific needs.

The fishing, seafood and maritime sectors represent Alaska's largest private employer and play a significant role in our state's economy. At a December 2011 summit convened by the Governor of Alaska, the Chair of the Rasmuson Foundation, and the President of the University of Alaska, participants committed to close engagement with the FSM industry sectors to meet the FSMI goals.

::: FSMI Goals :::

- (1) **Sustain and enhance the economy and the communities of Alaska** by developing a responsive workforce that enables the fishing, seafood and maritime industries to stay vibrant and substantial contributors to the state;
- (2) **Support Alaska's workforce, particularly in coastal communities**, in discovering and preparing for the wide range of employment opportunities in the fishing, seafood and maritime sectors.

In response to industry feedback at the October 2012 Forum and their commitment to more fully engage in developing a comprehensive statewide Workforce Development Plan, University of Alaska President Gamble invited a select group of industry and state agency representatives to participate on the newly formed **Industry Advisory Committee** (IAC). Kris Norosz, Icicle Seafoods; Paula Cullenberg, Seagrant Director, and Fred Villa, UA Workforce Programs co-chair the IAC.

The development of this plan was driven by the following ideals which were identified by the IAC.

- FSM workforce planning process is collaborative; driven by both employer needs / self-employed needs
- FSM workforce planning builds on successful partnerships
- FSM workforce planning is on-going
- FSM workforce development plan embraces AWIB principles

Overall Report on Education & Training Gap Analysis for the FSM Workforce

The McDowell Group produced the Education and Training Gap Analysis report in May, 2012. Their work on the gap analysis included the following major tasks:

- An overview of the fisheries, seafood, and maritime industry and summary of discussions held at the Alaska Joint Fisheries Seafood Maritime Workforce Forum held at UAA on March 5, 2012
- Telephone interviews with 25 representatives of the FSM industry and selected training providers
- Design and fielding of an online Workforce Needs Survey distributed by email to 250 FSM businesses and organizations and promoted through sector membership organizations
- Identification and analysis of specialized employment and training data in cooperation with the Alaska Department of Labor and Workforce Development Research and Analysis Unit
- Briefing and discussion with the UA Allied Fisheries Working Group
- Production of this report and associated data files for public use

Needs Assessments

One of the major steps in the creation of this workforce development plan was to conduct an occupational needs assessment for all four sectors. Brief descriptions of the methodology and players are below.

::: Fisheries Occupational Needs Assessment :::

The fisheries subcommittee developed an online questionnaire made available to the sector through email notification to United Fishermen of Alaska (UFA) and other fishing associations, and general industry media during January and February, 2013. Also, western Alaska Community Development Quota (CDQ) organizations were contacted to distribute surveys to local fishermen. Marine Advisory Program faculty members also conducted conversations about the survey with key local fisheries leaders in Anchorage, Cordova, Petersburg, Juneau, Kodiak, Seattle and Wrangell. The online FSM fisheries survey generated 360 responses.

::: Seafood Processor Occupational Needs Assessment :::

This group identified the top nine high-priority occupations in the Alaska seafood processing industry, described challenges encountered in filling the positions, and proposed strategies to meet current and future occupational challenges. Occupations were identified based on 40 responses to an online survey sent to all Alaska seafood processors. Results were included in a report finalized in April 2013.

::: Maritime Sectors Occupational Needs Assessment :::

As with the other sectors, the maritime sector conducted an online survey. The group produced a report based largely on responses to a voluntary, anonymous, online survey of employers. Self-employed workers and “mom and pop” operations, people who described themselves as primarily commercial fishermen, and

employers in fields peripheral to the maritime sectors such as law, insurance, and land and air transportation, were not included in the survey. Only companies doing business in Alaska were included. Some 45 employers filled out the survey instrument, although not all completed it. A few surveys were conducted on the phone or in-person. Though the number of respondents is low, the range of types of industry participants is fairly representative of the major subsets of the sector.

Supplemental input comes from personal experience of the industry advisory committee members and the coordinator, anecdotal input from other industry participants outside the committee, published reports about sector employment, industry journals, and Alaska Department of Workforce and Labor Development (AKDOLWD) reports.

::: Research, Conservation and Management Needs Assessment :::

As with the other groups, an online survey was conducted. As well as the online survey, many phone interviews were conducted with representatives from various research and conservation sectors around the state, including salmon hatcheries, federal agencies such as NOAA and state agencies such as Department of Conservation. The Alaska Department of Fish and Game (ADF&G) is the largest employer in the state regarding the research, management, and conservation workforce. ADF&G's Workforce Development section surveyed and interviewed most regional supervisors and research/management coordinators across the state for the FSM Workforce Survey. Coupled with feedback from other entities such as the North Pacific Fisheries Management Council and federal agencies, survey results were used to rank the top 11 priority occupations or skillset. The report also contained three overall FSM workforce development strategies.

NEXT STEPS

NOTE: This section will be updated to reflect the work done at the October 31 Industry Advisory Committee meeting.

This plan identifies much work to be done. Members of the Industry Advisory Committee as well as the University of Alaska Working group and other stakeholders will meet to build out work plans for the prioritized occupations and to further develop the strategies laid out in this plan – and the action needed to realize them.

OVERALL FISHERIES, SEAFOOD, AND MARITIME WORKFORCE DEVELOPMENT STRATEGIES

::: Strategy 1: Grow Career Awareness :::

Rationale: Career awareness and decision making in youth often begins at an early stage. Often students' choices are influenced by that with which they are familiar. With the high level of non-Alaskans filling FSM occupations, more Alaskans can be recruited by improving awareness and access to information about career opportunities. By emphasizing the vast possibilities for career-level, well-paying jobs across all regions of Alaska including coastal and remote communities, more youth may choose these careers.

ACTION STEP 1.1

Increase public awareness of FSM industry sectors and careers via branded informational material and promotion.

ACTION STEP 1.2

Gather and align FSM workforce data to leverage existing career exploration/job searching tools in the state (e.g., AKCIS, AlexSYS, Workplace Alaska).

ACTION STEP 1.3

Align Career Awareness through CTE Plan Branding.

::: Strategy 2: Develop Career Pathways :::

Rationale: Alaskan youth do not have access to information about FSM careers or what the career pathways are to reach them. They don't have information to consider FSM careers and to be aware of the skills needed in many advanced FSM environments. Similarly, there is opportunity to work with the K-12 system to adequately impart the necessary skills and to educate students on FSM career opportunities.

ACTION STEP 2.1

Implement AK Youth Employability Skills (YES) methodology throughout the K-12 system (i.e., Career Awareness, Exploration, Preparation, Choices).

ACTION STEP 2.2

Expand regional school best practices to other relevant regions (e.g., Ketchikan with Career Fair, Career Development classes for dual credit).

ACTION STEP 2.3

Create more maritime curriculum, activities, and internships for youth working toward career pathway decisions.

ACTION STEP 2.4

Leverage and promote Personal Learning and Career Plan (PLCP) methodology in the Alaska Career and Technical Education (CTE) Plan.

::: Strategy 3: Improve Access to Employment :::

Rationale: There is great opportunity to improve the prospect of future small business owners entering into self-employment, and to connect a qualified workforce with employment opportunities.

ACTION STEP 3.1

Improve access to employability and career readiness skill support including job application process and basic personal/workplace effectiveness training.

ACTION STEP 3.2

Increase awareness toward prevention of choices that may bar employment (e.g., criminal record) and increase support services in overcoming barriers to employment.

ACTION STEP 3.3

Develop programs that provide access to capital and financial management for small business owners and loan, reimbursement, and scholarship opportunities to incentivize students.

ACTION STEP 3.4

Promote programs to support Alaska resident workforce development with emphasis on coastal and Alaska Native communities.

::: Strategy 4: Train Alaskans for Fisheries, Seafood, and Maritime Employment :::

Rationale: There is opportunity to increase Alaska resident hire for the wide variety of high demand, technically skilled FSM workers through targeted education and training programs. Further, there is a need to assist employers to promote within the organization in finding relevant professional development training options and resources.

ACTION STEP 4.1

Identify gaps between highest priority workforce needs and existing training/education programs; develop programs in Alaska to meet those gaps or collaborate with best-in-class programs outside Alaska to support Alaskans in accessing that training.

ACTION STEP 4.2

Improve access to training and education programs; coordinate program development, existing resources (shared instructors, facilities, equipment, curricula), and delivery among existing training programs and employers.

ACTION STEP 4.3

Implement components of MSA Sec305(j) relating to marine education and training programs that foster understanding, practical use of knowledge (including Alaska Native traditional knowledge), and technical expertise relevant to stewardship of living marine resources, with emphasis on regulation, law, and policy education and engagement.

ACTION STEP 4.4

Identify internships, mentorships, on-the-job training and apprenticeships; provide training incentives and support (e.g., financial and administrative) to employers to participate in such programs.

::: Strategy 5: Improve Industry Engagement and Accountability :::

Rationale: There is a need for improved collaborative effort by industry, government, interest groups, and education providers in FSM workforce planning and in leveraging existing resources. Further, there is room for improvement in the accuracy of workforce data across the FSM sectors in Alaska and in understanding best practices outside Alaska to guide and evaluate workforce planning efforts.

ACTION STEP 5.1

Promote collaboration within industry associations and between industry, employers, government, interest groups and education/training providers in coordinating workforce planning efforts.

ACTION STEP 5.2

Analyze best practices of other maritime industry consortia and regions to guide workforce planning efforts regarding stakeholder collaboration, economic development, and education/training methodologies.

ACTION STEP 5.3

Improve FSM workforce data by capturing, defining, and coordinating between industry and state/federal labor departments for purposes of workforce needs analyses and program evaluation.

Other workforce development priorities for Future FSM Coalition work

Similar to workforce initiatives in other industries of Alaska (e.g., oil and gas, mining, health), a long-term coalition with key stakeholders (e.g. industry, education providers across the spectrum, and community development organizations) will lead to a long term approach in addressing the myriad workforce needs across the broad FSM industry. The health alliance has been ongoing for about 10 years and still has plenty of work to do to fully address workforce needs in that industry.

On the radar for future long-term coalition work:

- Industry-driven areas of applied research into new technologies and policy.

- Other barriers to developing FSM workforce (financial, policy, regulation, employee hiring/retention in certain geographic areas, etc.).
- Workforce projections for Broad-level infrastructure projects, such as Alaska deep port development, new research opportunities in the Arctic.

PRIORITY OCCUPATION AND SKILLSETS

The FSM workforce is complex to describe, evaluate and project. While overarching strategies to engage, train, recruit and retain workers in the FSM occupations are useful and essential, many occupations need specific detailed action plans comprised of detailed action tailored to their unique needs. In addition, the FSM workforce includes a high number of self- employed people – most commercial fishermen, many or most shoreside service occupations, and many others including some seafood processors. AKDOLWD data is very limited for these occupations.

Four sectors were identified for the purposes of identifying high priority occupations. A two month long needs assessment was carried out for each of these four groups. In addition data from the AKDOLWD are very informative so those data and scores are included in Appendix F for each high priority occupation selected by the needs assessment.

Industry Priority Occupations

Fisheries

- Commercial Seafood Harvesters
- Shoreside Support Businesses
- Shellfish Farmers

Seafood Processing

- Engineers
- Refrigerations
- Production Managers
- Electricians
- Can Machinists
- Quality Controls
- Baader Technicians
- Plant Managers
- Deckhands

Maritime (Skillsets, not occupations)

Shipbuilding and Repair

Shoreside Support

Passenger Service

Management

Unlicensed and Licensed Deck and Engine Personnel

Licensed and Unlicensed Vessel Engineers, including QMED

Diesel Mechanics, Gasoline Engine Mechanics, Port Engineers, Other Equipment Maintenance and Repair Specialists

Marine-specific Electronic and Computer Engineers and Technicians

Vessel Captains, Ship Captains, Ships Officers, Towboat Captains, Tour Boat Captains

Civil Engineers, Structural Engineers, Coastal Engineers

Research, Conservation and Management

Biometricians

Fish and Wildlife and Hatchery Technicians

Fishery Biologists

Fish and Game Coordinators

Fisheries Scientists

Analyst / Programmer and Database Managers

Engineers

Environmental Program Managers

Fisheries Economists

Fisheries Analysts

Fisheries Management Specialists

Hatchery Managers

Fisheries Sector Priority Occupations

Fisheries in this plan refers to commercial seafood harvesters, including fishermen and those who are employed in shellfish farming. The fisheries needs assessment resulted in three priority occupations.

::: Commercial Seafood Harvester :::

DESCRIPTION

Persons (commercial fisherman / skippers and crew) who hold State of Alaska and/or Federal commercial fishing permits and crew licenses and are engaged in commercial fishing for their livelihood on either a seasonal or year-around basis.

OVERVIEW

None was given.

EDUCATION AND TRAINING

Education / Training / Licensure / Certification:

At present, USCG drill conductor safety training is required on vessels operating in offshore waters. The needs assessment survey of 360 fishermen across the state that noted over 75% of respondents held this card. Other certifications held but not required in this occupation: EPA Freon handling cards (10%), USCG licenses (42%), SCUBA certification (29%), ABYC Electrician (3%). Other certifications of value noted by respondents included: CPR/First Aid (generally required in conjunction with Drill Conductor training) and Hazard Analysis and Critical Control Point (HACCP), a federal processing certification required of persons processing fish onboard by the State of Alaska.

Technical / Job-specific Skills:

The top 10 skills identified as “core-required” are:

1. Marine safety (304)
2. Vessel maintenance and repair (297)
3. Marine navigation and seamanship (290)
4. Seafood quality and handling (288)
5. Gear repair (252)
6. Understanding regulatory processes and fisheries management (229)
7. Engine repair (224)
8. Electrical and wiring (207)
9. Financing and managing debt (207)
10. Crew/employee management (205)
11. Other –cooking, interpersonal communication, computer/electronics, knowledge of fishing techniques

Employability / Soft Skills:

The majority of fishermen and crewmembers in Alaska work are self-employed. This occupation requires an independence and self-motivation that is different than employees in a more structured environment. Survey results highlighted crew and employee management as a top-ten priority skill set. Also highlighted were soft skills such as the need for problem solving skills, time management, hard work, and self-direction.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

The survey identified four future industry skills including: understanding operation financing and vessel fuel/energy efficiency (over 70% each) as well as new gear development (42%) and electrical and internet interface (50%). Others comments included understanding and participation in the regulatory process.

Temperament / Personality Traits:

In many cases, skills can be taught to fishermen. However, the temperament or personality traits that draw people to the career of fishing and give them an incentive to remain even during hard times are keys to successful workforce development in this career. Targeting people with these traits will make any efforts toward recruitment and retention more successful. Some of these traits identified during work group discussions and interviews are the following: passion/desire for fishing, independence, tenacity, enjoys outdoors/nature, prefers physically active or hands-on occupation over desk job, enjoys being rewarded for hard work, enjoys competition, etc. (Further discussion/survey work to refine these traits may be warranted.) Identifying these traits may help school counselors when discussing career paths with students.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Commercial fishing has very limited certification or training requirements and thus remains primarily an on-the-job learning occupation. However the survey identified training areas that would be useful to the occupation. The work group was aware of several state and local training providers including non-profits (Alaska Marine Safety Education Association, Community Development Quota corporations), University of Alaska system (primarily UAS, Alaska Sea Grant Marine Advisory Program, various regional campuses); DOL regional training centers (AVTEC, SAVEC, Bethel, Nome); Outside providers include the Merchant Marine Academy and five state maritime academies Bellingham Technical College, Colorado Diesel Mechanics School. Specific training provided by equipment vendors (electronics, refrigeration, diesel mechanics, net/gear, etc.) is also very important.

