



Washington State Ferries

Short-Term Strategies for Overtime Reduction

Executive Summary

The Joint Transportation Committee (JTC) issued a request for proposals in the summer of 2021 to identify short-term strategies to reduce Washington State Ferries' (WSF) use of overtime (December 2021) and develop a full workforce plan (December 2022). This report fulfills the first of those requirements.

Short-Term Overtime Cost Savings Report

Overtime costs consistently increased between Fiscal Year 2013 and Fiscal Year 2019, from \$5.4 to \$11.3 million in nominal value (or between \$8.1 and \$12.1 million in dollars adjusted for inflation using the Seattle-Tacoma-Bellevue area's November 2021 consumer price index). Overtime dipped in Fiscal Year 2020 due to the considerable reduction in the sailing schedule in the early months of Covid-19. However, it rebounded almost to pre-pandemic levels in Fiscal Year 2021 despite extending the winter sailing schedule on several routes.

OT Expenditures FY2013-FY2021

(in constant dollars, base year: Nov. 2021)

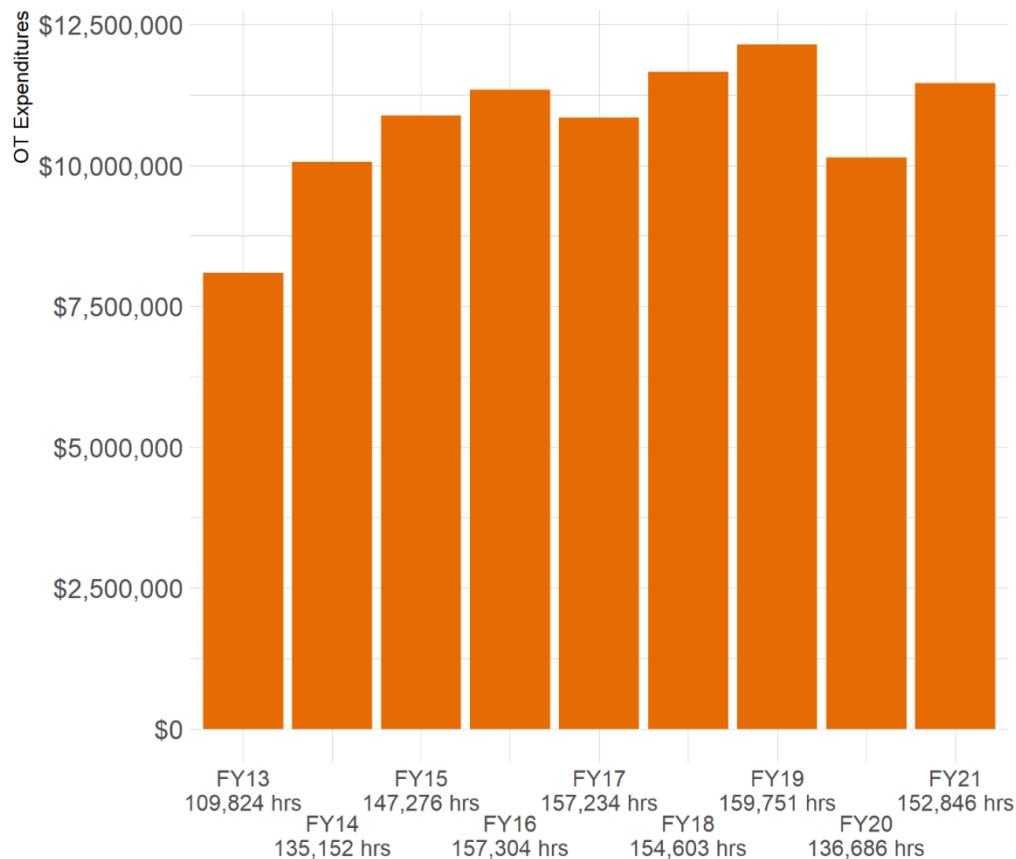


Figure 1. WSF Overtime Expenditures, FY13 to FY21

At the same time, the number of cancellations overall due to inadequate crewing rose sharply, indicating that there are too few crew members available to crew scheduled sailing.

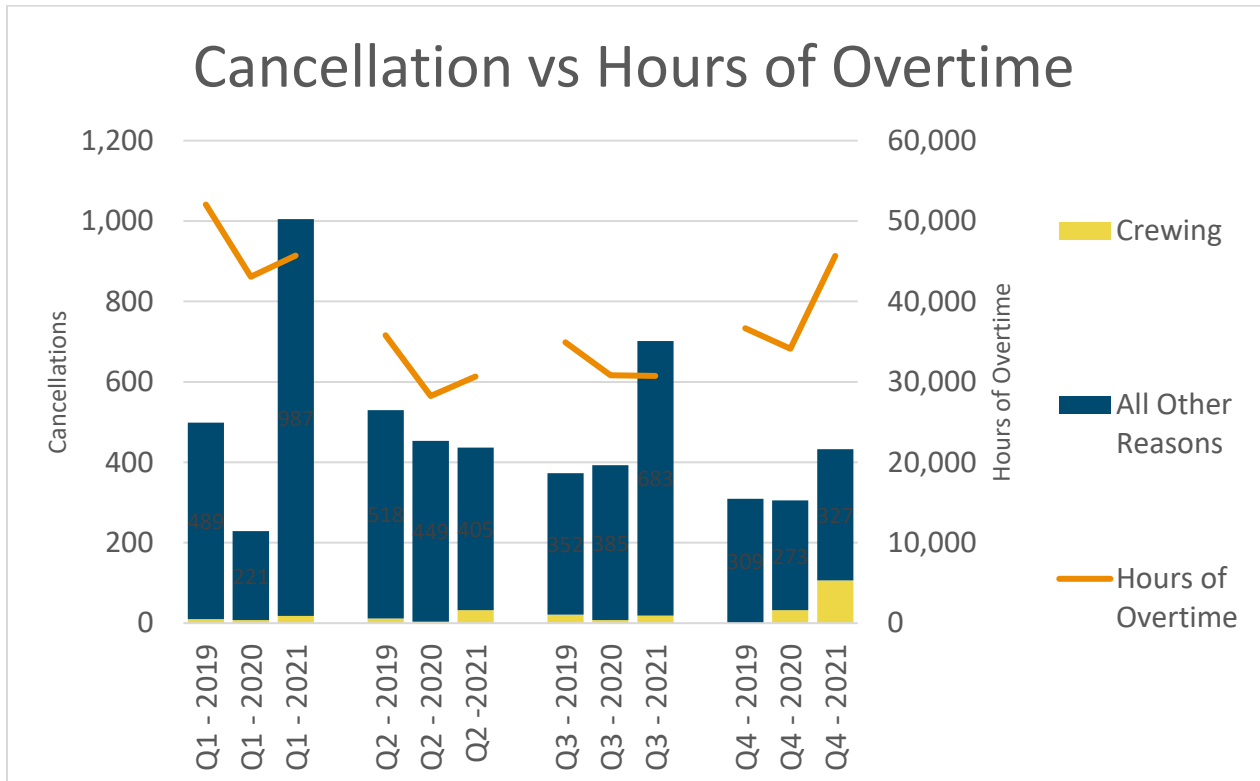


Figure 2. WSF Cancellations vs Hours of Overtime by Quarter, FY19 to FY21

Changing Conditions

The Legislature enacted the requirement for a report on short-term overtime savings strategies in May of 2021. Ferry staffing has changed dramatically in the intervening seven months. Impacts of the Covid-19 pandemic got worse instead of better, exacerbating challenges from long-simmering staffing issues and a tight labor market. These challenges have forced WSF to take the unprecedented step of system-wide service reductions.

Accordingly, the most pressing issue facing WSF as of this writing is restoring baseline service as soon as practicable. Because of the staffing restraints, that restoration will require overtime. This means the overtime cost reduction strategies contemplated in the Legislature's proviso cannot be evaluated, let alone implemented, until WSF can restore reliable service on the regular schedule.

Although the current climate leaves us unable to recommend **short-term** overtime reduction strategies, we have been focusing on the overtime issue as part of the system-wide evaluation and recommendations due in December 2022. This report includes findings on systemic overtime issues that will be addressed in the December 2022 report.

Successful strategies, both short and long term, will enhance WSF's resiliency which is the capacity to absorb, adapt, and recover from shocks and maintain equitable access during shocks. These strategies will

likely recommend additional investment in the ferry system. Still, they will evaluate and balance WSF's need to operate efficiently with its role as critical transportation infrastructure, providing reliable service in the face of changing conditions and serving as a significant employer in the Washington maritime industry.

Summary of Findings

The project team undertook an analysis of WSF human resources, payroll, and service data and completed a series of interviews and focus groups with WSF crew and staff to provide additional insight into the quantitative analysis. The primary findings are:

- There is no buffer to cover unscheduled absences, both typical, pre-pandemic sick and disability leave and the more acute Covid-19 related leave.
- All Deck and Engine crew are hired as on-call Ordinary Sailors or Oilers. The volatile hours and pay make on-call positions unattractive to potential applicants and inaccessible to many.
- Operations seasonality means there is a sharp reduction in hours for on-call employees. The variable income is untenable for many, particularly as they are still expected to fill any shift on short notice.
- Employees remain in on-call positions until a permanent position opens, typically long after they have exited the probationary period, often years.
- The complex licensure and training requirements limit the supply of experienced crew (e.g., Captains, Mates, and Engineers)

The report presents a preliminary crewing model that quantifies the number of employees in each division (Unlicensed and Licensed Deck, Engine, Terminals, and Eagle Harbor) that would cover all schedule sailings and earned time off minimizing staffing overtime costs. Estimates of minimum crew indicate that all crew positions are understaffed for the low seasons except Captains when relief staff is included. However, more permanent Captain positions are needed to meet minimum sailing when the additional demands are factored in. **No positions are adequately staffed to cover training and administrative duties or provide the coverage needed for critical transportation infrastructure.** There is a critical shortage of Engine Room crew, which is required around the clock for all vessels.

The project team will more fully develop this model in the coming year, relying on a framework that balances cost efficiency, service reliability, and resiliency. In addition, the project team will work with the Working Group to develop a comprehensive work plan based on the following analysis of administrative data, additional analysis as needed, and a comprehensive set of interviews with the WSF crew and staff.

While the short-term horizon contemplated in the proviso, i.e., recommendations that can be implemented before the full report in December 2022, has been overtaken by events, there are near-term steps available to set the stage for the long-term workforce plan. These are:

- Leverage local workforce development boards and workforce development organizations to reach new pools of applicants who are unaware of the opportunity for stable, meaningful employment at WSF.