STRATEGIES

Engage

- K-12 outreach about fishing as an occupation (important)
- Public information about the value of commercial fishing to the state's economy

Train

- Online and in-person courses in fishing technology via nontraditional delivery available across the state and in fishing ports
- Partnerships with industry vendors to offer training
- Develop shared curriculum across the state and with out-of-state trainers
- Potentially develop an occupational endorsement in fish harvesting
- Timeline: Most of these strategies probably need to happen in stages and be interactive. First, work with partners to develop curriculum. Next, advertise to build awareness of new programs. Lastly, implement and measure effectiveness. Tweak curriculum based on feedback, etc.

Recruit:

- “Map Your Career” in the seafood harvesting industry (i.e. Workforce Development Council of Seattle – King County currently has such a program)
- Middle school and high school programs (i.e. Ballard School District. Use these examples and tweak for what is appropriate in coastal Alaska.)
- Make capital more readily available to entering fishermen. Loans for new fishermen or current fishermen, coupled with financial management and training – these two **MUST** go hand-in-hand (maybe similar to the reduced loan fee for a AHFC loan).
- Internships or mentorships –related to transfer of ownership of fishing permits/quota
- Programs that encourage access through permit or quota ownership

Retain:

- Ongoing delivery of vocational and professional training for harvesters throughout their careers through various delivery means (workshop, web-based, etc.) by the university, regional training centers, Department of Labor, etc. to ensure the highest return from fish harvests.
- Training regarding regulatory process and fisheries management to ensure participation in the process.

::: Shoreside Support Businesses :::**DESCRIPTION**

Generally a small business owner or independent service provider (electronics, hydraulics, engine repair etc.). Technicians available in a fishing port with higher skills than individual fisherman. While not identical, this is very similar to the shoreside support described in the Maritime sector. Specifically, [shipbuilding and repair](#), [boat repair and maintenance](#), and [shoreside support](#) discussed later in the maritime section.

OVERVIEW

Fishermen depend on shoreside service providers to enable them to prepare for, operate and ensure the maximum value from their harvest. Lack of skilled support technicians in fishing ports can make or break the season for a fishing business.

EDUCATION AND TRAINING**Education / Training / Licensure / Certifications:**

Certifications relevant to their particular trade.

Technical / Job-specific Skills:

In addition to skills for a particular trade, shoreside support businesses need the skills required to operate a small business including finances, marketing etc.

Employability / Soft Skills:

Skills needed by small business owner/entrepreneur. These occupations require independence and self-motivation that is different than employees in a more structured environment.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engage:

- K-12 outreach about shoreside technical businesses as an occupation.

Train:

- Offer training in technical skills to a level that will get a shoreside support business owner what he/she needs to operate a business or work for a shoreside business.
- Partnerships with industry vendors.
- Shared curriculum across the state and with out of state trainers.
- AKDOLWD – one policy issue that needs to be addressed by the State is that many of their training programs only provide training to individuals if they identify an employer under whom they will work after training is completed. However, the reality of living in rural Alaska is that many individuals are self-employed. In fact, many times individuals must support themselves with several “jobs” (wear several hats), because the customer base is so small in these communities. This State policy needs to be changed in order to make job-training opportunities more available to the self-employed/entrepreneur.
- Timeline (ongoing)

Recruiting Strategies:

- Internships or mentorships.

Retaining Strategies:

- Professional development training

::: Shellfish Farmers :::

DESCRIPTION

Shellfish farming encompasses the activities of growing, harvesting, processing, marketing and sales of bivalve seafood products. The individual shellfish farmer must be multi-skilled to be successful, or operate a large enough farm in order to employ others who can specialize in certain aspects of the operation.

OVERVIEW

Shellfish farming in Alaska is a growing industry. Currently there are fewer than 50 shellfish farms in Southeast and Southcentral Alaska and all are either small businesses or are part of a regional Native corporation effort.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

- Certifications relevant to their particular trade (HACCP).
- Technical / Job-specific Skills:
- None were specified.
- Employability / Soft Skills:
- Skills needed by small business owner. This occupation requires an independence and self-motivation that is different than employees.
- Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requests):
- See mariculture survey results.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Alaska's Sea Grant Marine Advisory Program; OceansAlaska in Ketchikan, UAS Fisheries Technology Program has a hatchery worker strand which at this point is focused on salmon hatchery workers but has some relevance.

STRATEGIES

Engaging Strategies:

- K-12 outreach about shellfish farming as an occupation.
- Public information about the value to the state's economy.

Training Strategies:

- Online and in-person courses in shellfish farming technology via nontraditional delivery available across the state in fishing ports.
- Partnerships with industry vendors.
- Shared curriculum across the state and with out of state trainers.
- Timeline (ongoing).

Recruiting Strategies:

- Loans for new shellfish farmers.
- Internships or mentorships.

Retaining Strategies:

- Professional development training.
- Healthy resource.
- Market development and promotion.

Seafood Processing Sector Priority Occupations

Seafood processing in this plan refers to the processes between when seafood is harvested and when it is delivered to a customer, including activities like filleting, freezing, canning, and smoking. There are over 300 firms of varying size in Alaska, ranging from small “mom and pop” businesses to multimillion dollar operations. The seafood processing needs assessment prioritized nine occupations.

::: Engineer :::

DESCRIPTION

Plant Engineer (shore) / Chief Engineer (floating processor) ensure that factory machines, generators, diesel engines, and their support systems (i.e., hydraulic, pneumatic, electrical, etc.) are maintained and function in good order. Responsible for the proper installation and maintenance of mechanical systems according to industry standards and regulations; maintain and monitor spare parts inventory. The title of engineer includes a range of positions/skillsets needed in shore side and floating processing operations; all of them are critical to operations.

OVERVIEW

This was the most-cited need in the seafood processor workforce survey. The lack of qualified candidates is the main challenge in filling engineering positions. Engineering expertise and labor are essential requirements to shore side and large vessel operations. There are at least 40 shore side processing plants in Alaska with a plant engineer overseeing an engineering support staff, ranging from just a few engineers to those with more than 50. Plant Engineers tend to enter the field with technical background/training in at least one of the key areas of electrical, refrigeration, mechanical, or diesel engineering, expanding their knowledge through experience and additional training.

Chief Engineers (floating processors) develop through a more formalized process based on Coast Guard licensing requirements which take into account training and experience. Floating operators report working with maritime training institutions (maritime academies) to place graduates in entry level engineering positions.

Survey respondents reported high competition for engineers within the seafood processing industry and from other industries. Senior/expert level Baader equipment technicians are in high demand due to the widespread use of automated processing machines in both shore side and floating operations.

Some companies indicated potential recruits were unsuitable due to drug/alcohol problems, issues with the law, and insufficient work ethic or stamina.

Job opportunities are expected to increase in the future as processing plants become more technically sophisticated (due to more automation), as regulations become more complex (HAACP, refrigeration gases, OSHA), and due to the graying of the existing workforce of senior/experienced engineers.

Many of the engineering skillsets, at all levels, cut across most of the FSM sectors. This includes both those categories requiring technical certification, as well as those requiring more formal licenses such as those from the U.S. Coast Guard.

EDUCATION AND TRAINING

Education / Training / Licensure / Certification:

Appropriate licenses (e.g., Master Electrician), EPA certification for ammonia refrigeration systems, certification in electrical system operations; OSHA training standards for general mechanical and ammonia refrigeration. USCG license for appropriate horsepower and position (e.g., Chief Engineer, 2nd Assistant, 3rd Assistant Engineer for uninspected fishing vessels); USCG Tankerman's card. Education requirements vary by position and employer, ranging from high school diploma, 2 years college, to undergraduate degree.

Technical / Job-specific Skills:

All aspects of operation, maintenance, and repair of sophisticated, industrial-size refrigeration systems, especially ammonia based; one and three phase electrical wiring, motors, and controls, including hydraulic and pneumatic; diesel engines of all sizes and accompanying electrical generators, hydraulic pumps, and air compressors; seafood processing equipment, cranes, forklifts; boilers.

Engineering trouble shooting, welding (MIG, TIG, ARC) and fabrication of all metal types; OSHA and safety regulations; personal computers and business related software including Excel, Word, Outlook, and Adobe.

Employability / Soft Skills:

Overall mechanically inclined; able to follow maintenance instructions; troubleshoot in stressful and time sensitive situations; manage time effectively; work independently; communicate effectively; resolve disputes; supervise others and manage performance. Workers should be responsible, organized resourceful/analytical, self-starter, able to work well with minimal supervision, able to identify, mentor and teach entry level and junior engineers. They should possess people management, problem solving, verbal/written, and common sense skills.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

USCG Chief (and lower) Engineers License; OSHA and EPA training/licensure; senior/expert level Baadar expertise, able to overhaul, troubleshoot and adjust machines- industry facing serious shortfall in this area. TWIC, USCG Tankerman's Card; EMT/CPR.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

State and federal Maritime Academies provide opportunities for employees to earn entry level USCG Engineer licenses. Various vocational/tech training in and outside Alaska provide opportunities to gain expertise in welding, refrigeration, electrical, and diesel engineering. A large portion of employees rely on on-the-job training and experience in seafood processing plants and non-seafood plants, shops, and vessels in and outside of Alaska.

Many of the engineering skill sets are required/taught/exist within the different branches of the military, at all levels of expertise and experience. Personnel who exit the military with honorable discharges, due to expiration of their enlistment contracts or through retirement would be a potential source of talent and expertise. In addition to their technical expertise, many of these individuals possess the important soft skills (integrity, work ethic, leadership) difficult to find from other sources. Those with Alaska experience may be better prepared to deal with the challenges of working in Alaska (e.g., climate, remoteness, etc.).

STRATEGIES

Development of this section will closely resemble the sections for Fishing and Maritime, given the application/need of engineer skillsets across sectors. With that understanding the following specific additional suggestions are provided:

- Identify/provide formal Baadar equipment training program.
- Increase the availability of USCG-approved training courses for licenses.
- Encourage or provide avenues for “cadet/mid-shipman” internships to provide exposure experience on floating processing/vessel operations.
- Increase awareness seafood industry needs
- Continue to refine existing recruitment and employee development programs
- Offer seafood industry specific maritime degree programs.
- Offer Alaskans information about state and federal maritime academies.
- Provide refrigeration certification programs within the state.
- Seafood industry skilled trades job fairs.

Survey results indicated interest in seeing an Alaska-based engineering training program developed as an alternative to the current costly practice of sending employees to the lower 48. Additional analysis (and perhaps follow up surveys) should be done to better quantify the type, duration, and potential demand for such a program.

::: Refrigeration :::

DESCRIPTION

Ensure installation, operation, maintenance and function of mechanical refrigeration/freezer systems; facilitate improvements; test and flush refrigeration systems; ensure that policies and safety standards are met; analysis and modification of procedures as needed.

OVERVIEW

This was the second most-cited need in FSM processor workforce survey; extremely difficult to find trained and experience refrigeration personnel; wages paid for comparable jobs in other industries are higher; most positions are seasonal and require work in remote locations; many of the qualified applicants have drug/alcohol problems; discrepancy between offshore and onshore refrigeration wages.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Two year certification/degree in refrigeration/HVAC (heating/ventilation/air conditioning) systems; EPA Section 608 Universal Certified; Process Safety Management certification; OSHA training standards via the International Institute of Ammonia Refrigeration; Refrigeration Engineers and Technicians Association certification preferred; HACCP qualified is a plus.

Technical / Job-specific Skills:

Broad knowledge of the operation and maintenance of blast freezers, plate freezers, freezer holds, chill rooms, galley freezer/refrigerators, ice machines, condensers, compression/boosters, industrial ammonia and Freon systems; ability to read/test/adjust gauges and systems; physical ability to climb stairs, ladders, catwalks, and maneuver in close quarters/confined spaces; ability to cope with urgent situations; ability to operate hand and power tools, refrigeration service/recovery equipment, electronic and computerized equipment in a skilled and safe manner; ability to wear appropriate safety gear and equipment; ability to troubleshoot systems and test components; ability to repair and maintain refrigeration and cooling systems; knowledge of computer aided design and thermodynamics; thorough understanding of EPA codes and regulations pertaining to refrigeration systems; welding and fabrication experience preferred.

Employability / Soft Skills:

Available to work seasonally from with long hours, potentially seven days a week; problem-solver; self-motivated; team player; demonstrated leadership; strong work ethic; able to adjust to difficult working, living, and inclement weather conditions (i.e., remote Alaska locations); able to communicate orally and in writing (in English); abstract reasoning and decision making; able to work in fast-paced environment.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Valid driver's license; PLC (programmable logic controller) skills; Hazardous Materials training/certification.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On-the-job and vocational training.

STRATEGIES**Engaging Strategies:**

- Develop awareness of refrigeration occupations in Alaska, including K-12 awareness activities and vocational/technical outreach
- Provide information about, access to, and funding for training and career opportunities in refrigeration
- Support school districts in offering seafood processing occupations awareness and exploration activities
- Expand awareness of refrigeration opportunities to include specialty and advanced areas.

Training Strategies:

- Identify specialty priorities and achieve statewide process for specialty training
- Explore training opportunities through an RFP process
- Advise potential students on educational opportunities within and outside Alaska
- Offer a refrigeration educational training program in Alaska. If there is no interest from Alaska training facilities to provide this type of education, identify programs in the Lower 48 that meet industry training needs.
- Offer shorter duration training programs between harvesting seasons
- Offer apprenticeship programs that extend on-the-job training and classroom instruction.

Recruiting Strategies:

- Create a technical preparation pathway for high school students interested in this career area. Encourage them to take one or more courses from the university or vocational/technical center as a way to build toward a career and future training
- Provide incentives for students to enroll in refrigeration programs, including financial aid and scholarships for part-time, working students, and workplace learnin.
- Coordinate among the industry to develop a strong pool of refrigeration candidates in the State and identify schools in the Lower 48 that would likely admit these students.
- Work with post-secondary and vocational training programs to disseminate information to students who may be interested in a refrigeration career
- Create or provide employment placement programs for students
- Develop incentives that encourage refrigeration graduates to work in Alaska.

Retaining Strategies:

- Create/promote career pathways
- Incentivize refrigeration staff to welcome and mentor new employees
- Provide job shadowing and basic skills strengthening for those interested in refrigeration occupations
- Provide competitive compensation for refrigeration employees
- Provide continuing education to allow refrigeration workers to add to their competencies and advance in their field.

::: Production Manager :::

DESCRIPTION

Plans, directs, coordinates, and controls activities of workers engaged in production to maximize efficiency and minimize expenses; coordinates staffing and duty assignments; monitors and motivates workers to achieve production goals; assesses inventory requirements. Responsible for factory through-put and equipment modification when species and products are changed.

OVERVIEW

This was the third-most cited need in FSM processor workforce survey. The greatest challenge reported by companies was difficulty in finding candidates with the necessary skills.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

HAACP (quality assurance); HAZWOPER (hazardous materials); PSM (Process Safety Management); Emergency Response Plans; Lock Out/Tag out; First Aid/CPR; Legal aspects of supervision: anti-harassment, ADA and accommodation, FMLA, wage/hour regulations, and I-9 regulations; Business degree preferred (by some)

Technical / Job-specific Skills:

Knowledge of production planning; working knowledge of the seafood industry and seafood products; ability to detect subtle differences in quality; computer database and math/writing skills.

Ability to maximize throughput while minimizing labor costs in a safe but efficient manner, analyze production data, track inventories and packaging materials, manage and motivate crews.

Employability / Soft Skills:

Strong work ethic, initiative, demonstrated leadership skills; good communication and record keeping skills; organizational/supervisory/administrative/time management skills required; team player and ability to work well with a diverse workforce.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Staying up-to-date with ever-evolving environmental regulations and food safety requirements, as well as automation processing equipment innovations.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On the job and in-house training; Alaska Seafood Processing Leadership Institute; bring in instructors (HAZWOPER); local community providers: i.e. Fire/EMT Dept. (First Aid/CPR)

STRATEGIES**Engaging Strategies:**

- Expand career awareness and counseling (in high school and at job centers)
- Provide clear job descriptions and career ladders (AKSIS: AK Career Info System) to public and private training providers
- Reinforce job readiness skills, WorkKeys, YES, or other programs that develop soft skills

Training Strategies:

- Provide support for AK Seafood Processing Leadership Institute (consider adaptations to program to fit additional careers in seafood processing sector)
- Identify and widely disseminate information on web-based instruction for skills upgrading.

Recruiting Strategies:

- Provide clear job descriptions and career ladders (AKSIS: AK Career Info System) to public and private training providers
- Shift focus from recruitment from entry level processing jobs to developing career in the seafood sector.

Retaining Strategies:

- Promote mentoring of current employees
- Make current employees aware of steps/training they can take to prepare themselves for advancement
- Ensure pay rate is commensurate with duties and conforms to industry standards.

::: Electrician :::

DESCRIPTION

Installs, maintains and repairs electrical systems including plant equipment and machinery; diagnoses malfunctioning apparatuses (3-phase 480/240 V and single phase 240/120 V); member of engine room department (mix of industrial/marine electricians).

OVERVIEW

This position ranks fourth in the top priorities.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Varies from apprenticeship card to State of Alaska Electrician Journeyman's card. (Can do maintenance and repairs without any card. New installations must be done by journeyman.)

Technical / Job-specific Skills:

Background in marine, industrial/commercial electrical required; ability to read and interpret schematics, reports and manuals is critical.

Employability / Soft Skills:

Able to live and work in remote area; work long hours; good recordkeeping skills, problem solving skills; track and maintain inventory of electrical related materials; planning and scheduling projects; ability to take direction from Chief Engineer.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

All around good general maintenance skills a plus (general carpentry, light welding, metal fabrication)

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Industrial Electrical Journey license in Alaska; PLC (programmable logic control) training.

STRATEGIES

Build awareness of the need for electricians by the seafood processing sector.

Advise high school students, displaced workers, and other seeking employment of training and employment opportunities available.

Identify electrical training programs in Alaska.

Offer apprenticeship programs.

::: Can Machinist :::

DESCRIPTION

Can line set-up and operation, seam evaluation, can integrity and general can line maintenance

OVERVIEW

This was the fifth most cited need in FSM Seafood Processor Survey. A major challenge cited was finding applicants with sufficient knowledge and experience.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

GED or High School diploma is recommended.

Technical / Job-specific Skills:

Dealing with canning equipment from the 1930s and 40s as well as modern electronic equipment included in the weighing machines; troubleshooting and assessment skills: must be able to evaluate any defects in the cans and trace the problem back to the source and adjust machinery to solve issue; maximize production throughout via smooth running of machinery; work efficiently and with precision.

Employability / Soft Skills:

Strong work ethic; able/willing to work long hours; physically demanding; work quickly but with precision; anticipate needs for parts and maintain inventory of parts; ability to work independently as well as working with others.

Other Skills Needed (eg, skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On the job training.

STRATEGIES

Engaging Strategies:

- None was specified.

Training Strategies:

- Consider internships or registered apprenticeships

Recruiting Strategies:

- Ensure wages are commensurate with skill set takes into consideration unique skills required and are competitive.

Retaining Strategies:

- Ensure wages are competitive

::: Quality Control :::

DESCRIPTION

Quality control workers ensure processing facilities are safe and sanitary and will pass all government and customer audits; represent company in interactions with regulatory agencies; ensure monitoring, inspection, and evaluation of all products for wholesomeness, product integrity, and conformance with product specifications. They define, review, improve and teach quality policies to and with production management, ensure compliance with food safety rules and regulation. Respond to customer complaints.

OVERVIEW

This was the seventh-most cited need in FSM processor workforce survey. Respondents reported difficulty finding certified applicants who understand food quality and are willing to work in difficult/abnormal conditions and on a seasonal basis. Anecdotal evidence suggests there are many current job openings.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

HAACP, Better Process Control Certificate; NOAA Certificate of Seafood Inspection; BS in fisheries, food science, or related field preferred; FDA's Seafood Sensory Workshop; Oregon State University's Surimi School Program preferred.

Technical / Job-specific Skills:

Computer, spreadsheet software, and word processing skills; product knowledge, including testing procedures to grade/check/analyze quality; species identification; general knowledge of MSC/Global Trust and ISO 9000; familiarity with concepts of quality management. Good recordkeeping skills.

Employability / Soft Skills:

Management, leadership, communication, analytical skills, supervisory and organizational skills; problem-solver; self-motivated; team player; long-range/strategic planning; strong work ethic; able to adjust to difficult working and living conditions (i.e., on ship).

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Staying up-to-date on changing food-safety regulations; willing to work 12+ hours per shift; ability to operate and upkeep lab; ability to adjust to increased automation as the technology develops.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Current employees receive on-the-job training and education/training through FDA and NMFS.

STRATEGIES

Engaging Strategies:

- Develop awareness of QC/QA occupations in Alaska, including K-12 awareness activities
- Provide information about, access to, and funding for training and career opportunities in QC/QA
- Support school districts in offering seafood processing occupations awareness and exploration activities

- Educate public about career opportunities, including the ability to grow into the profession from a processing background
- Target college students enrolled in food science degree programs for information about opportunities in QC/QA
- Inform existing seafood processor workforce about QC/QA careers.

Training Strategies:

- Offer a food science degree program through the university
- Encourage and assist QC/QA staff to receive required levels of training in the field
- Provide and encourage continuing education opportunities on a variety of pertinent topics.
- Establish internship program.

Recruiting Strategies:

- Coordinate among the industry to develop a strong pool of QC/QA candidates in the State
- Work with post-secondary and vocational training programs to disseminate information to students who may be interested in a QC/QA career
- Identify methods of attracting QC/QA professionals later in their seafood processing careers
- Encourage interested employees to gain additional education and skills in the area of QC/QA.

Retaining Strategies:

- Create/promote career pathways
- Incentivize QC/QA staff to welcome and mentor new employees
- Provide job shadowing and basic skills strengthening for those interested in QC/QA occupations
- Provide adequate compensation for QC/QA employees
- Provide continuing education to allow QC/QA workers to add to their competencies and advance in their field.

::: Baader Technician :::

DESCRIPTION

Assembles, repairs, adjusts, and maintains Baader machinery.

OVERVIEW

This was the eighth-most cited need in FSM processor workforce survey. These companies said it is difficult to find people with Baader-specific training and work experience.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Most survey respondents said none, although one said a high school degree, as well as two years of relevant college or a vocational degree are required.

Technical / Job-specific Skills:

Knowledge of and training in specialized disciplines such as refrigeration, hydraulics, boilers, and electrical troubleshooting; able to quickly adjust Baader equipment based on fish size and processing requirements.

Employability / Soft Skills:

Self-motivated, ability to work independently and as part of a team; strong communicator; strong work ethic.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Keep up-to-date with Baader equipment advances.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On the job training, apprenticeships, transferable skill experience with other types of machinery, specifically, Baader Training.

STRATEGIES AND TIMELINE

None were specified.

::: Plant Manager :::**DESCRIPTION****Shore Plants:**

Responsible for all aspects of processing plant operations and production. Supervises plant employees; conducts pre-season preparations and post season plant closures; manages inventory of product, parts, and supplies. Organizes all backload and offload operations. Oversees all worker training, including new hire, safety, other regulatory compliance. Maintains working relationship with fishermen, employees, customers. Oversees all applicable paperwork regarding employees (new hire, time sheets, and separation), production, and plant operations IAW with applicable AKDOL, AKDEC, Workers Compensation and OSHA.

Floating Operations:

In addition to the above, is responsible for maintenance and operation of vessel Fishmeal/Oil plant, working to ensure safe operation, quality production and efficiency of operation. Manages fish meal operators and baggers, works with Chief Engineer for technical issues and with factory supervisor for production issues.

OVERVIEW**Shore Plants**

There are approximately 100 seafood processing plants in Alaska ranging in size from small plants with five or fewer employees to plants with 800 or more employees - each one has a plant manager. In the largest 40 plants, managers tend to have immediate subordinates who might have less overall responsibility and experience but possess similar skill sets, further expanding potential need.

Plant managers are at the apex of seafood processing operations with regard to responsibilities, skills, and experience. By definition they possess high levels of initiative, responsibility, judgment, people skills and technical expertise. These qualities are in high demand within this and other industries.

The forecast for the existing number of plants is to remain stable or decrease. However the increased use of automation and technology to displace the current use of unskilled labor could potentially shift the skills set required of plant managers. In addition, the trend toward a more corporate approach to plant management, especially with the increased emphasis on various government compliance programs, could increase the need for senior plant personnel with a high degree of responsibility and expertise albeit below the organizational level of plant manager.

By definition, plant managers are further along in their careers; for this reason and the previously mentioned outside demand for their skills, 10% attrition would be a conservative forecast for the next five years.

Where processing plants operate on a seasonal basis, a significant percentage of managers are non-Alaska residents, who may work for the rest of year in corporate offices. Processing plant location and duration of their operation are driven by primary processing species. Salmon plants tend to be in remote locations (close to the resource, e.g., Bristol Bay) and seasonal in nature. This has important implications regarding the recruitment, compensation, and retention of plant managers. Current costs of input factors to value added processing currently preclude expansion of seasonal operations. However, this could change with advancements in technology and increases in global labor costs.

The soft skills described above for plant managers are in demand by other industries, including those within the FSM portfolio.

Floating Operations: *Need input from afloat processors*

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Business degree, Quality Assurance and/or engineering background/education; minimum seven years of experience in seafood processing, three years as a plant manager (in a smaller plant or as an assistant in a larger plant). No licensure requirements reported. HACCP/SSOP certification preferred but not mandatory.

Technical / Job-specific Skills:

Proficient with computers, software, internet; experience with managerial budgeting and cost analysis; able to understand all Federal and state regulations, permits, and reporting requirements and ensure compliance by all elements of the processing plant organization; comprehensive knowledge of employment law, workers' compensation, FDA regulations, mechanics and shipping/logistics.

Afloat (meal plant manager): Minimum three years experience operating and maintaining sophisticated fishmeal/oil plant equipment including meeting quality requirements. Strong mechanical trouble shooting skills; ability to read schematics and perform various equipment and production calculations. Ability to read/write reports and various correspondence related to equipment and product.

Employability / Soft Skills:

Ability to manage people, workload, product flow, equipment while continually able to respond to and solve unforeseen challenges. Includes communication, leadership, performance under pressure, priority setting, and organizational skills while projecting a can-do attitude.

Other Skills Needed (eg., skills needed soon to meet future tech trends, innovations, and/or regulatory requests):

Automation of processing, compliance management, remote communications, inventory management, refrigeration technology. Alternative products/fishmeal; alternative energy and waste options; understanding

of resource allocation, seasons, and science affecting fisheries resources. Inventory management refrigeration technology.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Plant managers come from a variety of sources and backgrounds. They begin their careers with varied educational backgrounds ranging from high school to undergraduate degrees (in business, engineering, or other disciplines). They acquire additional technical and operation expertise through work experience in seafood or other types of plant operations. This experience can include technical training at Alaska or out of state providers, as well as courses offered by equipment manufacturers. While it is difficult to define a specific career path, some employees work their way up through their companies, sometimes within one large plant or through different plants. Others migrate across companies, progressing through different size plants; while others might gain engineering and plant expertise in non-seafood processing plants transitioning to the seafood sector. All plant managers share the common trait of significant experience. Some respondents and the FSM Education and Training Gap Analysis have suggested a business school curriculum tied to the seafood industry. It would seem that such a program might have potential to meet core needs of some of the other FSM sectors.

STRATEGIES

Recruiting and retaining plant managers for plants in Alaska and in rural Alaska in particular has been identified as a challenge. Alaskan residents would be an important group to target, especially those within the general geographic area of plant locations (e.g., SE for plants in SE). Engagement should focus on seafood processing as a career leading to senior positions in plant management. Individuals with work experience in seafood processing plants have a solid knowledge of what the business is about, and therefore represent another important source of talent to feed into plant management accession programs.

Training should recognize the current informal ‘dual track’ ascension system. Some might be served through undergraduate college programs that emphasize, or at least inform students of the upward career mobility offered in seafood processing operations...in the core fields of business, management, and engineering. But for many others, coming up through on-the-job training route, technical training in electrical, refrigeration, mechanical, diesel operations and maintenance could assist their entry and accelerate their advancement.

Soft skills in responsibility, accountability, learning, and fundamental education in math and sciences, cut across this position and many others in the FSM portfolio and should be part of the middle-school/high school emphasis for potential recruits.

Some respondents indicated mixed results with workers coming to Alaska for ‘experience or adventure’ suggesting a high turnover/attrition rate for this group once their experience was complete. A development strategy targeting individuals already familiar with Alaska and with ties to the community may reduce this attrition.

::: Deckhand :::

DESCRIPTION

Working on deck, duties varied depending on size and type of vessel; operating and repairing gear and nets.

OVERVIEW

This was ranked in the 9th position in seafood processor occupational priorities survey.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Basic safety training and survival; AB License helpful; USCG Merchant Marine Credential helpful.

Technical/ Job-specific Skills:

Sea time; advanced fire-fighting; first aid and CPR training.

Employability / Soft Skills:

Net mending/cable splicing; quick thinker, fast worker, safety conscious; basic rope-typing skills.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Need to stay current in changing regulatory environment.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

None were specified.

Maritime Occupations and Skills

Alaska's maritime sector is large and diverse, comprising hundreds of large and small businesses with thousands of workers in hundreds of occupations related to supporting the activities and infrastructure of the FSM industry. These include things like vessel building, maintenance, and repair; marine transportation (i.e. ferries and cargo ships), ports and harbors, environmental response, fuel distribution; net and machinery maintenance; towing; research vessels; and Naval and Coast Guard support. Most maritime industry employers in the state are small businesses—tug and barge companies, local ports and harbors, small boatyards and marine repair companies, for example.

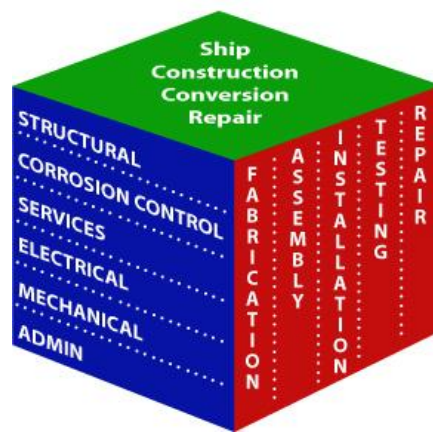
The work group focused on maritime trades and professions opted to identify priority skillsets rather than priority occupations. What follows is a description of the highest priority skillsets identified by the group.

The maritime work group also came up with strategies that encompassed the skillsets they identified, so strategies for maritime are discussed collectively after all skillsets have been presented.