- Redesign job posting wording and reach, emphasizing the potential for career advancement and skills development within WSF and avoiding gender- and racially-coded language and other language well-established to discourage nontraditional applicants.
- Fund TWIC, MMC, and other credentials required to apply to WSF to reduce barriers for low-income applicants
- Expand training to include swimming to expand the number of applicants
- Increase core crewing levels beyond USCG minimums.

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Acknowledgments

Many thanks to the WSF leadership and Human Resources, Budget, and Operations staff for supplying the necessary administrative data and supporting human resources and payroll data analysis. Thank you to the dispatch staff and vessel crew for sharing their insights. Finally, thank you to the Working Group (see Appendix G) for their feedback and insights.

Abbreviations

BIPOC	Black, Indigenous, and Other People of Color
CBA	Collective Bargaining Agreement
FTE	Full-Time Equivalent
JTC	Joint Transportation Committee
MITGS	Maritime Institute of Technology and Graduate Studies
MMC	Merchant Mariner Credential
TWIC	Transportation Worker Identification Credential
STCW	Standards of Training, Certification, and Watchkeeping for Seafarers
USCG	United States Coast Guard
WSDOT	Washington Department of Transportation
WSF	Washington State Ferries

Introduction

The Joint Transportation Committee (JTC) of the Washington State Legislature contracted with Seattle Jobs Initiative and two project partners, Segal, and Emsi Burning Glass, to develop a workforce plan for Washington State Ferries (WSF). This project has two phases: initial short-term strategies and a long-term workforce plan. To guide the recommendations and strategies, the project team adopted the following definitions of these timeframes:

- Short-term: strategies to improve existing workforce capacity to be implemented in 2022 before completing the complete workforce plan. WSF can implement these strategies with limited legislation changes and little or no changes to collective bargaining agreements.
- Long-term: strategies that are not constrained by existing workforce capacity. These strategies may require legislation and changes to collective bargaining agreements.

The following report is phase one, short-term strategies for reducing overtime use. The impetus is the rapid growth of WSF overtime use. Overtime hours requested by the Ferries to the Legislature have increased by 45%, from 109,687 hours in Fiscal Year 2013 to a peak of 159,285 hours in Fiscal Year 2019. As a result, the overtime budget requested also more than doubled between these years, reaching \$5.8 million in 2019.

This report builds on the work of two previous reports commissioned by the Legislature, examining how overtime had changed over the years and providing broad recommendations to address the issue but without a practical implementation plan. The first report, "Washington State Ferries Overtime Analysis" by KPFF Consulting Engineers and Progressions, quantified overtime change, categorizing use by occupation and issuing preliminary recommendations.¹ The second report, "Washington State Ferries Workforce Management Analysis" by the Consulting & Development Center of the University of Washington Foster School of Business, created a financial model to compare filling vacancies with only straight time versus overtime employees but did not establish how to use overtime optimally.² Both reports noted the need for a workforce development plan on which SJI and its partners are currently working.

Changing Conditions

Operating and labor market conditions have changed often and rapidly throughout the pandemic. Since the Legislature issued the proviso, changes in the national and regional labor market and regulations severely impacted the goal and roadmap of this report. First, the Covid-19 pandemic exacerbated pre-existing labor shortages in the maritime labor market³. An estimated 3.2 million workers nationwide left the labor market between 2019 and 2021, impacting every sector of the economy.⁴ Second, WSF was particularly hard hit by employees not complying with the state vaccine mandates. It lost 120 crew members or approximately 6% of its operational workforce. Not only is this nearly double the state employees' rate of 3.2%, but the losses were also concentrated in critical occupations: 20 oilers and 40 temporary assistant engineers left their positions.

The combination of these pressures has brought WSF to a crisis point. In the summer and fall of 2021, sailing cancellations rose sharply due to crew shortages.⁵ It became clear that overtime served as a

stopgap for chronic labor issues, and overtime alone was no longer enough to maintain service. As a result, the priority for this report has thus shifted from identifying short-term strategies to decrease overtime spending to providing the first step in identifying what is needed to put WSF on a path to a sustainable workforce.

Framework

In partnership with Segal and Emsi Burning Glass, Seattle Jobs Initiative conducted an in-depth quantitative analysis of WSF human resources and payroll data and staff and crew interviews. The aim was first to understand why overtime had grown over the years and second what could be done to reduce it (see Appendix A for detailed Methodology).

In keeping with the Washington Department of Transportation's goal to be an employer of choice,⁶ this work aims to allow WSF to:

- Provide reliable scheduled ferry service
- Increase workforce diversity
- Improve employee satisfaction
- Minimize avoidable costs

These priorities highlight the continuum and tradeoffs in balancing running cost control and resiliency. Resilient systems have the capacity that allows them to absorb or resist shocks, adapt to shocks, restore function to a pre-shock state, and maintain equitable access in the presence of shocks.⁷ To some extent, resiliency capacity is redundant under normal conditions. However, it is essential to maintain service or recover to regular service when the system is disrupted or stressed. The lack of such capacity leads to operations breakdown during or after periods of stress. Efficiency and resiliency are not either-or but exist on a continuum, and where along that continuum an organization exists should be guided by how likely a disturbance is and how much tolerance there is for service disruption or organizational failure.⁸



Figure 3. The Tradeoff between Efficiency and Resiliency

Report Structure

Using data from WSF payroll and Human Resources and Dispatch, this report shows how overtime has changed throughout the years, where WSF uses it most, and why WSF is using it. Building on the previous reports, this report categorizes overtime into three categories:

1. Overtime hours outside of WSF's control, for example, medical emergencies, inclement weather.
2. Cost-effective overtime hours, cases where it is less expensive to pay a regular employee overtime than backfill with a second, often relief employee at the same or higher rate.
3. Overtime hours that WSF could avoid with different crewing levels and practices.

The report presents a preliminary crewing model that quantifies the number of employees in each division (Unlicensed and Licensed Deck, Engine, Terminals, and Eagle Harbor) that would cover all schedule sailings and earned time off minimizing staffing overtime costs. The project team will more fully develop this model, relying on a framework that optimizes cost efficiency while maximizing service reliability and ensuring resilience. The report then suggests some short-term strategies to begin to reach those levels.

Still, given the underlying labor market conditions, even worthwhile strategies are unlikely to appreciably change overtime use or the underlying staffing issues in the coming year. Long-term strategies and their implementation will be discussed in a subsequent workforce plan in December 2022.

This report is organized as follows:

1. Washington State Ferries Background
2. National and Regional Maritime Labor Market
3. Overtime Use
4. Minimal Crewing Requirements
5. Changing Conditions
6. Conclusions and Recommendations
7. Next Steps in Project

1. Washington State Ferries Background

Washington State Ferries (WSF) is the largest operating public ferry system in the United States. Created in June 1951, it provides essential transportation services to 23.4 million customers annually in the Puget Sound area.⁹ Its 21-vessel fleet and 20 terminals support ten routes from Sidney, British Columbia to Point Defiance. WSF plays an essential role in the state economy, providing essential transportation to residents and tourists and freight and commercial vehicles.