::: Shipbuilding and Repair :::

DESCRIPTION

Shipbuilding and repair is included in the US and Training Administrations High Growth Job Initiative under Advanced Manufacturing. This



Employment Training initiative is a

strategic effort to prepare workers to take advantage of new and increasing job opportunities in high-growth, high-demand, and economically vital sectors of the American economy. The term Shipbuilding alone is often used to include ship repair and includes boatbuilding and repair and related. Because of the inconsistent use of occupational titles with this industry sector, the National Shipbuilding Research Program developed a set of functional titles that describe the industrial processes that occur in shipyards and are performed by people. The eleven shipbuilding processes are Fabrication, Assembly, Installation, Testing, Repair, Corrosion Control, Structural, Mechanical, Electrical, Services, and Administration. Each has specific skill requirements, but both the ship and boat building and repair industries require multi-skilled workers who can move from one task to another so a great deal of cross-training is required, as well as a number of fundamentals such as industrial practice, safety, materials, etc. Basic training in this field prepares employees for shore-side and at-sea occupations in construction and maintenance of vessels, other structures and equipment.

These are separate but inter-related skillsets that are required for construction, repair, refit, and modification of boats and ships. Although most commonly associated with aluminum and steel vessel construction, all these skills are also required for work on wood and fiberglass vessels in the area of propulsion systems, deck machinery, superstructures and rigging, and fishing gear hauling equipment.

While technically synonymous with ship builder or ship repairer, shipwright skills are commonly understood to apply to wooden vessels or wooden components of vessels. While welders, fabricators and machinists may be hired as stand-alone trades, competitive shipyards depend on multi-skilled workforce that can move from one process to another through the entire progress of the project.

In short: ship builders and repairers include welders join pieces of metal with gas or electric welding, fabricators shape metal and assemble vessel parts or equipment from the shaped pieces, machinists use lathes and cutting tools to make parts or straighten and true parts such as shafts, conduct a wide variety of tasks including the above plus scaling, painting and corrosion-proofing, cabinetry, interiors installations, mechanical installations, and much more. Other trades such as fiberglassers, mechanics, electricians and electronics technicians are also encompassed in ship builders and repairers but are listed separately in this report.

Administrative, supervisory, engineering skills and knowledge are also required. Related skills include pipefitter, platefitter, and forklift and crane operator.

OVERVIEW

Extensive anecdotal and experiential evidence shows that Alaska's shipyards, boatyards, boat builders and other repair and construction facilities suffer a chronic shortage of skilled workers in these trades. In addition, these skills are in short supply in boat and ship facilities nationwide, as reported in industry journals such as WorkBoat. Survey respondents report difficulty finding qualified applicants for openings, there is a graying of the workforce, there is a non-resident factor, there is an anticipated increase in demand over the next 20 years due to an increasing trend to do construction, refit and repair in-state and due to anticipated increased maritime industrial activity associated with accelerated oil exploration and production and climate change opening new arctic trading routes, and this skillset is needed across sectors. . The broad range of occupations employed in shipbuilding becomes apparent when looking at the occupational overlap with other industry sectors. Oil and gas is a good example. Currently Alaska Division of Business Partnerships identified 280 targeted oil and gas occupations. Of those 280 occupations, shipbuilding employs 197 (70%) of those targeted occupations. Marine technology in ships is constantly evolving and requirements for fabrication, installation,

maintenance, and repair are becoming more stringent being driven by increasingly complex regulatory standards and increasingly demanding industry standards.

Nationally, average labor income per job in shipbuilding and repair was approximately \$73,630, 45% higher than the national average for private sector economy (\$50,786) (source The Economic Importance of Shipbuilding and Repairing Industry, Maritime Administration, May 30, 2013. Similar earning ratios are being reported in Ketchikan.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- There is not a single highest priority; a range of skills and abilities are needed, though any individual industry sector or employer may have more need for one skill over another. Most often mentioned in surveys and dock talk is welding because it has such broad applicability but each of the other skills is also in high demand and the multi-skilled worker is required by all.

Education / Training / Licensure / Certifications:

Shipbuilding is an expression of marine technology and requires a wide range of regulatory and production related certifications particularly in shipyards engaged in public marine transportation (ferries), oil and gas. Certification in structural and pressure vessel welding has been specified, as well as Travelift operator, CDL, HAZWOPER, refrigeration certification, and ABYC certifications. Shipbuilding and shipwright skills are taught in a very few specialized institutions. Most production level learning occurs on-the-job, while management, design, and production control positions often require professional degrees from marine academies or universities.

Technical / Job-specific Skills:

The following two paragraphs are quoted from

http://www.doleta.gov/BRG/pdf/Advanced_Manufacturing.pdf.

“Technical skills are essential to the future of Advanced Manufacturing. According to a 2005 NAM survey on the advanced manufacturing workforce, 53 percent of respondents listed technical skills as the greatest need over the next three years. Additional skill sets include the ability to work in teams (47 percent), strong computer skills (40 percent), the ability to read and translate diagrams and flow charts (39 percent) and strong supervisory and managerial skills (37 percent).”

“Jobs in the Advanced Manufacturing industry require a complete understanding and mastery of a variety of skill sets. Workers need the *production* skills to set up, operate, monitor and control the manufacturing process. They need the *process design and development* skills to continuously improve production processes. They need skills in *health and safety* to maintain a safe work environment. They need skills in *maintenance, installation* and *repair* to maintain and optimize complex equipment and systems. They need knowledge of *supply chain logistics* in order to plan and monitor the movement and storage of materials and products. Finally, manufacturing workers need skills in *quality assurance* and *continuous improvement* to ensure that products and processes meet quality requirements.”

Employability / Soft Skills:

Strong work ethic, good time management, ability to think in three dimensions, communication skills,

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Anticipate more training/certification will be expected or required in refrigeration, possibly in aluminum or steel welding.

Entry level applicants need resources to prepare them for the workplace, including soft skills such as communication, critical thinking, and to deal with employment bars such as drug/alcohol, domestic issues, driver's license, parole, etc.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Heavy emphasis on previous on-the-job and experience. Employers say they want proven abilities based on work experience and in some cases trade school training more than certifications.

::: Boat Repair and Maintenance, including Diesel Mechanics, Gasoline Engine Mechanics, Port Engineers, Other Vessel and Equipment Maintenance and Repair Specialists :::

DESCRIPTION

These are mainly trained (and in some cases holders of university degrees) mechanics and port engineers that maintain and repair a wide range of engines and machinery, mainly in a shore-side capacity. Many of the skills are the same as vessel engineers and training as a mechanic can lead to a career as a port or vessel engineer with further training and experience.

Outboard motor mechanic, diesel mechanic, port engineer/port maintenance mechanic. All these primarily shore-based occupation involve maintenance and repair of internal combustion (gasoline or diesel) engines, and usually a range of peripheral components such as transmissions and marine gears, generators, systems supporting fuel, cooling and exhaust of those engines, and often other vessel systems such as electrical and hydraulic. Also includes (port maintenance mechanic) welding, wiring, electrical, pile and dock repair, concrete repair, used oil handling, boatlifting and blocking.

Port Engineer - Oversee and coordinate repair, maintenance and improvement of vessels and vehicles owned by employer to minimize loss of revenue and cost of repairs. Responsible for ensuring vessels and vehicles provide safe, comfortable transportation for customers and employees and comply with applicable laws and regulations, including developing and implementing cost-effective maintenance and repair schedules.

Boat repair and maintenance - This occupation field also includes skillsets related to the non-mechanical components of boat maintenance and repair, including welding (steel and aluminum), machinist, painting, corrosion control carpentry and shipwright, rigging, canvas work and interiors, plumbing and electrical. Most of the skillsets are similar to those involved in shipbuilding, above, but may not require the same level of training and certification.

OVERVIEW

As with shipbuilding skills described above, engine mechanic skills are in demand across the board in maritime sectors and anecdotal and experiential input indicates a widespread lack of sufficient supply of workers skilled in these fields. While outboard, gas, diesel, and port mechanic are to some extent separate specialties, many work environments require skills in two, three or all of them.

Work is considered physically demanding, uncomfortable, dirty, and increasingly technical. Several survey respondents listed mechanic as a high-priority occupation due to difficulty recruiting qualified workers to meet demand. There is a graying factor, and the skillsets are needed across sectors. While most of the soft skills and some technical skill cross over to other specialties, mechanic occupations tend to stand apart from other maritime trades. However, mechanic skills are needed in all four of the FSM sectors.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- Mechanic knowledge and skills.
- General boat maintenance and repair skills as detailed below.

Education / Training / Licensure / Certifications:

Certifications exist in diesel, gas and outboard, but survey respondents did not report that they require them. Port engineer and port maintenance mechanic are not specific skills but occupations in which a range of skills are required. Also, certifications in welding, CDL, Travelift operator, HAZWOPER.

Technical / Job-specific Skills:

Not specified in surveys but generally understood to encompass the full range of skills related to maintaining, troubleshooting, repairing, and overhauling different classes of engines and related propulsion systems. Outboard mechanics, for example, need to know not just engines but also attachment brackets, controls, lower units, shafts, props and fuel systems. Both gas (including outboard) and diesel engines increasingly are electronically controlled and diagnostics are done with computer diagnostic equipment. Mechanics must be familiar with SAE and metric tools, engine component metals and materials, lubrication and cooling fluids, various kinds of filtration media, fuel characteristics, etc. Port engineer/port mechanic needs to know how to repair boat vessel engine/propulsion systems including entire power train and steering as well as vehicular units such as forklifts and trucks. Also included are fiberglass, woodworking, plumbing, machine tool operations, painting, wire rope splicing, DC and AC electrical installation, etc.

Employability / Soft Skills:

Work ethic, presenteeism, basic math, communication.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Increasing emphasis on electronic diagnostics and electronic engine component maintenance/replacement. Drug testing, TWIC, CDL are minimums.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Many mechanic training programs, both at the college and trade school level, prepare marine mechanics. Some engine manufacturers conduct mechanic training on their own products and some mechanics collect certifications from multiple programs to demonstrate broad knowledge on a variety of brands of machine. A few formal marine mechanic training options are offered in Alaska. Many mechanics and boat maintenance specialists are trained on the job or self-taught.

::: Shoreside Support :::

DESCRIPTION

This is a cluster of shore-based occupations essential for the successful operation of ports and harbors, freight and passenger fleets, marine supply stores and other facilities and services that support maritime businesses.

Note: “shoreside support” in this sector has an entirely different meaning from that used in the Fisheries sector, above.

This shoreside support category comprises mainly entry-level positions although each involves performing specific skilled tasks, from operating dewatering pumps to firefighting, radio communications, hazardous materials handling, emergency response, patrolling dock areas to maintain security, directing bus and pedestrian traffic, answering questions from the public and giving answers, computer operation related to vessel traffic monitoring and dispatching, power machinery and tools use, cash and electronic payment management, customer service and public relations, and much more. Vessel agents manage large vessel port calls, and work with government agencies such as CBP, USCG, EPA, ADEC, logistical support. Harbor officers, port security, vessel agents, retail workers all share certain basic skill sets, including an understanding of vessel operations and needs, good public communication skills, safety training, etc.

OVERVIEW

Workers with these occupational skills and credentials are required in many kinds of maritime industry businesses. Turnover is fairly high, many are entry-level or non-career jobs, although some have career paths to higher-paying career occupations for employees who show aptitude and commitment. Job growth is anticipated as growth in those sectors occurs, the result of increasing oil exploration, for example, or cruise ship/tour boat activity, and harbor expansion due to increased demand and activity. The required skillsets are transferable to other maritime sector industries including fishing, seafood processing, and resource research and management.

EDUCATION AND TRAINING

There is no single skill set for all of these occupations. In general, workers need to have English verbal and written communication skills, be able to read and follow instructions, in most cases have some safety and first aid training, have computer skills.

Education / Training / Licensure / Certifications:

In general, none. However, individual positions may have training requirements specific to it. HAZWOPER and Transportation Worker Identification Credential (TWIC) might be considered key commonalities. Harbor officers, for example, may be required to complete a harbor officer course (UAS) or take classes in facility officer training, HAZWOPER, emergency trauma technician, marine firefighting, TWIC, forklift operator certification, CDL, Confined Space Entry, first aid, CPR, hypothermia awareness, ICS systems training, OSHA marine safety curricula, PPE training.

Technical / Job-specific Skills:

General maintenance skills and computer skills. Knowledge of and familiarity with marine equipment (pumps, skimmers, containment boom, PPE, etc.) Harbor officer needs welding, heavy equipment, dock repair, lifting and blocking vessels, basic seamanship and boat handling, radio. Most require knowledge of vessel operations, port operations and worldwide shipping.

Employability / Soft Skills:

On time, willing to put in hours, carry out orders, reliable, work ethic, strong customer service attitude, speaking skills, conflict management, communication with other employees and managers, good time management skills, basic computer skills, personal hygiene, no substance abuse issues, reading/writing, respect for company equipment, driver's license.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Background check, TWIC card

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On-the-job training, HAZWOPER and other marine safety training provided for SE Alaskan communities by SEAPRO.

::: Passenger Service :::

DESCRIPTION

Passenger service positions include ferries, cruise ships and tour boats employ stewards, cooks, pursers and others who provide for the safety, comfort and entertainment of passengers. Many of these skills are applicable on a range of vessels as well as in shore-side occupations.

These shipboard occupations are found on most ferries, cruise ships and other larger vessels that carry passengers. Chief Cooks conduct kitchen management and oversee food preparation. Chief Stewards are in charge of hotel management; stewards do food presentation, housekeeping, cabin assignment and money handling, and a variety of other tasks. Chief purser is in charge of ticketing, accounting, and medical training.

OVERVIEW

The Alaska Marine Highway has on-going need for workers in these occupations. Cruise ships and tour boats also employ these occupations but most do their hiring outside the state so have not responded to the survey. There is a significant non-resident workforce, though that may be a function of outside-based employers. Steward and cook skills are ubiquitous in all FSM sectors. AMHS did not express anticipation of significant growth in its fleet, but cruise ship traffic has been growing after a decline during the recession.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- Food handling, hotel management, vessel safety and crowd management and various others. (See below)

Education / Training / Licensure / Certifications:

High School diploma or equivalent (hotel management/culinary arts/accounting) certification for all passenger services employees. In addition to entry level requirements and USCG approved Basic Safety Training and RORO Crowd management, proficiency in survival craft/Lifeboatman. Chief Stewards and Chief Cooks – Certified Food Protection Manager Certificate. Pursers – USCG approved Crisis Management class, USCG approved Medical Person in Charge class, and USCG issued Certificate of Registry for Pursers.

Technical / Job-specific Skills:

Microsoft Word and Excel, specialized databases. Anticipate more USCG approved “refresher” courses required for all initial USCG approved courses such as basic safety training, PSC/Lifeboatman.

Employability / Soft Skills:

TWIC and MMC, passport.

Other Skills Needed:

Communication skills (verbal and written), interviewing, teamwork, ability to think under pressure, living in close quarters, assigned roommates, working together shipboard, being held over, ability to work with coworkers from variety of backgrounds. Communication skills to relate issues between machinery/crew/shore-side activities. Must pass regular drug tests, initial background check, have USCG credentials and pass English proficiency exam.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

This question was not included in the survey but most of these skills (other than culinary) are on-the-job training and experience, aside from the specific certifications listed.

::: Management :::**DESCRIPTION**

All management occupations overseeing organizations, production lines or facilities. Each has specific and advanced content specializations, but all have common skills requirements such as budgeting, personnel management. Some, such as shipyard, harbor and hatchery managers, have annual budgets in the tens of millions of dollars and in some cases dozens of employees and contractors.

Fuel facility superintendents oversee vessel loading and discharge operations and are responsible for overall oversight and safety.

Harbormasters are responsible for all port and harbor management, operations, billing, enforcement, security, safety, tariff administration, cruise ship security.

There are some specific and advanced content specializations, but all have common skills requirements such as budgeting, personnel management.

Hatchery managers operate hatcheries on a daily basis, troubleshoot, repair plumbing/electrical, monitor environmental conditions, collect data, record and summarize data.

Executive director, manager, facility manager, superintendent, and hatchery manager, all require business management training as well as specific content area knowledge and experience. Management skills are highly transferable among industries and industry sectors.

Other management professionals specialize in fields such as ships management, vessel support, project management, fleet management and port administration

OVERVIEW

Several survey respondents listed managers as high priority, although numbers for each were low or not provided. There is a high “graying” factor, and skillsets apply across sectors.

Harbormaster positions are advertised frequently through the Alaska Association of Harbormasters and Port Administrators (AAHPA) and industry journals and often are the jobs that experienced mariners and managers retire from. These tend to be higher paying (\$5,000-8,000 monthly) occupations, yet there are not enough applicants for some (e.g. harbormaster) positions.

Hatchery expansion is anticipated, with an estimated six new manager positions. At this time it is likely all will be recruited from Washington and Oregon.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- These vary by specific occupation, but include budgeting and financial management, accounting, personnel management, communication skills, public relations, plus in depth knowledge of the specific field, such as salmon biology, ports and harbors, hotel and hospitality, etc.

Education / Training / Licensure / Certifications:

Most require or prefer a bachelor's degree in business management or related field, plus extensive (e.g. 5-20 year) experience. Specific content area degrees may apply when backed by progressive management experience. Some positions are filled based on experience rather than academic qualifications.

Technical / Job-specific Skills:

These depend on content area, but commonly required skills are advanced computer skills and oral and written communication. Facility officer training, HAZWOPER, first aid, heavy equipment familiarity. Must understand facilities maintenance and operation. Strong work ethic, communication with public and administration. Social media, marketing, customer service, maintenance.

Hatchery managers must understand facilities maintenance and operation, water flow calculations, use of microscopes to count cells.

Employability / Soft Skills:

Ability commensurate with employment at professional level. Writing, sales, marketing, business development, interpersonal skills. Good communication and people skills. People management, self-starter, communicate to other employees and other managers.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Management degrees offered by many institutions inside and outside Alaska. These professions require extensive experience within the industry sectors in which they function. OJT, work experience and progressive management experience lead up the career path.

::: Unlicensed Deck and Engine Personnel :::

DESCRIPTION

Vessel crewmembers that work under licensed officer supervision in deck and engine room capacities on larger vessels including ferries, cargo ships, research vessels, offshore supply vessels and some classes of large fishing industry vessels. Include “deckhands” as well as machinery operators and technicians, engine “wipers” and “oilers” and similar capacities. Some positions require highly technical skills, but in general deck and engine crew skills are transferable among many classes of vessels and to many shore-side

occupations. Engine room crew with the STCW endorsement “Ratings Forming Part of a Watch” either navigational or engine. Most are members of seafarers unions such as IBU, SIU, though some companies are non-union.

OVERVIEW

Marine Highway System is the largest single maritime sector employer in the state but many other companies that operate in Alaska waters employ unlicensed deck and engine crews. Total numbers are not available. Industry journals and anecdotal communication indicate that seafaring in general has a “graying” problem, and with anticipated increase in oil exploration related maritime activity the number of positions is likely to increase. These occupations tend to pay well above average wages, but separation from home and sometimes harsh conditions limit the number of applicants. Aside from the Marine Highway system, most hiring is done out of state.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- None described

Education / Training / Licensure / Certifications:

Unlicensed deck and engine employees attend USCG approved courses for endorsements to merchant mariners credentials, including the domestic and international STCW endorsements. This includes courses in port security and hazardous materials, basic safety training, RORO crowd management, proficiency in survival craft/lifeboatman, advanced firefighting, fast rescue boat, crisis management, radar unlimited, FCC radio operators permit, RFPNW and QMED Oiler. Various schools, online programs and short training courses offer preparation for these tests.

Sea time (work experience) is the most difficult part of obtaining qualifications. Some USCG approved courses include “credit” toward the sea time requirement. Sea time is additionally categorized into areas: AMHS requires “seagoing” or oceans/STCW sea time in waters termed “inland.” Additional courses are required in security and hazardous materials. Certification/Licensure for all Passenger Services employees: in addition to entry level requirements and USCG approved Basic Safety Training and RORO Crowd Management, USCG approved courses: Proficiency in Survival Craft (PSC)/Lifeboatman – this course requires another set of international endorsements to MMC under STCW.

Recommended courses include Advanced Firefighting, Fast Rescue Boat, and 14-hr Crisis management. Deck: recommended Radar Unlimited, FCC radio operators permit and Able Seaman and RFPNW classes. Engine department – QMED Oiler course.

Technical / Job-specific Skills:

Skills are encompassed in the certifications and preparations listed above. Microsoft Word, Excel and specialized databases.

Employability / Soft Skills:

Not skills, but crew need credentials including (TWIC) card, Merchant Mariner Credential, passport or proof of immigration status. They also need English proficiency and membership in the relevant union. They require strong work ethic, clean criminal record, good physical condition and they must pass a drug test and be enrolled in a random drug test program.

Some required endorsements are linked to sea time. Written and verbal communication including accessing company specific courses on the internet. Interviewing skills, team work and ability to think under pressure, ability to work with others under pressure, ability to work with coworkers from a variety of backgrounds.

Other Skills Needed:

There are currently, and likely to be more in the future, requirements for USCG approved “refresher” courses for all USCG initial course requirements, including basic safety training, sc/lifeboatman, fast rescue boat, advanced firefighting and security.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS:

Sea time, on-the-job training, the unlicensed crew academy, and trade/tech schools and programs, inside Alaska and outside.

::: Licensed and Unlicensed Vessel Engineers :::

DESCRIPTION

Basic skills for these occupations are similar as most require mechanical knowledge and in most cases mechanical training or higher level engineering training. These skill sets apply to many on-board and on-shore occupations. Workers in this field maintain, operate and repair vessel mechanical and electrical systems. They are in charge of all engine room duties on board ships. Job titles include licensed vessel engineer, chief engineer, designated day engineer.

OVERVIEW

Not provided in survey, but known to be in demand on a wide range of vessel due to complexity of on-board systems.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- None described.

Education / Training / Licensure / Certifications:

USCG license, QMED

Technical / Job-specific Skills:

Diesel engine maintenance and repair, refrigeration and hydraulic theory and repair

Employability / Soft Skills:

Record-keeping, parts inventory and ordering procedures, safety regulations and reporting requirements, emergency procedures.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

More personnel are needed with USCG Designated Duty and Qualified Watch Stander certification. Must pass drug test.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Unspecified

∴ Marine-specific Electronic and Computer Engineers and Technicians ∴

DESCRIPTION

These specialists are employed in nearly every field of the maritime sector, and may find particularly well-paying jobs in OCS, exploration, Naval support and ship/fleet operations management. Skills are transferable to many other industries. Job titles include electronics technicians, network technicians, computer scientists, and computer engineers.

A group of occupations that require advanced skills related to electronic devices and computing. Electronics technicians generally work on (install, troubleshoot, repair, tune or adjust) electronic devices, such as those used in vessel operations and scientific research. Computer scientists, computer engineers and network technicians design, build, modify, program, install and run various kinds of computing devices used in operations, accounting, data acquisition and analysis, equipment monitoring, and so on.

OVERVIEW

Survey respondents listed them as high-priority but did not specify reasons. Trade journals, anecdotal accounts and experience indicate that this mix of skills is needed in most areas of maritime sector. The skillsets are cross-cutting and apply to all of the FSM sectors.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- Not specified in the survey.

Education / Training / Licensure / Certifications:

Computer science and computer engineer occupations generally require college degree in that specialization. Technicians may have degrees or training in pertinent voc-tech programs. Survey respondents did not specify certification requirements but it may be assumed that formal training is necessary for adequate performance.

Technical / Job-specific Skills:

Not specified.

Employability / Soft Skills:

Not specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Not specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Many colleges and tech schools have electronics and computer science/engineering and technology programs.

::: Vessel Captains, Ship Captains, Ships Officers, Towboat Captains, Tour Boat Captains :::

DESCRIPTION

Survey indicates steady demand for holders of Coast Guard licenses for operating various sizes and classes of vessels. Vessel operating skills are broadly transferable to other vessel operations and to shore-side management occupations particularly in the maritime fields. Job titles include vessel officer, captain, master, deck master and deck mates, marine pilots, and captains of towing vessels (tugs), captain of sightseeing tour vessel licensed ship, tug and other vessel officers. Responsible for vessel, and for crew and passenger safety, navigation, overall vessel operation.

OVERVIEW

Potential employers include the Alaska Marine Highway System, freight transportation, passenger transportation, tugs, and some classes of large fishing industry vessels. Graying of the workforce is an issue as many captains in particular are at retirement age. Skills needed in vessel operations are cross cutting to several industries. There may be increased demand due to expanded OCS exploration, increased North Slope oil production, increased Great Circle and Northwest Passage transit. If licenses become required for fishing vessels, licensed captains will become even more difficult to recruit. Some jobs pay more than \$8000/month, most others \$5,000-8,000. The marine sector, and in particular petroleum carriers, have steadily increasing compliance requirements.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

Education / Training / Licensure / Certifications:

Basic requirement is Coast Guard licensing. Many levels of licensing and various endorsements of licenses. Basic requirement for captains is USCG Master of appropriate tonnage; tug captains require towing endorsement. There is a shortage of officers with towing endorsements, for example. Some incumbents came “through the hosepipe” but most require college or maritime academy degrees. Preferred are majors in engineering, vessel operations, logistics, etc.

Technical / Job-specific Skills:

Licensure requires considerable sea time and experience, and skills are acquired or honed in the training and experience that qualifies them for licensing, although maritime academy graduation can substitute for some sea time and experience Hazardous cargo knowledge. In addition to license, some employers require local knowledge of Alaska’s rivers and coastline. Some passenger boat captains must know how to operate jet boats in silty water, cross tidal flats in all conditions and run rivers safely.

Employability / Soft Skills:

Standard soft skills, including oral and written communication pertaining to machinery/crew/shoreside activities, and math. Ability to deploy to remote area for five to eight months. Computer skills, tide table knowledge.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Computer mastery increasingly essential. Captain's job is increasingly digital and tech-savvy candidates are sought. Tour boat captain must do engine maintenance, manage crew, ensure safety of crew and passengers, narrate tour and know wildlife laws and regulations. Must have ability to operate boat in ice. Radar certification, bear guide certification, USFS, naturalist certification.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

College degree, maritime academy, combined with sea time

::: Civil Engineers, Structural Engineers, Coastal Engineers :::

DESCRIPTION

Professionally licensed support occupations such as surveyors and materials testers. Electrical and mechanical engineers are included in this class. Port and harbor development, coastal infrastructure construction, transportation facilities and similar developments depend on the skills of specialized civil engineers. Most positions require an advanced degree in an engineering specialty. Various kinds of technicians work with engineers; they also require specialized training but not at the post-graduate level. Job titles include civil engineer, structural engineer, and coastal engineer.

Design structures, ports, docks, floats, facilities, harbors, breakwaters, erosion- and flood-control measures, and designs for coastal processes and storm events. Supervise construction activities. Conduct materials sampling/testing. These occupations also design and oversee routine maintenance, required upgrades, facility replacement, perform required inspections.

OVERVIEW

Relatively few positions but most recruited from outside Alaska at significantly increased cost to employers. High paying, important work depended upon by many other marine industry subsectors. Likely to be increased demand with many new coastal developments planned. Difficult and costly for employers to attract and retain non-residents to engineering positions in Alaska due to competing demand for engineers in other states.

EDUCATION AND TRAINING

Describe the highest priority knowledge/skills/abilities needed for this Occupation/Skillset:

- None specified

Education / Training / Licensure / Certifications:

Minimum bachelors, preferred master's degree in structural or related engineering. Trend is toward a Master's and for PE requires 30 credits beyond a Bachelor's.

The progression for the engineering profession is as follows:

1. Engineering degree
2. FE Exam

3. EIT status – “Engineer-in-Training” – four years of training in their specific field with licensed engineer
4. PE Exam (principles and practice) – licensed professional engineer must sign off on four years of experience before candidate can be accepted to take the PE exam.
5. Licensed Engineer status –engineer can practice professional judgment in field of expertise.

Substantial OJT required for professional licensure. Employers tend to train new employees in support occupations (e.g. materials testing) using OJT. Also a professional licensing for surveyors.

The State of Alaska is instituting new categories called SE (structural engineer) and ME (marine engineer) but ME is really an Architectural Marine Engineer which deals with actual vessel design, not port, dock or float design. So, both a Civil Engineer with Structural engineering courses and a Structural Engineer would be qualified to do marine (port, dock, floats) work. A Coastal Engineer in Alaska is a Civil Engineer who has an advanced degree in Coastal Engineering, which deals with coastal processes and storm events.

Technical / Job-specific Skills:

Commensurate with degree

Employability / Soft Skills:

Standard soft skills, including oral and written communication, and math. Willingness to travel to diverse communities, including remote locations, for extended periods of work.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Computer mastery increasingly essential. Administrative tasks, ability to learn and apply new skills and technology as industry practices change.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

Universities inside and outside Alaska.

::: Strategies for All Maritime Trades Skillsets :::

- Recognize successful Alaskan marine programs and determine methods with which to expand and strengthen these programs to more Alaskans.
- Through the use of University resources, and state funding, improve the knowledge of the opportunities that the maritime industries offer.
- Identify current marine education programs both inside and outside of the state and determine where we can strengthen and expand the programs offered in Alaska
- Assist educators in preparing the next generations of marine employees.
- Determine ways to increase industry and engagement through internships and mentorships, work study, scholarships, recruiting and job placement and other means.

The maritime sector survey questionnaire included a question on strategies for attracting and preparing suitable requirements which included eight options and space for respondents to add their own. Of the eight, four were endorsed by more than 90% of respondents who answered the question:

- Strengthen secondary school maritime industry programs as well as the education of guidance counselors.
- Provide industry-specific vocational and technical programs.
- Create public awareness of maritime sector careers.
- Develop internships and apprenticeships.

The industry advisory committee added three of its own:

- At secondary school level put greater emphasis on reading, communicating and math skills. Many of these skillset require the same basic preparation as do engineering related programs and occupation.
- Get more industry engagement and support.
- Analyze competitors (other industry consortia and employers) and benchmark responses.

Research, Conservation and Management Priority Occupations

Employees in this sector typically work for a governmental and/or regulatory body such as the Alaska Department of Fish and Game (the largest employer in this sector) or a number of federal agencies such as National Marine Fisheries Service, the North Pacific Fishery Management Council, the US Fish and Wildlife Service, the US Forest Service, the National Park Service and the Bureau of Land Management. In addition, occupations in research, conservation and management may work for private consulting firms, nongovernmental organizations, CDQ groups or other regional Native nonprofits.

This group identified 12 priority occupations.

::: Biometrician :::

DESCRIPTION

A biometrician works with the development and application of statistical and mathematical methodology to management and research operations. Biometricians may provide policy review and technical expertise in statistical and biometric issues related to research and management of commercial and subsistence fisheries.

OVERVIEW

Biometricians may often stay in a university working environment but many are employed in Alaska by the Department of Fish and Game and some with National Marine Fisheries Service. The needs assessment survey indicated a need across the state, especially in Juneau, Kodiak, Anchorage, and Fairbanks for biometricians.

State agencies find it difficult to compete with private industry on compensation. The FSM Education and Training Gap Analysis noted that the private sector competes with ADF&G for employees, and ADF&G competes with NOAA and other federal employers. Further it was noted that data management and biometrics will be ‘types of training that are either needed now or expected in the next 10 years to be in short supply’.