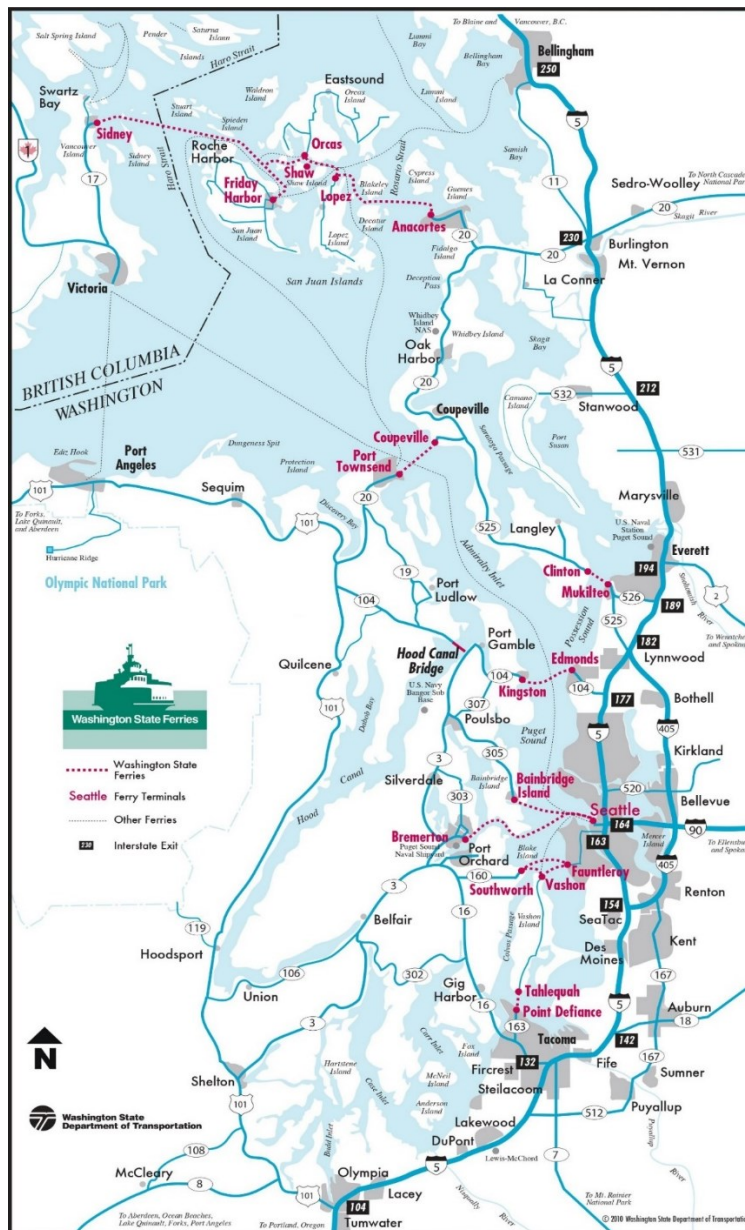


Figure 4. Washington State Ferries, Route Map, WSDOT, 2010

Workforce Overview

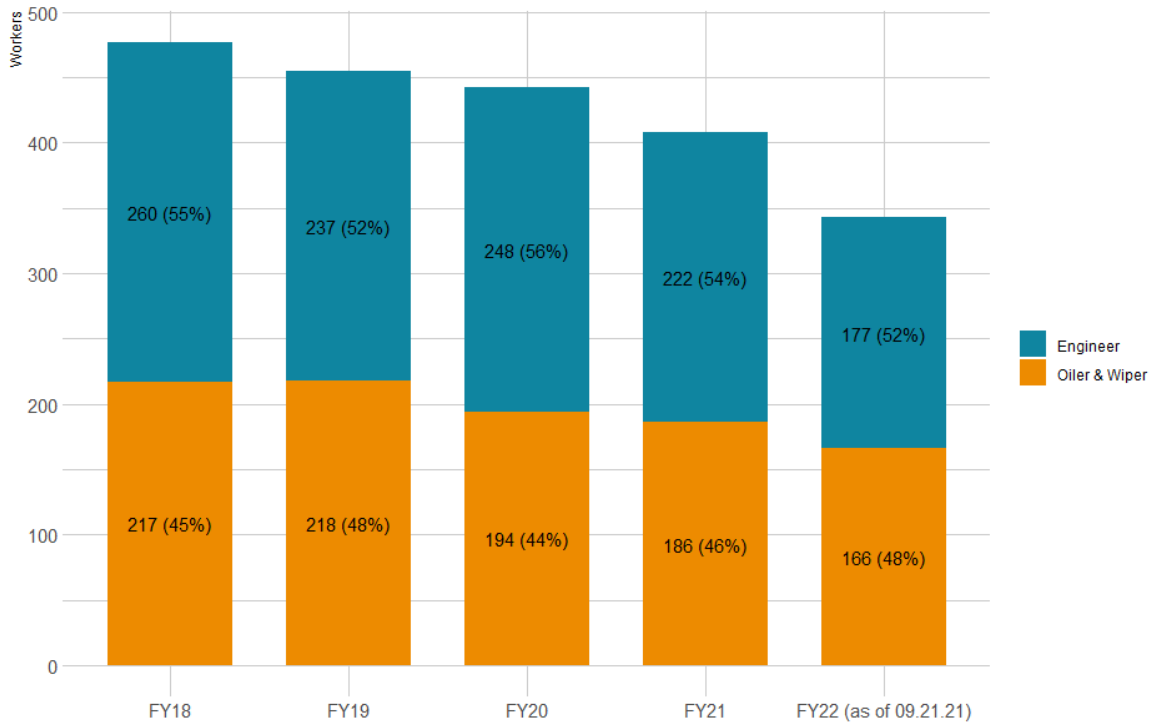
WSF is also a significant employer in the state, historically providing high-quality, desirable jobs in the state's maritime industry. The ferry system employs nearly 1,900 workers in various divisions, including administrative services and other professionals (see Appendix B). Operations employs the following number of workers in trade and technical occupations:

Table 1. Number of WSF Operational Employees by Category as of September 21, 2021, adjusted for workers who separated due to the vaccine mandate in October 2021

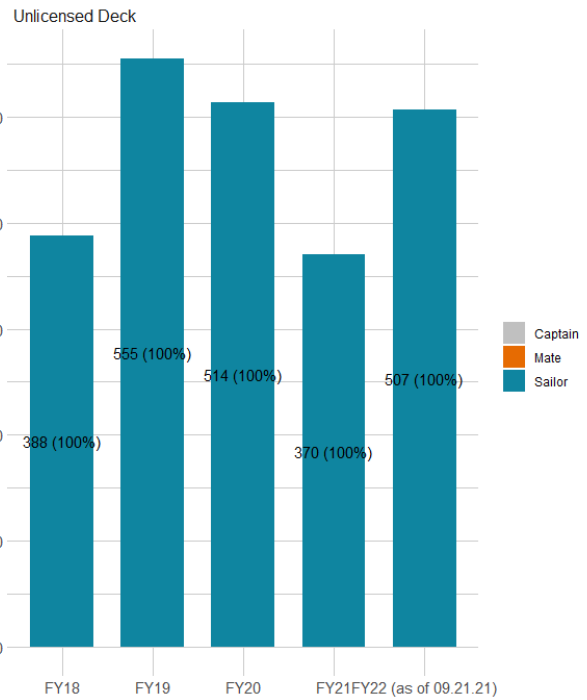
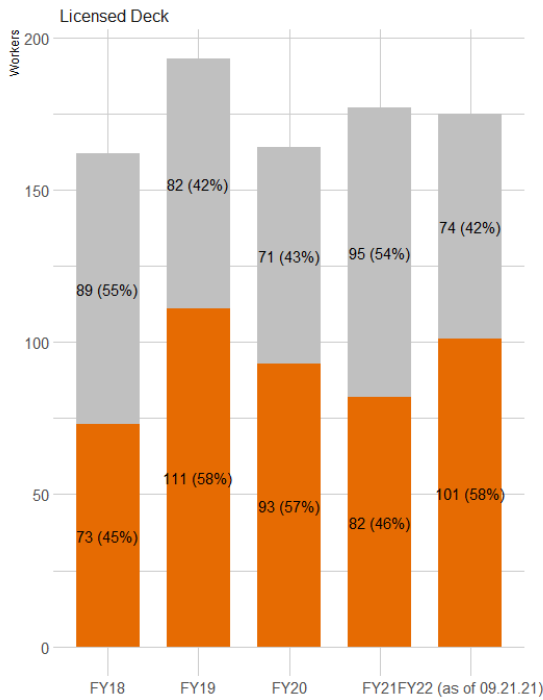
Division	Number of Employees (post-Covid vaccine mandate)
Licensed Deck	175
Unlicensed Deck	507
Engine	343
Terminal	357
Eagle Harbor (trades)	102
Total	1,484

These workers are represented by 16 unions and 13 collective bargaining agreements (see Appendix A). Because WSF relies on such a diverse workforce, the agency needs to adapt to changing conditions in multiple labor markets, facing a labor shortage in maritime and trades sectors. Across positions, recent workforce numbers have been declining since 2019.

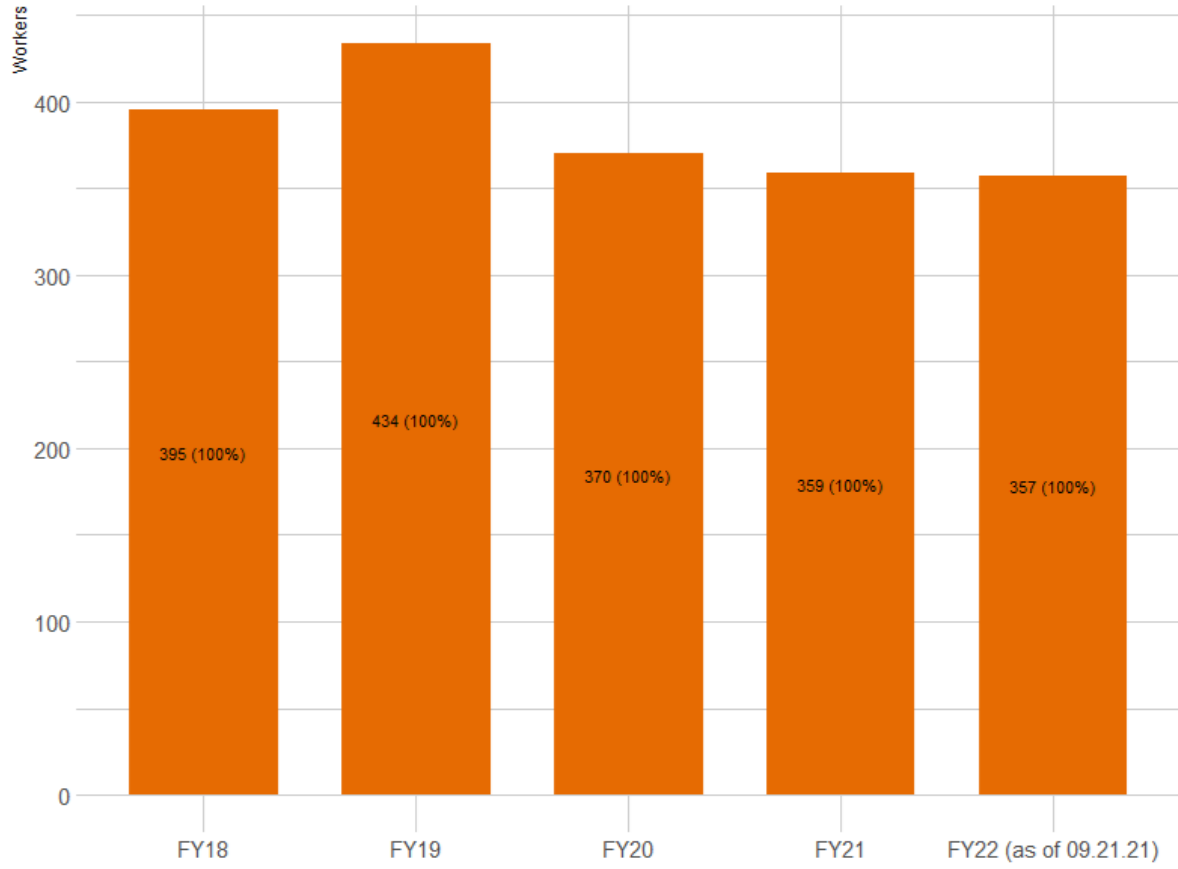
WSF Workforce FY2018-FY2022: Engine



WSF Workforce FY2018-FY2022: Deck



WSF Workforce FY2018-FY2022: Terminal Agents



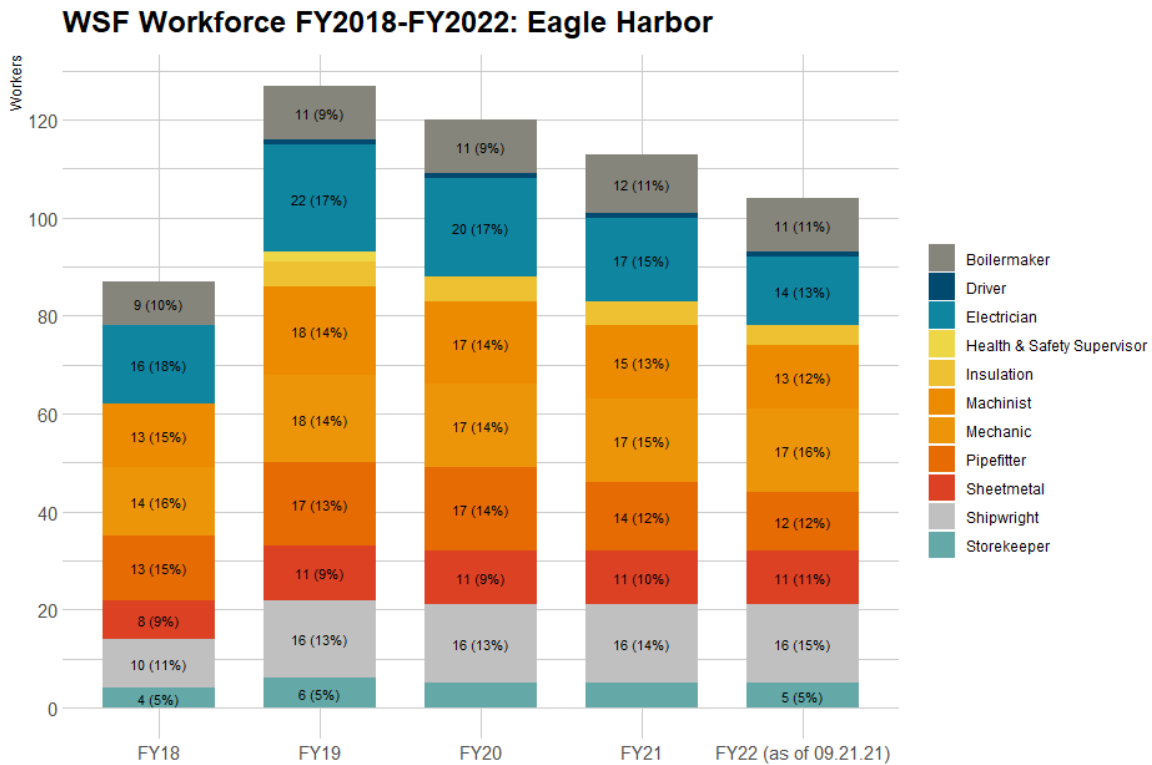


Figure 5. WSF Workforce by Category, FY18-FY22

Timeline

Over the last two-plus decades, several events have directly impacted WSF's current operating conditions (Figure 4). In 1999, Initiative 695 passed, eliminating the Washington state motor vehicle excise tax, slashing the state's transportation funding. This revenue loss cut 22% of the WSF operating funds and 100% of the capital budget. The immediate impact was the cancel plans to expand service and cancel orders for new ferries.¹⁰

In 2007, four aging ferries were retired, leaving WSF with little buffer. These vessels have been replaced gradually over the last 14 years. Three new ferries came into service in 2010 and 2012 and four more between 2014 and 2018. However, this still leaves WSF three vessels short of the 24 that the WSF plans indicate they need to cover routes with adequate capacity to cycle ferries out for routine maintenance and cover for unplanned repairs on the ferries more than 40 years old (came into service before 1982).¹¹

In 2010-2011, King 5 conducted an investigation prompting the Legislature to pass and the governor to sign House Bill 1516.¹² The legislation aimed to improve ferry management and internal controls and address the apparent misuse of overtime, special assignments, and travel pay with an estimated \$10 million in savings.¹³ However, the loss of key benefits, particularly travel pay, has affected WSF's ability to crew vessels.

In 2012, WSF implemented a new reservation.¹⁴ While this was a system improvement, it changed ridership patterns in conjunction with an upward trend in ridership. Time at dock increased across the schedule as riders were nudged toward previously low-demand routes when Captains had previously been able to make up time and get back on schedule when running behind. Individually, these delays are small, but they have increased, and they accumulate over the course of the day, making it increasingly difficult to maintain the schedule.

In 2012-2013, the US Coast Guard reassessed crewing requirements, changing them twice during the period, concluding with an increase in crewing. If the WSF does not meet USCG crewing requirements, it cannot legally sail. The revised crewing requirements:

- Eliminate the projected savings from HB-1516, and
- Eliminate crewing redundancy. Before the increase in crewing requirements, WSF scheduled one extra standby person per shift to fill in for a last-minute absence, thereby increasing resiliency.

In 2017, there were a series of unplanned mechanical failures and repairs that took longer than estimated on four vessels. Because there were not enough vessels in reserve, there were a historic number of cancellations in the first quarters of Fiscal Year 2018.¹⁵

In 2018, Governor Inslee issued Executive Order 18-01, requiring ferries to slow to save fuel.¹⁶ Captains had increased speeds over the preceding years in response to the tightening of the schedule thanks to the change in ridership patterns and increasing ridership that started with the reservation system implementation. Fuel use was at an all-time high but the time savings from the high speeds were minimal. However, it highlighted the challenge of keeping the schedule over the course of a day, particularly on multi-stop routes like the San Juan Islands.

Finally, the Covid-19 pandemic severely disrupted service in 2020 and 2021. Crewing was substantially disrupted by illness and quarantining exposed employees. Governor Inslee required that all employees of executive agencies be vaccinated for Covid-19 by October 18, 2021, to halt the spread of Covid-19, minimize further disruption in state services, and protect critical infrastructure.¹⁷ WSF crews were particularly vocal in opposition to the mandate and 132 separated from WSF on October 18, 2021 due to noncompliance with the mandate.

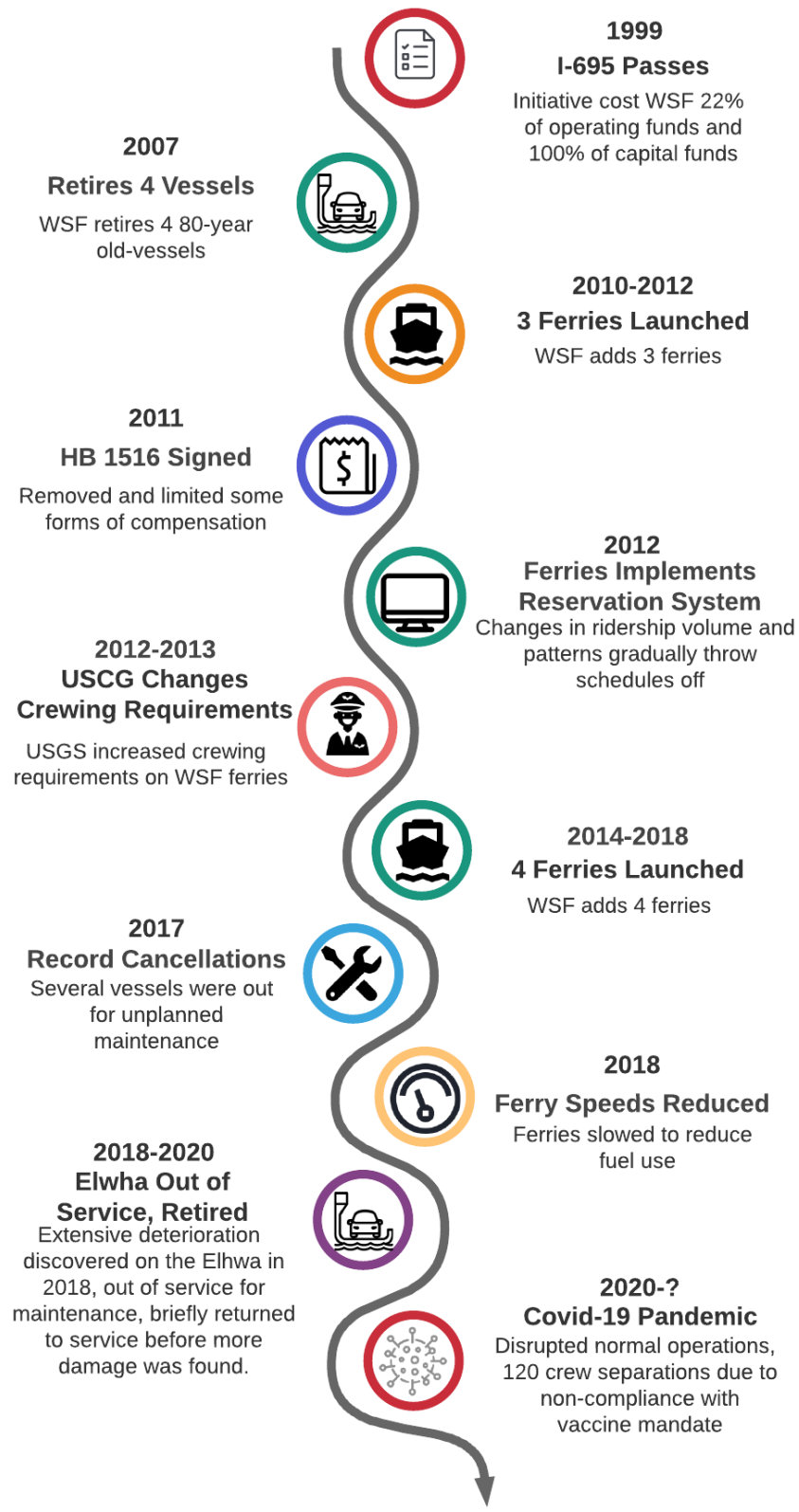


Figure 6. Timeline of Key Events

2. National and Regional Maritime Labor Market

The national maritime labor market is very cyclical, with demand for sailors, oilers, captains, and mates increasing as the demand for oil and goods increases. The widely reported supply chain issues were, in part, due to labor shortages, including mariner shortages. This shortage extends well beyond the US. However, everything from large container ships, fishing vessels, and supply vessels for offshore oil and offshore wind projects are competition for US mariners. As the economy continues to recover from the Covid-19 pandemic, the demand for them will also increase. In the next ten years, the Bureau of Labor Statistics projects the demand for water transportation workers will increase by 12%.¹⁸ However, the Employment Security Department projects Washington state's water transportation employment will contract by 6% in the next decade (Table 2).¹⁹

Table 2. Labor Demand for Water Transportation Workers In Washington and the US. 2019-2030 ^{18,19}

Occupational Title	Washington			US		
	Employment 2019	Projected 2029	Percent Change	Employment 2020	Projected 2030	Percent Change
Water transportation	4,914	4,596	-6%	66,600	74,400	12%
Sailors & marine oilers	2,173	2,075	-5%	26,400	29,200	10%
Captains, mates, & pilots	1,731	1,584	-8%	29,900	33,900	13%
Ship engineers	935	860	-8%	7,800	8,400	8%

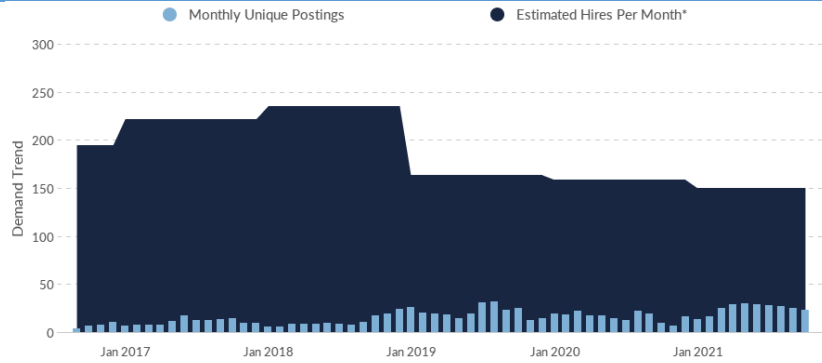
The maritime labor pool is regional, if not national or international. Washington state employers compete with employers in other Pacific Coast states (Alaska, Oregon, California, and Hawaii) and, to a lesser extent, employers on the East and Gulf Coasts and beyond. The decline in water transportation employment in Washington state does not necessarily indicate that an employers' labor market is on the horizon.