EDUCATION AND TRAINING

Education / Training / Licensure / Certification:

Biometricians need statistical sampling education and experience, including training with modeling tools. Virtually all educational programs for statistics do not emphasize sampling and modeling. An introductory course to fisheries management in Alaska would also be beneficial; applicants are lacking fisheries acumen and not familiar with how life cycle of fisheries works when they accept these jobs.

Technical / Job-specific Skills:

Programming languages, data management, and biometrics. Candidates are lacking good technical foundations and knowledge of how to apply technical skills to fisheries management. Applicants are also unaware of our how our mission connects to biometrician work. There is an overall lack of local knowledge about and exposure to Alaska's fisheries. Overall, there are problematic language barriers since many applicants are foreign nationals, which can sometimes severely impede written and verbal communication skills.

Employability / Soft Skills:

None were specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On-the-job training; statistical education programs with more of a natural resource management focus.

STRATEGIES

Engage:

- ADF&G managers suggest partnering with FSMI for financial support for the expansion of ADF&G's Internship Program; and increase the department's recruitment-focused public relations and outreach.
- Facilitate communications with applicant pools (e.g. UAF) of what we need.

Training strategies:

- FSM Gap Analysis noted that continuing education via online certificates, degrees, and workshops in the aquaculture, biometrics, data management areas would be useful.
- ADF&G managers suggested interfacing more with the universities and collaborating on curriculum reviews; having more ADF&G staff as adjunct university staff/faculty;

Recruiting strategies:

- If salary is not commensurate with duties and not competitive with private and federal sectors positions will be difficult to fill.
- Make all positions open to “All applicants” and provide the advantage to Alaskan residents at the interview stage.

Retaining strategies:

- Address salary concerns; analyze why staff are not seeking promotions.
- Promote mentoring of current employees so they are better prepared to be promoted when positions open.
- Incentivizing longevity for ADF&G staff.

::: Fish and Wildlife and Hatchery Technician :::

DESCRIPTION

Fish and Wildlife and Hatchery Technicians perform biological field sampling and research functions requiring a fundamental knowledge of research procedures in the areas of fisheries, aquaculture or wildlife and their habitat. Incumbents may work at field sites, in office settings, on vessels or in laboratories.

Work may involve: simple computer preparation or formatting of data for analysis at a higher level, assisting with field camp operations or following simple laboratory procedures. Incumbents often work as crew members and, in small crews of two or three members may monitor work flow and scheduling, following written manuals or operation plans. Difficult questions concerning technical/biological matters are referred to a supervisor, who may be located either on site or at a field office.

Examples of duties may include: Directs work flow or scheduling of other crew members in a two- or three-member team. Performs creel census, port sampling, river sonar surveys of adult salmon, etc. Under close supervision, applies drugs and chemicals to control diseases of eggs, fry and fingerlings at hatcheries. Removes and reads fish tags. Use computers and computer software to conduct routine data entry or output. Collects range condition data and monitors escapement of brood stocks. Collects biological samples for purpose of gathering data on species, size, age and sex composition; performs fish tagging, test fishing, scale mounting, stream gravel sampling, etc. Identifies species; collects scales, otoliths, or biological samples. Operates skiffs and small boats, nets, firearms, snow machines, chain saws, and other equipment, etc. Mends nets; makes boat repairs; sets up and/or repairs fish counting weirs and towers.

Work may involve: serving as crew leaders authorized to direct the work of three or more crew members and to perform simple support functions involving field logistics, supply and personnel/payroll matters. Positions require some knowledge of fisheries, wildlife, aquaculture or subsistence technical practices and procedures. Incumbents are expected to perform simple problem analysis and resolution, and be able to effectively provide information to the public regarding project operations.

Examples of duties may include the duties listed above, in addition to serving as a crew leader supervising lower level technicians in the collection of biological data or samples, in the performance of routine duties, maintenance and operation of field camps, etc. Performs simple functions in the areas of personnel, procurement and supply to maintain logistical support of field crews. Designs logs and forms for data collection. Collects data, maintains records, compiles simple reports and/or maps. Performs simple statistical computations, organizes and presents data for reports. Explains regulations and programs to the public. Maintains and adjusts water supplies to provide desired quality, quantity and temperature to incubation and rearing units and adjusts and maintains automatic feeders.

OVERVIEW

Fish and Wildlife and Hatchery Technicians comprise a large percentage of the sector's workforce. Many ADF&G managers contend techs are the "backbone" of the agency, and it is of paramount importance to have

a skilled technical workforce. Technician work is also seasonal in nature, so is more difficult to recruit the same staff season after season because people generally want a job that lasts longer.

As generational shifts occur in education emphases, prospective applicants will be more skilled with computers and suited with office “indoor” work as opposed to the outdoor “get your hands dirty” style of work typical to the technician series. Outdoor pursuits are less and less encouraged in school, and the technician series is vital to ADF&G continuing to meet its mission. Technicians are often the start of the workforce pipeline, i.e. many department biologists, scientists, managers, and leaders started out as technicians.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

ADFG: Fish identification; field methods/techniques; field data collection.

Technical / Job-specific Skills:

ADFG: Firearms training and being comfortable around firearms; hunter education; sportsman's education; Emergency Medical Technician (EMT) training; small engine repair; work with outboard motors and ATVs; CPR; swift water rescue (preferred, but not required).

Employability / Soft Skills:

ADFG: Understanding of ADF&G mission and what the department does.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On-the-job training; previous experience commercial fishing, guiding, trapping, or subsistence hunting; experience with outdoor manual labor.

STRATEGIES

Engaging strategies:

- Collaborate with staff to encourage them to commit to hiring more interns instead of technicians (technicians are sometimes difficult to find, but ADF&G has an internship program with many college students who are seeking field work experience to couple with their fisheries or biology degree – and this in term builds the pipeline.)

Training strategies:

- Vocational training options in manual work, like boat handling, small engine repair, field work, fish identification, etc.

Recruiting strategies:

- Increased outreach in rural areas.

Retaining strategies:

- Sometimes it is a challenge bringing the same technicians back year after year. Potential strategies are unknown at this time. We have a hard time competing with conflicting fishing seasons (often more profitable for a person to fish commercially for a season than to work in the field for ADF&G)

::: Fishery Biologist :::

DESCRIPTION

At the Alaska Department of Fish and Game, there are four levels in the Fishery Biologist job class. ADF&G indicated levels III-IV have the greatest workforce development challenges.

Fishery Biologist IIIs plan, develop, direct, conduct, and evaluate fisheries management and research projects and activities as an area management biologist or area research biologist, or research, analyze, and consult on specific fishery issues or species as a technology or program specialist. Fishery Biologist III is the advanced level of the series.

At this level incumbents serve as the area management or area research biologist for a designated fisheries management area; as a program or project biologist responsible for a program or projects with factors of complexity characteristic of this level; or as a biologist specializing in a technology, such as hydroacoustics, or in resolving complex issues subject to controversy and contributing to management decisions. In all roles incumbents have responsibility for planning and controlling the resources necessary to perform the work, and projects or activities are characterized by broad scope, limited guidelines, and extensive external interaction. The role of area management/research biologist or project biologist requires administrative and/or supervisory responsibilities, with authority to commit the division to a course of action.

Fishery Biologist IVs oversee and control fisheries management activities or research programs as regional management or regional research biologists; or are program managers of a statewide programs; or are staff assistants to a member of division management, with significant influence on fisheries management or research policy; or are technical experts and consultants for particular program spheres, providing guidance on controversial, interagency, and external issues. Fishery Biologist IV is the program manager or technical expert level of the series.

At this level incumbents provide biological and programmatic expertise as: regional biologists planning, developing, coordinating, implementing, evaluating, and supervising either fisheries management or fisheries research activities in a designated geographic region or significant portion thereof; program managers of a statewide program with significant impact on division functions, policies, and procedures, or whose work requires technical expertise to ensure scientific integrity in meeting program goals, with significant program administration and supervisory responsibilities; assistants to division management with responsibility for performing substantive research, analysis, and problem solving of specialized, but controversial, complex issues, affecting the division's policies, positions, or recommendations; or technical specialty experts and consultants, developing a multiplicity of effort and policy decisions to coordinate, negotiate, and resolve controversial fisheries related issues among state, federal and private representatives.

OVERVIEW

In 2012, ADF&G had 128 Fishery Biologist IIIs and IVs. At that time, 23% were eligible to retire in less than one year. There are often too few Alaskan residents applying for these jobs, and it is difficult to entice

educated Alaskans to work in Alaska. Nonresidents often require a longer transition period in a new position to gain the experience a resident has gained in past jobs with ADF&G or a federal agency. Often entry-level career biologists (FB II) are reluctant to take the “next step” promotion, either because they are early in their careers (year 5 to 10 in a 30-year retirement) and do not want to be in a higher level position (often attributed with more bureaucratic responsibility) for the majority of their career.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

For Fishery Biologist IIIs: a degree in general biology usually doesn't fully prepare a student for a career in fisheries, therefore a degree in fisheries is preferred. An emphasis on a candidate's particular educational background differs depending on the job being in research or management. Experience (more than education) is more of the focus for the management realm, and we are seeing candidates lacking this trait. Coursework and knowledge of statistics also appear to be lacking, as well as experience in radiotelemetry, GIS, acoustic tagging, etc.

For Fishery Biologist IVs: At this level, applicants are generally further along in their career; therefore, they might not be as current in their education and need fundamental statistics education (however, not all FBIV positions require the use of stats). Desired education might also include geneticist education and experience so the applicant can demonstrate they know the "language" of genetics; a 200 level fish genetics class is not sufficient.

Technical / Job-specific Skills:

Nonresident applicants for management positions do not have experience in the Board of Fisheries process or are unfamiliar with the complexity of Alaska's fisheries (commercial, sport, personal use, subsistence). For the research positions, it is difficult to find someone with experience with a broad range of species (resident species, salmon, marine) and sampling expertise. In fisheries management, previous knowledge or dealings with the fishery, the buyers, the fishermen, the regulations, and the process is important. In research, candidates need and are often lacking experience with the technology (sonar for example), constructing and maintaining a field camp, managing the logistics of a 3-4 month field camp in remote locations, directly supervising 4-9 staff, experience with state SOPs including purchasing, hiring, discipline, etc. It is near to impossible to get this combination of experience without working for the state, or possibly another government agency. Written communication skills are needed across the board: not just technical writing, but candidates need to possess the skills for writing and editing reports, news releases, staff comments, log items, and day-to-day communication.

Employability / Soft Skills:

Individuals must be generalists, have to know a little about many diverse topics, must have good common sense and superlative people skills, public speaking and writing skills, quantitative skills, have to build long-term working relations with diverse individuals, high integrity, strong work ethics, years of experience on the job. It seems the only way to get these kinds of people is from the ranks, based on proven work experience and demonstrated work performance. We are finding candidates lacking largely in public speaking skills (such as how to give testimony at the Board of Fish); public interaction and media training (like how to anticipate the contact and how to deal with reporters); legal expertise/knowledge; dealing with difficult people in adverse situations; basic understanding of civics; budgeting skills; negotiating; and exposure to being a supervisor.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Technology changes so quickly and regularly, but it is expected genetics will play an ever increasing role.

Fisheries management in most fisheries continues to become more complex due to regulations, state-federal interaction, user conflicts, etc. The electronic age of information flow allows much more public interaction, which is good for the stakeholders but puts additional demands on staff to respond to a multitude of data requests, policy questions, etc.; also technology changes so rapidly that database management applications, administrative programs (tears, work place AK, etc.) are constantly upgraded, making for a lot of training required for users. Much of this is a given for current employees, but new employees from outside state government and the department often become frustrated with workloads, perceived inefficiencies, and added bureaucracy.

Other Hiring Challenges for Fishery Biologists: There are often too few Alaskan residents applying for these jobs. Nonresidents often require a longer transition period in a new position to gain the experience a resident has. Often entry-level career biologists (FB II) are reluctant to take the “next step” promotion, either because they are early in their careers (year 5 to 10 in a 30-year retirement) and do not want be in a higher level position (often attributed with more bureaucratic responsibility) for the majority of their career. For example, Habitat Biologist IIIs that work in fisheries often get promoted up the ranks very quickly and therefore "top out" early in their career. Or sometimes the position requires they move to advance upward and they are not interested in relocating or have family ties that do not allow a move. One hurdle is that required job experience, such as conducting aerial surveys, familiarity with commercial fisheries, SCUBA diving with drysuit gear, might only be available in Alaska residents. When there is a shortage of qualified Alaska applicants with appropriate experience, recruiting from outside of Alaska may not be an option.

The solution may be to get applicants of potential into lower tier positions, such as the Biologist I or II levels. In addition, if a Biologist has been in their position for more than 5 years, the immediate pay increase to take a promotion is minimal, and there is little incentive to take a position with more responsibility for little financial gain. Incentivizing the career track is a problem.

Other Hiring Challenges for Fishery Biologists IV: Some managers have the viewpoint that the university persuades their students into the research track, and yet – ADF&G is not a research entity; it is a management agency. Higher education at some universities seem to have an ecosystem approach and the focus appears to be getting "greener," however, not all fisheries are in a dire situation. This sometimes puts candidates at a disadvantage if their alma mater had a different slant/focus contrary to much of the management culture in Alaska.

One particular challenge in hiring for this occupation is encouraging people to promote up the ranks. Many staff consider the Fishery Biologist III level to be the "best job ever" - yet progressing up to the Fishery Biologist IV level moves the incumbent one step further from "why they got in it in the first place." Many managers contend that it does not make sense to promote up when the pay is not commensurate to the advanced duties

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

On-the-job training.

STRATEGIES

Engaging strategies:

- Facilitate communications with applicant pools (e.g. UAF) of what is needed.

Training strategies:

- On-the-job training.

Recruiting strategies:

- Change the advanced step placement (ASP) process to equally benefit ADF&G employees and those coming from outside the department – for example it is not uncommon for an FB III advancing to the FB IV level to take a pay cut when considering the reduction in premium pay (Sea duty, etc.) and usually ASP does not apply to the recruited position unless there was a “recruitment problem” – e.g., one applicant.
- Make all positions open to “All applicants” and provide the advantage to Alaskan residents at the interview stage.

Retaining strategies:

- Identify potential succession for particular positions (i.e., job description or PD specifically states that position X provides training and experience for advancement to position Y);
- Promote mentoring of current ADF&G employees so they are better prepared to be promoted when positions open.

::: Fish and Game Coordinator :::

DESCRIPTION

Fish and Game Coordinators are responsible for:

- Managing all of a division’s fisheries, wildlife, or habitat management and research activities within a geographic region of the State; or
- Managing the research or management of major fisheries or wildlife programs that include multiple species, single species with federal or international involvement, or whose scope exceeds regional boundaries; or
- Providing technical expertise to policy level executives for resource management with federal or international implications.

This is a supervisory class with substantial responsibility for the exercise of independent judgment in employing, disciplining, or adjudicating grievances of subordinates. Fish and Game Coordinators are biologist managers responsible for planning, organizing, directing, coordinating, and controlling activities and resources to efficiently accomplish the functions and goals of a division.

Under the first option, incumbents are regional managers responsible for directing, developing, evaluating, and managing all the division’s biological studies, research, resource assessments, and resource management activities in a designated geographic region. Incumbents have considerable responsibility for controlling the direction of research and management activities and ensuring short-term goals and tactics support the department’s strategy and long-term goals. Control and direction is exercised through subordinate supervisors at the Fishery Biologist IV, Wildlife Biologist IV, or Habitat Biologist IV level.

Under the second option, incumbents are managers of regional resource management, of regional resource research, or of a statewide program, whose scope of responsibility includes one or more fisheries groups (examples of groups are shellfish, groundfish, or dive fisheries), multiple species and a greater geographic scope than the designated region, significant federal or international involvement through treaty or co-management regime, or direct supervision of multiple subordinate supervisors at the Fishery Biologist IV, Wildlife Biologist IV, Habitat Biologist IV, Fisheries Scientist I, or Wildlife Scientist I level.

Under the third option, incumbents are the division technical expert responsible for policy analyses and recommendations on political, environmental, regulatory, and economic matters. No more than one position in a division may be allocated under this option.

OVERVIEW

In 2012, ADF&G had 22 regional supervisors with 31.3% of those staff eligible to retire. Most current regional supervisors “grew up” in the department and rose through the ranks. However, now it is difficult to get a Fishery Biologist III or IV to consider applying for a Fish and Game Coordinator or Regional Supervisor position, which is unfortunate because candidates employed in those job classes are generally the best prepared and have the most relevant experience for moving up into the Coordinator series.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

None were specified.

Technical / Job-specific Skills:

None were specified.

Employability / Soft Skills:

Verbal and writing skills; time management; supervisory skills specific to the State.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

Other Hiring Challenges for this position: Though there is a pay increase when promoting from a Biologist III or IV to a Coordinator or Regional Supervisor (range 18 or 20 going up to a range 22), many incumbents remark the pay difference is "not significant enough to give up fun work and sea duty pay for drudgery." In other words, many folks are more content being an area management biologist than working exclusively at a desk job. Additionally, some ADF&G Coordinators serve in the track of "Regional Supervisor", as opposed to working in that same job class as a manager of a research or management program. The difference in duties between these two tracks is dramatic, and some managers contend there is almost triple the responsibility with significant authority and stress, yet pay is not commensurate with duties, which is another reason it is difficult to promote staff into those higher levels.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging strategies:

- Facilitate communications with applicant pools (e.g. UAF) of what is needed.

Training strategies:

- On-the-job training.

Recruiting strategies:

- Make all positions open to “All applicants” and provide the advantage to Alaskan residents at the interview stage.

Retaining strategies:

- Identify potential succession for particular positions (i.e., job description or PD specifically states that position X provides training and experience for advancement to position Y);
- Promote mentoring of current ADFG employees so they are better prepared to be promoted when positions open.
- Improve pay to be commensurate with duties.

::: Fisheries Scientist :::

DESCRIPTION

At the Alaska Department of Fish and Game, there are two levels in the Fisheries Scientist job class. Both levels have been indicated as having the greatest workforce development challenges.

Fisheries scientists independently plan and manage expert original fisheries research, determine methodologies or disciplines in addressing complex fisheries problems and issues, direct statewide research projects and technical services, may be responsible for statewide management of a specialized research unit or functional area of fisheries research. They have supervisory roles with substantial responsibility for the exercise of independent judgment in appointing, promoting, evaluating, transferring, suspending, discharging and adjudicating the grievances of subordinate personnel.

At a higher level, fisheries scientists may serve as chief of research for the Division of Sport Fish, or as chief of research for either salmon fisheries (anadromous species), or ground fish and shellfish fisheries (marine species) for the Division of Commercial Fisheries. This job also has substantial responsibility for the exercise of independent judgment in appointing, promoting, evaluating, transferring, suspending, discharging and adjudicating the grievances of subordinate personnel. This is a policy-level job class.

OVERVIEW

In 2012, there were 10 Fisheries Scientists at the department, and 30% were eligible to retire within one year. This job class is rarer than the Biologist and Fish and Game Coordinator series, so there are fewer openings due to less turnover. The Fisheries Scientists positions are PhD preferred careers. Unfortunately, not many PhDs are produced here in Alaska. Resident applicants tend to have Alaska experience, which is valuable to the position.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Industry reports that fisheries scientist applicants tend to lack mathematics and statistics knowledge. Statistical analysis in their field of expertise is important, yet there does not seem to be much of an emphasis on statistics being core to degree requirements. Statistics is not taught as a tool of “how” a graduate can do their job, but rather the emphasis on stats seems to be just for a student to check it off the list of requirements.

Technical / Job-specific Skills:

Verbal and writing skills; knowledge of Alaska and its fisheries, understanding of the management process.

Employability / Soft Skills:

None were specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

The focus on genetics seems to be ever increasing. For example, our Fisheries Scientists work closely with our Fisheries Geneticists, and it is paramount that both of those job classes understand and are flexible to technology trends and changes, as well as working to best ensure how new innovations can be of benefit to the department.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- Facilitate communications with applicant pools (e.g. UAF) of what we need.

Training Strategies:

- None were specified.

Recruiting Strategies:

- Make all positions open to “All applicants” and provide the advantage to Alaskan residents at the interview stage.

Retaining Strategies:

- Promote mentoring of current ADF&G employees so they are better prepared to be promoted when positions opens.

::: Analyst / Programmer & Database Manager :::

DESCRIPTION

Analyst/Programmers develop and maintain data systems that support internal staff and the public.

A/P Level I (goes up to Level V in the state): Positions in this series design, implement, maintain or modify data processing systems in a specialized area of computer programming or systems analysis and design using

technologies currently in use in state agencies. Typical technologies currently in use may include COBOL, ADABAS, NATURAL, SAS, MVS, NTAS, NTW, MACOS, UNIX, PERL, C, C++, Shell Script, advanced HTML, JAVA, ORACLE, SYBASE, SQL, relational database technology, RPC, SAL, Windows Internals, Delphi and Visual Basic.

Analyst/Programmer I represents the entry, trainee level in the series. Positions at this level, which work under close supervision, receive on-the-job training in programming and analysis functions.

OVERVIEW

It is difficult to recruit for these positions in general due to salaries being much lower than private sector and even more difficult in remote areas due to cost of living.

The FSM Education and Training Gap Analysis (pg.16) noted that the private sector competes with ADF&G for employees, and ADF&G competes with NOAA and other federal employers. It also notes (pg. 33) that data management and biometrics will be types of training that employees either need now or can expect or need in the next ten year and are hardest to find and currently in short supply.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

A/P Level I: Successful completion of nine (9) semester hours of college level coursework in computer languages or system analysis, or three months of actual computer programming experience, or one year of work experience using a computer for analysis, including experience in the use of computer reporting languages, spreadsheets or statistical packages.

Technical / Job-specific Skills:

CFEC: Survey/experimental design, including field experience.

A/P Level I: Ability to follow oral and written directions, work with details accurately, learn to analyze complex problems, identify their basic elements, and describe solutions graphically as a series of logical steps; write and speak effectively. They are also expected to learn structured programming techniques and codes.

Employability / Soft Skills:

CFEC: communication to a wide audience, leadership skills, ability to work within a group.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Engineer :::**DESCRIPTION**

Engineers perform professional work requiring the application of knowledge of the principles, methods and techniques of engineering concerned with facilities and systems for controlling pollution and protecting the quality of resources and environment. The work also requires an understanding and utilization of aspects of chemistry, biological sciences and public health that pertain to the control or elimination of pollutants (see job classification for full list of duties).

OVERVIEW

It is very difficult to fill these positions due to strict minimum requirements and to lack of competitiveness of the state compared to private industry.

EDUCATION AND TRAINING**Education / Training / Licensure / Certifications:**

Bachelor's degree from an accredited institution in environmental engineering or a related branch of engineering and three years of engineering experience of which two years were equivalent to an Engineering Assistant II, DEC with the State of Alaska.

OR

Master's degree from an accredited institution in environmental engineering or a related branch of engineering and one year of engineering experience equivalent to an Engineering Assistant I, DEC with the State of Alaska.

AND

Require registration as a professional engineer (PE) by the State of Alaska.

Technical / Job-specific Skills:

- Considerable knowledge of professional engineering concepts, principles and practices applicable to the full spectrum of engineering duties concerned with the design and layout of industrial and domestic waste treatment facilities, pumping stations, sewer systems, storage facilities, water supply and distribution systems.
- Considerable knowledge of standard pollutants for a variety of industries and operations and the methods and techniques used to measure emissions or dispose of solid waste.
- Working knowledge of the application of engineering mathematics, equations and computations.

- Working knowledge of environmental laws and regulations as well as departmental policies and procedures.
- Working knowledge of the application of related scientific fields such as chemistry, hydrology, geology or biology.
- Familiarity with related engineering disciplines, such as mechanical.
- Ability to design and evaluate designs of facilities, structures, systems or processes developed to control or reduce pollution, treat or store industrial or domestic waste.
- Ability to make engineering-economic evaluations of proposed pollution control methods and plans; to adapt standard practices and techniques; and to recognize discrepancies and deviations.

Employability / Soft Skills:

Ability to establish and maintain working relationships with a wide variety of professional and nonprofessional representatives of local, State or federal governmental interests, the public sector and private businesses.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Environmental Program Manager :::

DESCRIPTION

Incumbents direct the work of an office or unit providing services to regulated entities or agencies in a defined geographic area and directly supervise professional level staff. Incumbents have responsibility for planning, organizing, directing, and controlling resources and program delivery for the office or unit, including developing and implementing procedural controls, budget development and control, personnel administration, and procurement. This is a supervisory role with substantial responsibility for the exercise of independent judgment in employing, disciplining, or adjudicating grievances of subordinates.

OVERVIEW

No overview was given.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

A bachelor's degree from an accredited college in an environmental, physical, biological, or natural science; engineering; planning; natural resources; or public or business administration;

AND EITHER

One year of advanced level professional experience in environmental regulation compliance, pollution control, environmental damage recovery, or programs to improve or protect environmental quality; or evaluating the potential environmental and socio-economic impacts of construction projects; preparing environmental documentation; and determining, negotiating, and monitoring permitted activities. This experience is met by service as an Environmental Program Specialist IV or Environmental Impact Analyst III with the State of Alaska, or the equivalent with another employer.

OR

Two years of full-working level professional experience in environmental regulation compliance, pollution control, environmental damage recovery, programs to improve or protect environmental quality, or the analysis and documentation of environmental assessments and environmental impact statements. This experience is met by service as an Environmental Program Specialist III or Environmental Impact Analyst II with the State of Alaska, or the equivalent with another employer.

OR

Two years of advanced professional experience in an environmental health or sanitation program. This experience is met by service as an Environmental Health Officer III with the State of Alaska, or the equivalent with another employer.

OR

Two years of full-proficiency experience in an environmental engineering program. This includes such work as Environmental Engineering Associate or Village Safe Water Engineering Associate with the State of Alaska, or the equivalent with another employer.

OR

Two years of advanced professional or supervisory level experience in natural resource management. The required experience includes work such as a Natural Resource Specialist III, Natural Resource Manager I, Geologist III, Hydrologist II, Agronomist II, Forester III, Fishery Biologist III, Wildlife Biologist III, or Habitat Biologist III with the State of Alaska or the equivalent with another employer.

Substitution:

Four years of any combination of experience in environmental or scientific field work, sampling, and analysis; environmental regulation compliance; site remediation; emergency response; hydrologic or geologic studies; environmental planning; or environmental engineering and post-secondary education in an environmental, physical, biological, or natural science; engineering; planning; natural resources; or public or business administration from an accredited college (3 semester or 4 quarter hours equal one month) will substitute for the required degree.

Technical / Job-specific Skills:

- Thorough knowledge of state and federal statutes and regulations that protect the environment; the sources of environmental pollution; and the techniques and practices for preventing release of pollutants and testing for their presence.
- Thorough knowledge of environmental issues and areas of controversy.
- Thorough knowledge of the principles of an environmental, ecological, biological, or physical science.
- Thorough knowledge of research techniques, statistical measurements, and report writing.
- Considerable knowledge of sampling design theories and the use of monitoring and field equipment to detect the presence or quantify the level of various pollutants.
- Skill in communicating and working cooperatively with community officials to plan and achieve mutually beneficial goals.
- Ability to analyze and evaluate technical scientific data.
- Ability to develop, implement, and coordinate programs providing appropriate, cost effective solutions to environmental and public health problems.
- Ability to provide leadership, direction, training, and supervision to professional staff.
- Ability to work effectively with people having a variety of backgrounds and potentially conflicting goals.
- Ability to communicate, both orally and in writing, with the general public, business representatives, and professionals in a variety of fields on technical environmental issues and requirements.

Employability / Soft Skills:

None were specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES**Engaging Strategies:**

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Fisheries Economist :::

DESCRIPTION

A Fishery Economist with The North Pacific Fishery Management Council⁶ works with other economists/analysts in the identification and analysis of economic issues pertaining to fisheries management off Alaska. This person will participate as part of a team of social, economic, and biological analysts from Council staff and from the staffs of other agencies. The Council is one of eight regional Councils established by the Magnuson-Stevens Fishery Conservation and Management Act of 1976. The Council has authority over the management of fisheries in the Bering Sea/Aleutian Islands and Gulf of Alaska in the Exclusive Economic Zone off Alaska. The states of Washington, Oregon, and Alaska are represented on the Council.

Primary responsibilities are to participate as part of an analytical team in support of Council initiatives to develop and modify management programs for the multi-billion dollar, federally managed groundfish and crab fisheries off Alaska. Several different management approaches could be considered. Economic and social impact analyses, including benefit-cost and distributional economic impact analyses will be required to help the Council develop management approaches for these fisheries.

OVERVIEW

No overview was given.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Master's degree or higher in economics, resource economics, agricultural economics, or a related discipline.

Technical / Job-specific Skills:

- Familiarity with North Pacific fisheries and their current management structures;
- Experience in the compilation and/or review of environmental impact statements (EIS) or related economic analyses supporting regulatory actions; progressively responsible experience in economic research and analysis related to fisheries or other renewable natural resources;
- Experience in conducting applied economic analysis, including benefit-cost and distributional economic impact analyses;
- Ability to clearly communicate complex issues to non-technical audiences;
- Knowledge of the various laws pertaining to management of the fishing industry, including the Magnuson-Stevens Fishery Conservation and Management Act, the Executive Order 12866, the Regulatory Flexibility Act, the National Environmental Policy Act, and the Endangered Species Act;
- Ability to manipulate and analyze large, comprehensive sets of state and federal fisheries data;
- Ability to conceptualize the scope of a problem, analyze potential impacts, and complete writing assignments on time.

Employability / Soft Skills:

None were specified.

⁶ This occupational need was indicated by the North Pacific Fishery Management Council.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Fisheries Analyst :::

DESCRIPTION

Duties for this position are more general than an economist; employees may also be a biologist or have another background. Principle skills are working in a high-energy environment with deadlines, and requires ability to coordinate and compile extensive analytical documents (up to and including environmental impact statements).

OVERVIEW

No overview was given.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Master's degree minimum and/or work experience in fisheries management arena.

Technical / Job-specific Skills:

Compiling and disseminating detailed scientific information to layman audiences.

Employability / Soft Skills:

Project management skills and work ethic are definitely required for this position.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Fishery Management Specialist :::

DESCRIPTION

This position was identified as being particularly needed in Juneau, Anchorage, Kodiak, and Dutch Harbor.

Fishery management specialists collect and analyze fishery management program data; oversees fishery monitoring, scale inspections and catch monitoring plans. It requires excellent writing and communication skills, the ability to work in a dynamic environment and in a team, a working knowledge of Federal regulations governing North Pacific fisheries, Federal rulemaking process. Experience working with fishing industry is desired.

OVERVIEW

In the past 24 months, 80% of new hires for this position are recruited from out of Alaska. We continue to show little success in attracting Alaska Natives and other underrepresented populations into our workforce.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Minimum requirement: Bachelor's degree in physical or social sciences.