The national trends of an industry growing faster than the economy overall indicate that Washington state employers, including WSF, may struggle to compete with employers elsewhere for qualified talent and the state may lose competitive advantages in the maritime industry. As we can see with the increase in posting relative to hires in Washington state and especially in Pacific Coast state, employers must make more effort to hire at all levels with the shortage of engineers being particularly acute (Figure 5).

In addition to the decline in projected employment, the maritime industry in Washington is facing an aging workforce. Compared to the US and the other Pacific Coast states, the Washington maritime workers are older and closer to retirement. Both the Unlicensed Deck (Sailors and Marine Oilers)* and Marine Engineers are at high risk of losing a large share of experienced workers eligible for retirement (Figure 6).

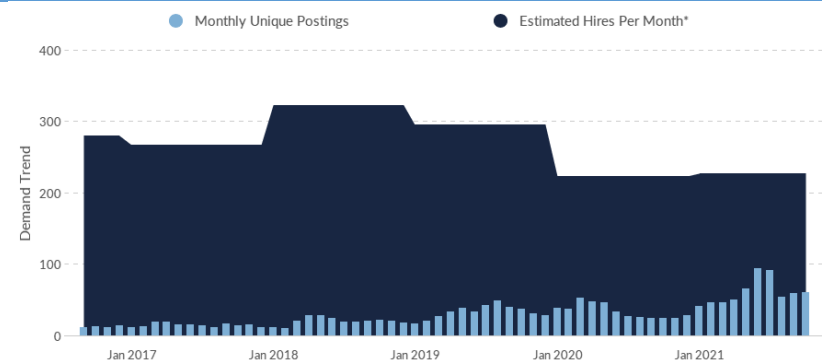
* The US Bureau of Labor Statistics uses Standard Occupation Codes (SOC), which group together sailors and oilers.

Washington State

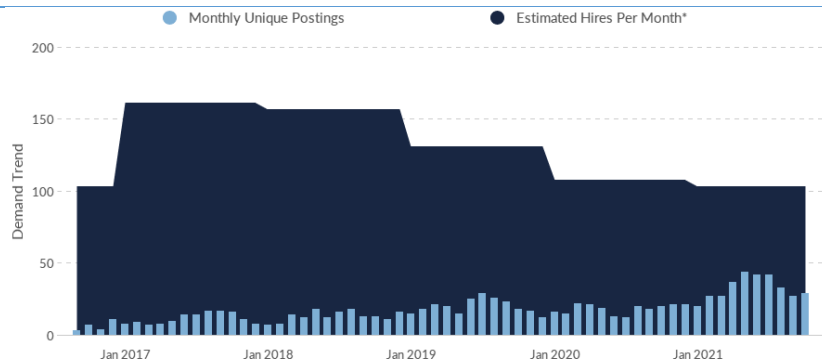


Occupation	Avg Monthly Postings (Nov 2020 - Oct 2021)	Avg Monthly Hires (Nov 2020 - Oct 2021)
Sailors and Marine Oilers	22	151

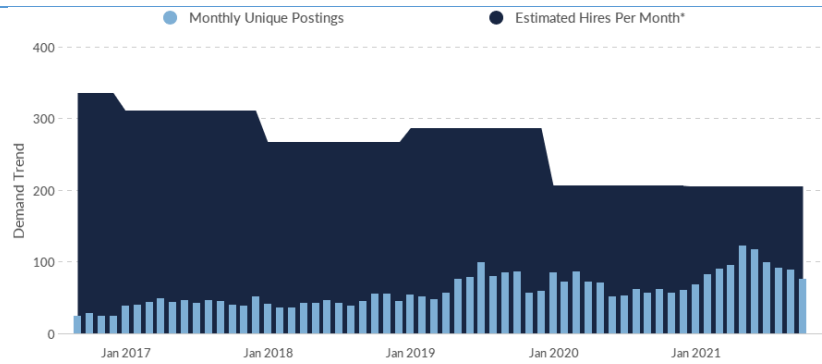
Pacific Coast States



Occupation	Avg Monthly Postings (Nov 2020 - Oct 2021)	Avg Monthly Hires (Nov 2020 - Oct 2021)
Sailors and Marine Oilers	55	226



Occupation	Avg Monthly Postings (Nov 2020 - Oct 2021)	Avg Monthly Hires (Nov 2020 - Oct 2021)
Captains, Mates, and Pilots of Water Vessels	31	104



Occupation	Avg Monthly Postings (Nov 2020 - Oct 2021)	Avg Monthly Hires (Nov 2020 - Oct 2021)
Captains, Mates, and Pilots of Water Vessels	88	205

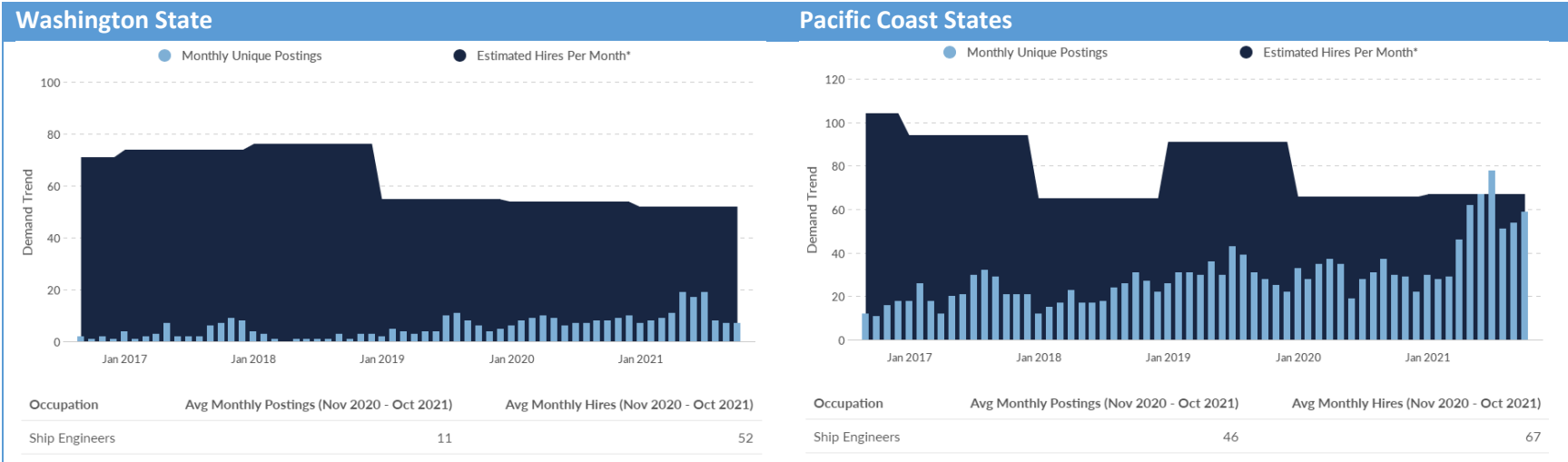


Figure 7. Job Postings vs. Hires for Mariners in Washington State and the Other Pacific Coast States, January 2017-October 2021

Washington State

Rest of the Pacific Coast (Alaska, Oregon, California, & Hawaii)

Unlicensed Deck - 53-5011 Sailors and Marine Oilers

Retirement Risk Is High, While Overall Diversity Is About Average



Retirement Risk Is About Average, While Overall Diversity Is High



Licensed Deck - 53-5021 Captains, Mates, and Pilots of Water Vessels

Retirement Risk Is About Average, While Overall Diversity Is About Average



Retirement Risk Is About Average, While Overall Diversity Is High



Engine - 53-5031 Ship Engineers

Retirement Risk Is High, While Overall Diversity Is Low



Retirement Risk Is Low, While Overall Diversity Is High



Figure 8. Retirement Risk & Racial Diversity of the Maritime Workforce in Washington State & Other Pacific Coast States

Washington's maritime labor force lack of diversity. At all levels, from Ordinary Sailors to Captains, Washington state's labor force is notable less racially diverse than both the maritime industry in US overall and the rest Pacific Coast. The diversity of the Pacific Coast maritime industry is undoubtedly due in part to the high proportion of Black, Indigenous, and Other People of Color (BIPOC) in the military, the Navy being a significant employer in Pacific Coast states. It also indicates an opportunity for Washington maritime in general and WSF in particular. BIPOC workers are represented in the regional maritime workforce, but BIPOC communities are untapped in Washington state. Navy veterans are particularly promising for recruitment.

3. Overtime Use

Between FY2013 and FY2021

WSF overtime increased significantly between Fiscal Year 2013 and Fiscal Year 2021. The resulting increase in overtime expenditure is due to a simultaneous increase in overtime hours (extensive margin) and hourly overtime rate (intensive margin). For example, overtime hours grew by 45% between FY2013 (109,687 hours) and FY2019 (159,459 hours). Similarly, nominal overtime hourly rate consistently increased for all occupations, particularly for Licensed Deck (Captains and Mates) (+52% in the past eight years), while growth was most moderate for Terminal Agents (+36.6% between FY2013 and FY2021).

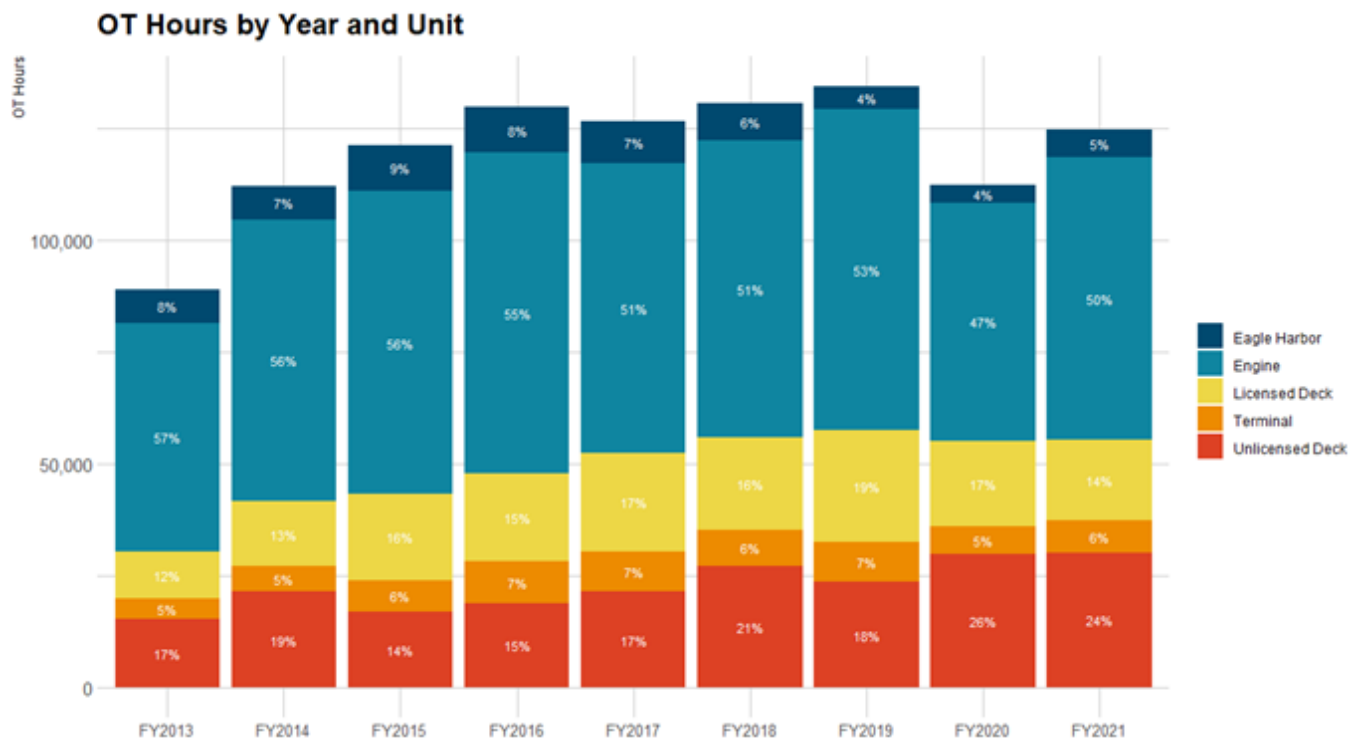


Figure 9. WSF Overtime Hours by Year and Unit, FY13 to FY21

However, despite the yearly increase in hourly rates provisioned in collective bargaining agreements to keep up with the cost of living and reward seniority, hourly overtime rates adjusted for inflation have failed to keep up with inflation, except for Engineers and Captains/Mates. Improving remuneration to match changes in the cost of living will help attract recruits in the competitive maritime labor market.

OT Hourly Rate by Year and Unit

(in constant dollars, base year: Nov 2021)

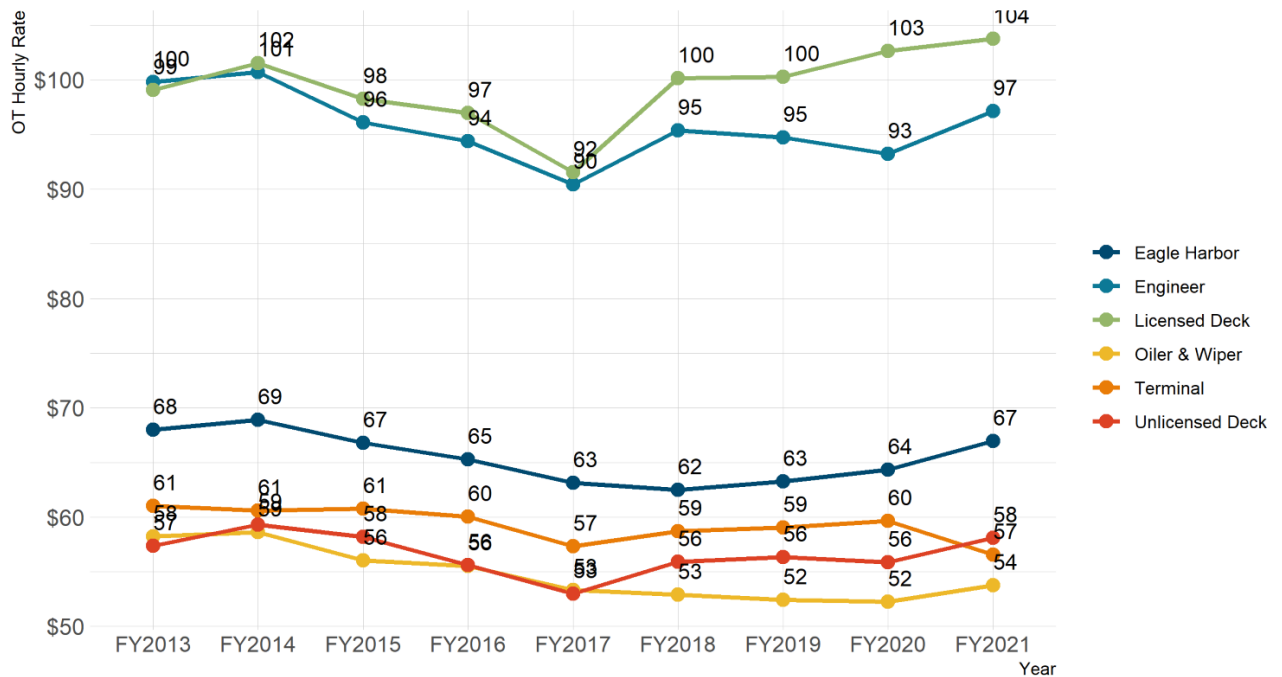


Figure 10. WSF Hourly Overtime Rates Adjusted for Inflation, FY 13-FY21

The combination of increased hours and increased rate caused overtime expenditures to double during that period, growing by \$5.8 million and reaching a peak of more than \$11 million in FY2019. Expenditures grew for all occupations but are by far the largest for Engine Room occupations (48% of overtime expenditures in FY2019). However, Unlicensed and Licensed Deck have been consistently increasing overtime expenses since the beginning of the study period: in FY2013, they accounted for 12% and 15% of total overtime expenses, respectively, which grew to 14% and 25% in FY2019.

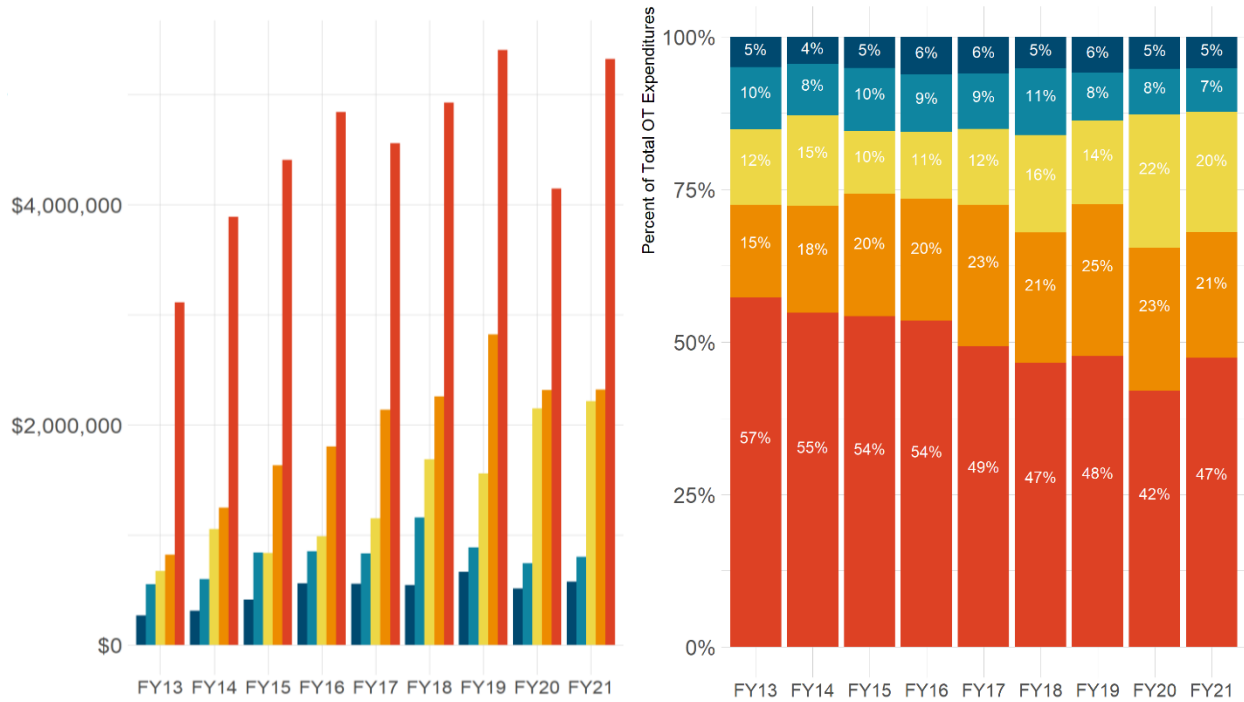


Figure 11. Overtime Expenses by Year and Unit

The two occupation categories with the largest overtime use and expenses are Engine Room (Maritime Engineers and Oilers) and Licensed Deck (Captains and Mates). In FY2019, Maritime Engineers accounted for 33% of WSF overtime expenses while Oilers used up 14% of expenses, meaning that 47% of overtime expenses were due to Engine Room that year. Licensed Deck accounted for 25% of overtime expenditures in FY2019 (Captains – 14%, Mates - 11%). Ordinary and Able Sailors (13% for Unlicensed Deck). Other occupations, most of which are in the Terminal and the trades working at or out of Eagle Harbor, represent a marginal share of WSF overtime expenditures (see Appendix D for descriptions of occupations)

The large amount of overtime observed in the Engine Room and Licensed Deck indicates there are not enough workers to fulfill these roles. This is consistent with the economy-wide labor shortage of licensed mariners detailed above. In addition, WSF hiring practices are vulnerable to shortages because they hire all vessel crew into the WSF entry-level[†] positions (Ordinary Sailors (OS) and Oilers). All new employees, regardless of qualification and work experience (see Appendix D), must work as an on-call OS or Oiler until they have earned enough seniority to bid on a permanent position. As a result, there is no easy way to rapidly expand the number of Mates, Captains, and Engineers as direct hire of experienced employees is not allowed by the collective bargaining agreements.

This rule was implemented to guarantee regular promotions to current employees. However, the long process to obtain required certifications to become an Engineer or a Captain, combined with the maritime labor shortage and high attrition rate of on-call employees due to the unpredictable schedule and pay,

[†] Oiler is not an entry level because it requires sea time and USCG-approved examination. However, it is the lowest level position WSF hires for the Engine Room. The standard entry-level position for the engine room in the maritime industry is Wiper.

result in a small pool of internal qualified candidates. As WSF has trouble hiring and retaining new qualified talents, the current crew in these occupations must work long hours to maintain service. Therefore, strategies to reduce overtime described in the following sections will focus on expanding recruitment for Engine and Deck workers.