Graduate, or equivalent, full-performance level knowledge of the theories, principles, and methods of a technical professional field and of a specialty within that field, and the ability to define problems, perform background research, develop, and execute a project plan, organize and evaluate results, and prepare reports of findings

Technical / Job-specific Skills:

High analytical and writing skills are needed for this occupation.

Fishery management staff provide biological, economic, and social analysis for application to fishery management issues and plans. They develop, implement, administer and ensure compliance of specific regulatory programs prescribed by the various fishery management plans, amendments and regulations to

conserve fishery resources. They process permit actions, coordinates relevant activities with management councils and other applicable groups.

Fishery information staff collects, organizes, analyzes, and disseminates fisheries and economic information that provides a basis for development, implementation, and administration of fisheries management operations. They design, implement, and maintain fisheries information systems which provide data used to analyze socio-economic, biological, and operational effects to determine effective management and conservation regimes.

Program management staff for these jobs perform studies and make revisions to existing policies and procedures to ensure the effective implementation and execution of the multifaceted programs of an organization.

Employability / Soft Skills:

None were specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

::: Hatchery Manager :::

DESCRIPTION

Hatchery managers need a combination of traditional management skills and industry-specific knowledge and experience. Hatchery managers need training in fish biology and also in maintaining mechanical systems in remote locations. Hatcheries also must conduct environmental monitoring and compliance. Experience working with fishing industry is desired.

OVERVIEW

None specified.

EDUCATION AND TRAINING

Education / Training / Licensure / Certifications:

Minimum requirement: Bachelor's degree in physical or social sciences.

Graduate, or equivalent, full-performance level knowledge of the theories, principles, and methods of a technical professional field and of a specialty within that field, and the ability to manage employees and resources.

Technical / Job-specific Skills:

High analytical and writing skills are needed for this occupation.

Hatchery managers provide biological, economic, and social analysis for application to runs the hatchery. They develop, implement, administer and ensure compliance of specific regulatory programs prescribed by the various fishery management plans, amendments and regulations related to hatcheries.

Employability / Soft Skills:

None were specified.

Other Skills Needed (e.g., skills needed soon to meet future tech trends, innovations, and/or regulatory requirements):

None were specified.

CURRENT OPTIONS TO ACQUIRE NEEDED SKILLS

None were specified.

STRATEGIES

Engaging Strategies:

- None were specified.

Training Strategies:

- None were specified.

Recruiting Strategies:

- None were specified.

Retaining Strategies:

- None were specified.

CROSS-CUTTING & FOUNDATIONAL SKILLSETS

Cross-cutting Skills

In analyzing the Occupational Needs Assessments and the FSM Education and Training Gap Assessment, it became clear that there are skillsets within the industry that cut across many or all sectors:

- Managerial/Executive
- Architectural Design/Engineering
- Vessel Operation
- Marine Industrial Trades (Generalist; Mechanical; Electrical)
- Scientific (Regulatory; Specialized, Applied)

Employees with these transferrable skills are able to work in a variety of occupations within the industry. Prioritizing these skill sets and weaving them in to a variety of programs may be strategic in developing a more cross-trained, efficient workforce. In the diagram on page 81, these skillsets are in the center, with the related sets of occupations connecting to them.

Foundational Skillset & Job Readiness

Of note in both the FSM Education and Training Gap Analysis and the ONAs was the need expressed by industry employers for workers to have a solid foundational skillset – or soft skills. This job readiness component seems particularly important in this industry because of the seasonality and remote locations of the work. This is a critical skillset to build and foster, according to industry, and it lays an important foundation for higher-level positions. In this industry, most workers will work their way up to those positions from the seasonal, entry level positions they start in. Some of the skills may require formal training and a technical certification, but most of them do not. Employers also noted that job readiness training often can serve a related function of screening prospective workers for attitude, drug and alcohol use, and other skills or attributes related to job performance.⁷

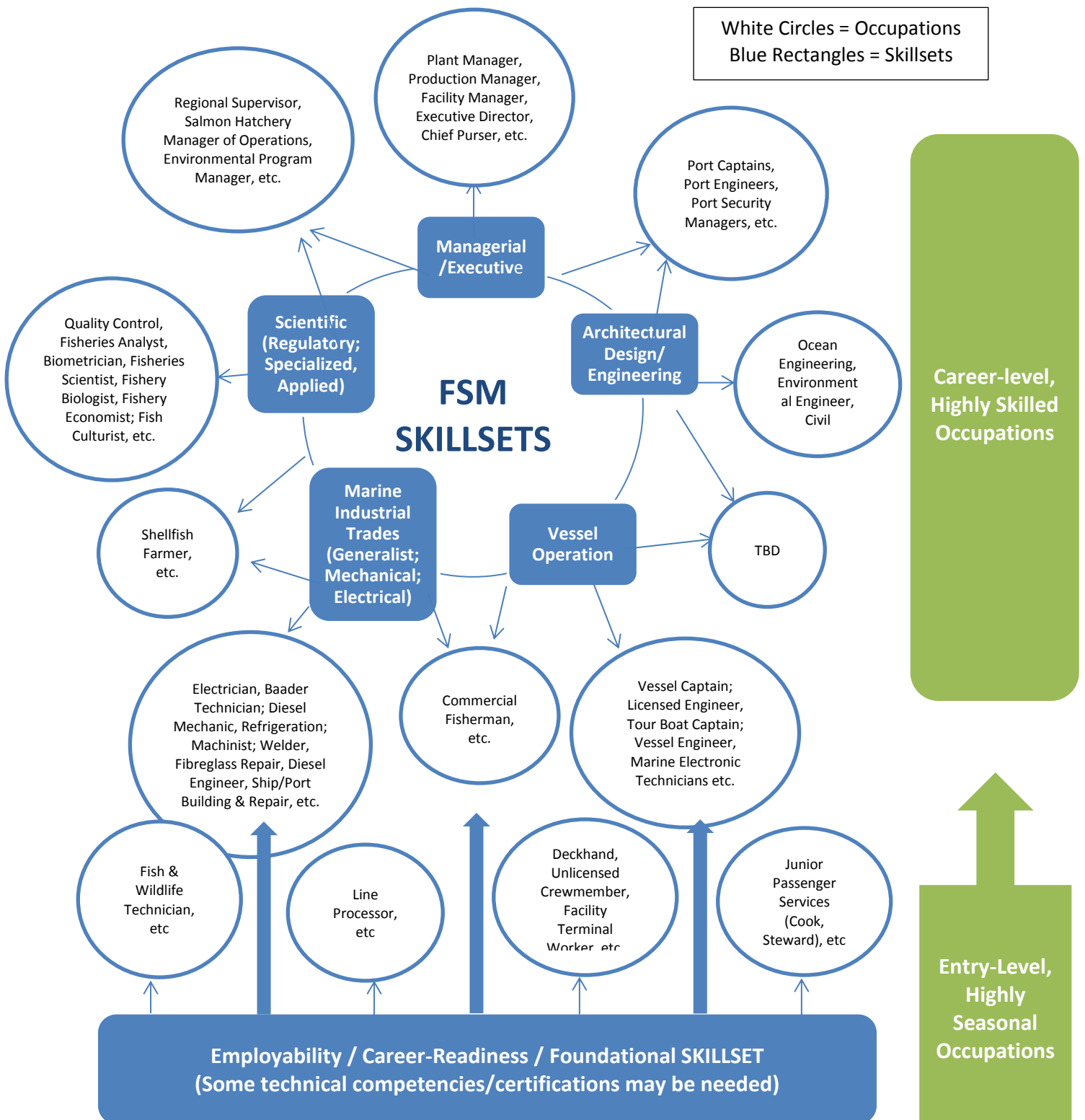
In particular, the following soft-skills were identified by employers:

⁷ FSM Education and Training Gap Analysis

- Basic reading, writing and math (English language speaking and writing skills)
- Organization
- Computer skills, ability to communicate electronically
- Interpersonal dynamics
- Safety skills
- Customer service
- Drug-free
- Maintenance, attention to detail
- High school education
AA, bachelor's, masters, specialized education
- Information Technology
- Reliability
- Ability to show up on time and be available on schedule required by employer
- Willingness to work long, hard hours
- Mechanically inclined
- Ability to follow instructions
- Problem solving/trouble shooting skills
- Ability to operate in stressful situations
- Time management
- Ability to work independently
- Team players
- Effective communication
- Ability to follow direction from leaders
- Self-motivated

In the following diagram, this set of skills is shown as the foundation to sets of related jobs in entry-level, highly seasonal positions.

Figure 1: Highest Priority Skillset Needs identified by Fisheries, Seafood, & Maritime (FSM) Industry Sectors



APPENDIX A: OVERALL STRATEGIES

Strategy	Opportunity	Action Steps
1. Grow Career Awareness	Attract more workers by improving public awareness and access to information about career opportunities. Emphasize the vast possibilities for career-level, well-paying jobs across all regions of Alaska including coastal and remote communities.	<p>1.1. Increase public awareness of FSM industry sectors and careers via branded informational material and promotional campaign (best practice may be ADFG recruiting program).</p> <p>1.2. Gather and align FSM workforce data to leverage existing career exploration/job searching tools in the state (e.g., AKCIS, AlexSYS)</p> <p>1.3. Align Career Awareness through CTE Plan Branding.</p>
2. Develop Career Pathways	Engage more Alaskan youth to consider FSM careers and make them aware of the skills needed in many advanced FSM environments. Similarly, work with the K-12 system to adequately impart the necessary skills and to educate students on FSM career opportunities.	<p>2.1. Implement AK Youth Employability Skills (YES) methodology throughout the K-12 system (i.e., Career Awareness, Exploration, Preparation, Choices).</p> <p>2.2. Expand regional school best practices to other relevant regions (e.g., Ketchikan with Career Fair, Career Development classes for dual credit, Boating Without the Boys class to expose girls to FSM career choices)</p> <p>2.3. Create more maritime curriculum, activities and internships with youth towards career pathway decisions</p> <p>2.4. Leverage/promote Personal Learning and Career Plan (PLCP) methodology in the Alaska Career and Technical Education (CTE) Plan</p>
3. Improve Access to Employment	Improve the prospect of future small business owners entering into self-employment and connecting a qualified workforce with employment opportunities.	<p>3.1. Improve access to employability and career readiness skill support including job application process and basic personal/workplace effectiveness training.</p> <p>3.2. Increase awareness towards prevention of choices that may bar employment (eg, criminal record) and increase support services in overcoming barriers to employment</p> <p>3.3. Develop programs that provide access to capital and financial management for small business owners and loan/reimbursement/scholarship opportunities to incentivize students</p> <p>3.4. Promote programs to support AK resident workforce development with emphasis on coastal and Alaska native communities</p>

Strategy	Opportunity	Action Steps
4. Train Alaskans for Fisheries, Seafood, and Maritime Employment	Increase the Alaska resident hiring rate for the wide variety of high demand, technically skilled FSM workers through targeted education/training programs. Further, assist employers to promote within the organization in finding relevant professional development training options and resources.	4.1. Identify gaps between highest priority workforce needs and existing training/education programs; develop programs in AK to meet those gaps or collaborate with best-in-class programs outside AK to support Alaskans in accessing that training.
		4.2. Improve access to training/education programs; coordinate program development, existing resources (shared instructors, facilities, equipment, curricula), and delivery among existing training programs and employers
		4.3. Implement components of MSA Sec 305 (j) relating to marine education and training programs that foster understanding, practical use of knowledge (including Alaskan Native knowledge), and technical expertise relevant to stewardship of living marine resources, with emphasis on regulatory/law/policy education and engagement
		4.4. Identify internships, mentorships, on the job training and apprenticeships; provide training incentives and support (e.g., financial and administrative) to employers to participate in such programs.
5. Improve Industry Engagement and Accountability	Improve collaborative efforts by industry, government, interest groups, and education providers in FSM workforce planning and in leveraging existing resources. Further, improve the accuracy of workforce data across the FSM sectors in Alaska and actively explore best practices outside Alaska to guide and evaluate workforce planning efforts.	5.1. Promote collaboration within industry associations and between industry, employers, government, interest groups and education/training providers in coordinating workforce planning efforts.
		5.2. Analyze best practices of other maritime industry consortia and regions to guide workforce planning efforts regarding stakeholder collaboration, economic development, and education/training methodologies.
		5.3. Improve FSM workforce data capture, definition, and coordination between industry and state/federal labor departments for purposes of workforce needs analyses and program evaluation.

APPENDIX B: SUGGESTED CRITERIA FOR EVALUATING OCCUPATIONS

The following criteria are suggestions for weighing and prioritizing occupational needs. These criteria can help provide a comprehensive examination of FSM occupations in Alaska and the trends they exhibit.

The criteria came from both AKDOLWD suggestions and from other workforce development efforts. They are fairly standard criteria in workforce development planning. The criteria were reviewed by several industry stakeholders prior to the data being collected.

For this plan, data was collected for most of these criteria [*NOTE: we are looking into options to make that data available in another venue once the plan is finalized*]. However, there are a few challenges in being able to utilize that data fully, some of which may be addressed in the work plans for executing this plan.

The criteria are outlined below, including notes related to challenges in finding or obtaining the needed data.

::: #1: Growth Rate :::

- **Unit of Measure:** % Growth
- **Data Source:** Alaska Department of Labor; 2010 data.
- **Data Notes:** The Growth Rate is the rate of growth over a 10-year span (2010-2020). It is the rate across all sectors and industries, not just FSM. It reflects new jobs only, not replacement jobs. The average across all occupations in Alaska is 12% which is considerably high compared to other states.

::: #2: Total Worker Count :::

- **Unit of Measure:** Worker Count
- **Data Source:** Alaska Department of Labor; 2012 data.
- **Data Notes:** Current worker counts are specific to FSM sectors by use of NAICS (industry) codes.

::: #3: Non-Resident Worker Rate :::

- **Unit of Measure:** % Non-resident Workers
- **Data Source:** Alaska Department of Labor; Commercial Fisheries Entry Commission licensing data; 2012 data.

::: #4: Average Age of Worker :::

- **Unit of Measure:** Mean Age (years)

- **Data Source:** Alaska Department of Labor; Commercial Fisheries Entry Commission licensing data; 2012 data.

::: #5: Average Hourly Wage :::

- **Unit of Measure:** Mean Hourly Wage in Alaska
- **Data Source:** Alaska Department of Labor; 2012 data.
- **Data Notes:** Cannot get Mean Hourly Wage for Fishers (and potentially deckhands). Could use Average Permit Value as a proxy but then not comparable to other occupations.

::: #6: Seasonality :::

- **Unit of Measure:** Mean number of months/year working that occupation
- **Data Source:** No data source found
- **Data Notes:** There is no current data source. One option may be to assign scores based on general industry knowledge.

::: #7: Dependency :::

An occupation would be scored higher where a large number of workers, or the smooth operation of a work environment, are highly dependent upon that one occupation being filled with a qualified worker (eg, machinist in a processing plant where if the equipment breaks, many workers are reliant on that machinist to get the operation running again).

- **Unit of Measure:** Degree of Dependency
- **Data Source:** No data source found
- **Data Notes:** There is no current data source. One option may be to assign scores based on general industry knowledge.

::: #8: Cross-cutting Skillset :::

An occupation where the required set of skills is highly transferable to other occupations within the FSM sectors or to other sectors will be scored higher than an occupation without transferable skills.

- **Unit of Measure:** Unknown
- **Data Source:** No data source found
- **Data Notes:** There is no current data source. One option may be to assign scores based on general industry knowledge.

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