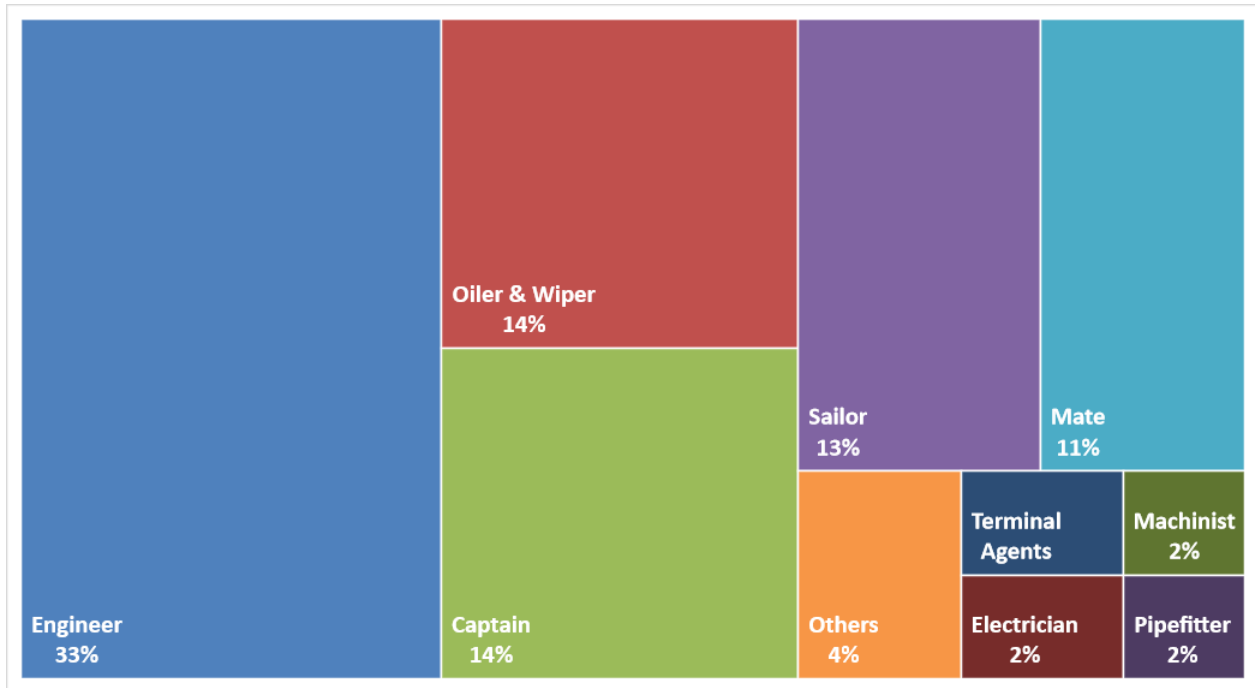


Figure 12. Overtime Expenditures in Fiscal Year 2019 by Job Title

Impact of the Covid-19 Pandemic

Ferry Ridership

The Covid-19 pandemic severely impacted Washington State Ferries like any other transportation service provider. Remote work, the decline in business activities, and stay-at-home mandates curtailed business and recreational users' need to travel around Puget Sound. This resulted in a significant drop in ridership for all routes between 2019 and 2020. The most significant decline was observed for the Seattle-Bremerton route, whose ridership contracted by 91% between the end of March 2019 and March 2020. In 2021, all routes still exhibit a decline in ridership compared to 2019, with the notable exception of the Interisland, Port-Townsend-Coupeville, and Point-Defiance-Tahlequah routes, for which ridership at times increased beyond 2019 levels.²⁰

Training & Hiring

However, the pandemic had other effects, notably in the labor market and training institutions, that indirectly impacted WSF. First, despite the record-high yet short-lived unemployment rates observed at the height of the pandemic in Q2-Q3 2020, employers ramped up hirings in 2021 to compensate for recruitment freezes that occurred in 2020. Yet, workers are hard to come by. While open jobs reached 10.4 million nationwide in August, 4.3 million workers left their jobs that same month, the highest in the

past two decades. There were more vacancies in August than unemployed workers. Attempts to attract workers by increasing wages were unsuccessful, and the labor force shrank in September. New variants and lack of dependent care (daycare, schools, etc.) continue to make in-person jobs inaccessible to many people.

Staff Availability and Attrition

In addition to the impact on hiring, Covid-19 had two direct effects on existing staff. First, crew members were out sick with Covid-19. They also had difficulties stemming from the lack of dependent care and some were concerned about exposure on the job. To that end, when one crew member tested positive for Covid-19, other crew members that had worked within the defined period before testing positive would have to quarantine. This was particularly problematic in the Engine Room because all the other members of the Engine Room on that shift would also have to quarantine, taking up to three additional employees in high demand out of their regular work schedule.

In light of the impact of Covid-19 on state operations and to minimize the spread, Governor Jay Inslee mandated that all employees of state agencies be fully vaccinated by October 18, 2021 or have an approved exemption. Also, according to state mandate, employees were allocated additional sick days to recover from receiving the vaccination. Despite this and the impact of exposure on crewing, WSF crews, especially Engine Room crew, were particularly vocal about their opposition to the mandate. At the close of the first quarter of Fiscal Year 2022, 120 employees separated from WSF employees due to non-compliance with the mandate, and an additional 46 retired. More employees have separated from WSF in the first quarter of FY2022 than have separated each of the last three years. The separations were heavily concentrated in the Engine Room, with Engine Room employees accounting for 55% of the non-compliance separations and 43% of all separations in the first quarter.

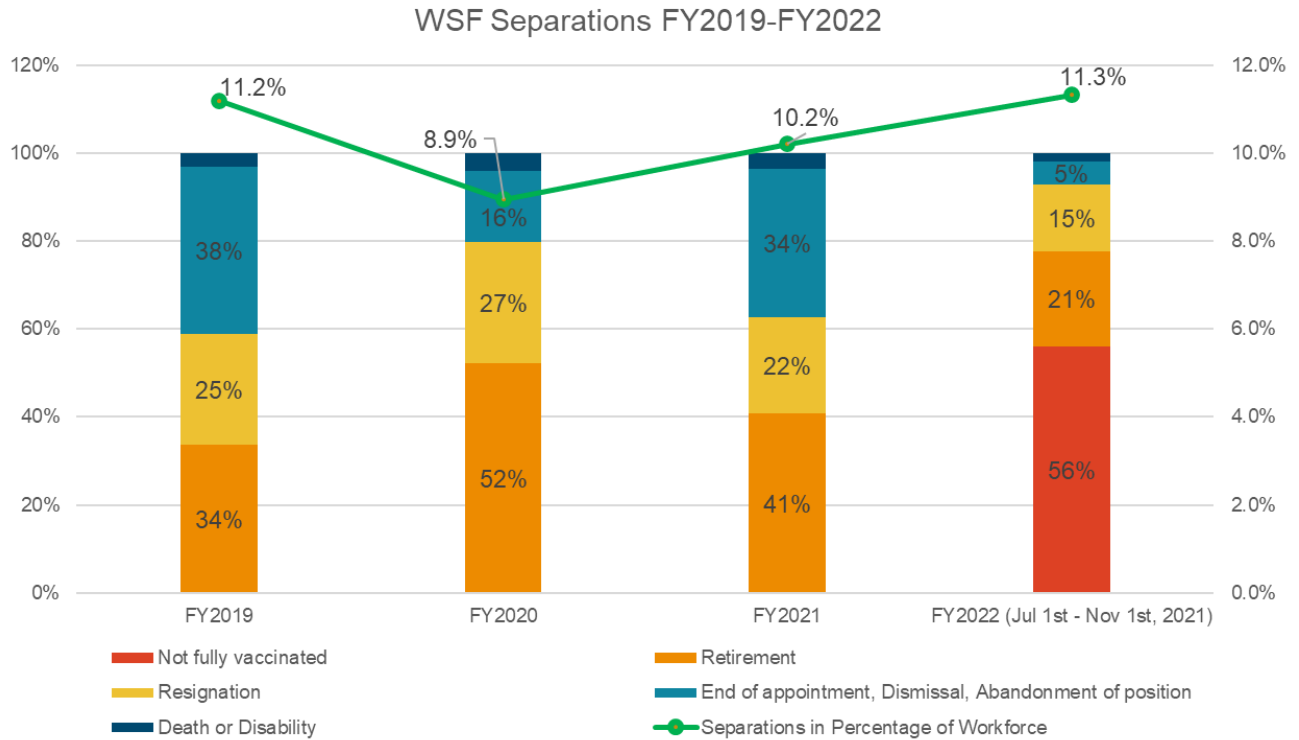


Figure 13. WSF Separations, Fiscal Year 2019-First Quarter Fiscal Year 2022

Cancellations

The drop in ridership and lack of qualified workers, combined with decreased vessel availability due to regular and deferred vessel maintenance in a small reserve fleet,¹¹ made it impossible to maintain services at their regular level. Since vessels can only sail with the required crewing level set by the United States Coast Guards (USCG), a worker shortage will directly impact the ability to meet these requirements. This resulted in a spike in trip cancellations throughout 2021 compared to the two previous years. Cancellations grew gradually during the year, to reach a peak in October where 559 cancellations occurred.²¹ Disruptions due to lack of qualified crew have also been more frequent, increasing from 6% of cancellations in March 2021 to 67% in September.²¹ To minimize disruptions for riders, WSF adopted a temporarily reduced sailing schedule, which entailed removing one vessel from each route and reassigning crews previously assigned to non-operating vessels to other vessels.

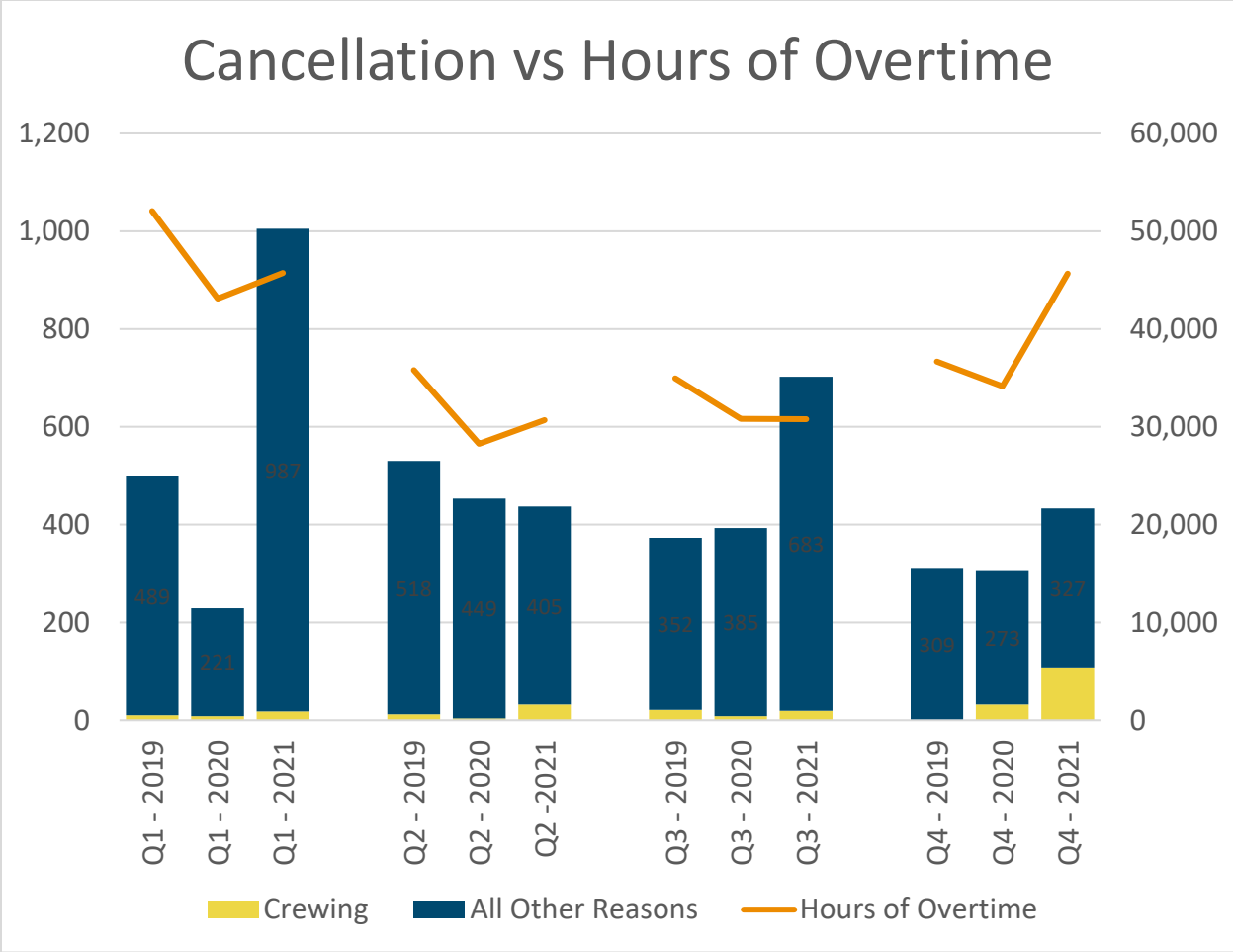


Figure 14. Cancellations by Quarter vs. Overtime and Reason, 2019-2021

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Overtime Categories

The main goal of the first deliverable from this project was to identify short-term strategies to reduce overtime use at WSF. Identifying the most effective strategies requires understanding the root causes of the problem and why WSF must resort to overtime. Combined analysis of payroll and dispatch data from WSF provides necessary insights. This data reported when overtime was used and why as different overtime codes and pay reasons are recorded depending on the situation. For example, suppose overtime was incurred because a medical emergency happened onboard. In that case, workers who were delayed because of this situation and paid overtime were recorded in the dataset with a specific code indicating medical emergencies. Similarly, when a worker receives training on overtime, payroll will record these hours with an overtime code indicating training. These detailed payment codes made it possible to categorize overtime in three sections.

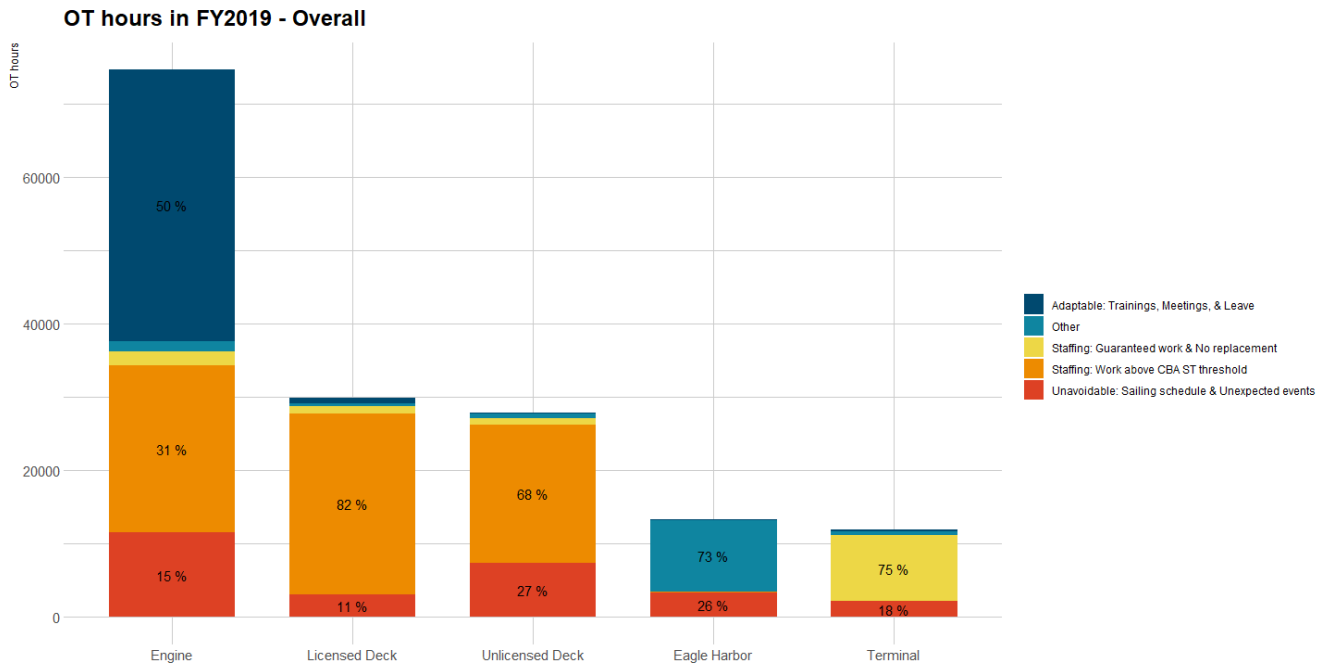


Figure 15. Categories of Overtime Hours

- Unavoidable overtime: overtime hours that can be difficult or even impossible to predict and which would require significant investments to eliminate. This category includes overtime hours incurred because of medical emergencies onboard, inclement weather, or when working during a time changeover from Pacific Daylight-Saving Time to Pacific Standard Time (as provisioned in some collective bargaining agreements).
- Adaptable (cost-effective) overtime: overtime hours could be reduced by reorganizing some internal events, such as administrative meetings, medical visits, or training. However, decreasing overtime in these categories is often cost-effective. Engine Room training, for example, often happens on overtime. The overtime rate for Engine Room crew is 1.5 their straight time rate. However, rotating a worker off-boat to complete their training on straight time requires backfilling that position with another worker also on straight time. Otherwise, the vessel cannot sail according to USCG regulations. Backfilling means the training time would effectively cost double or more depending on whether the position is filled with an on-call or relief employee.
- Overtime due to crew shortage: overtime hours incurred because of a lack of qualified crew members. Due to USCG requirements, vessels cannot sail when it is not fully crewed. Since WSF only has funding to crew vessels based on minimum crewing requirements, the vessel cannot sail

if one worker calls in sick or is delayed. To make scheduled sailings, dispatch fills these unplanned absences by going first through the list of on-call employees, then relief employees, and finally, when they have exhausted the first two lists, the list of employees who will be working overtime if they fill some or all of a shift or they may hold over crew members from the prior shift. These methods of backfilling positions prioritize minimizing overtime. Still, employees frequently reach the maximum number of straight time hours. Increasing permanent crew levels, expanding the relief pool, and improving the year-to-year retention rate of on-call employees would help ensure that vessels are adequately crewed and minimize using overtime to cover for missing workers.

Due to their large share of total overtime hours and expenses, strategies identified in this report will focus on overtime due to crew shortage and Engine Room training.



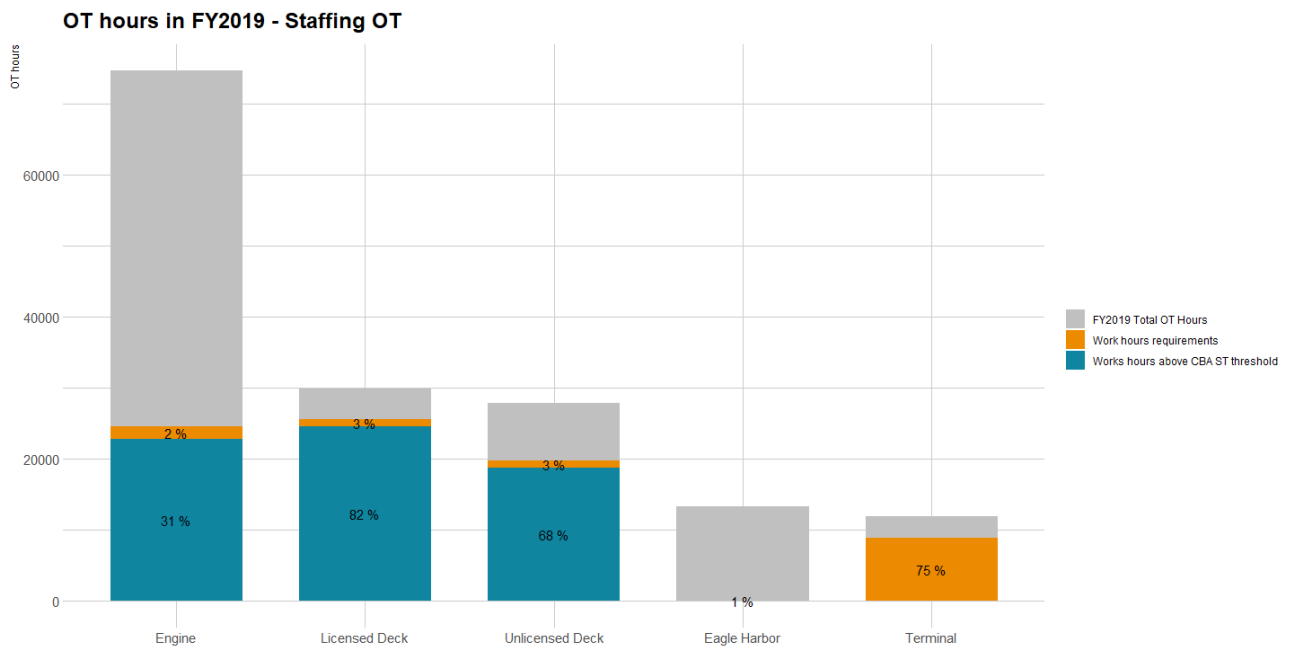
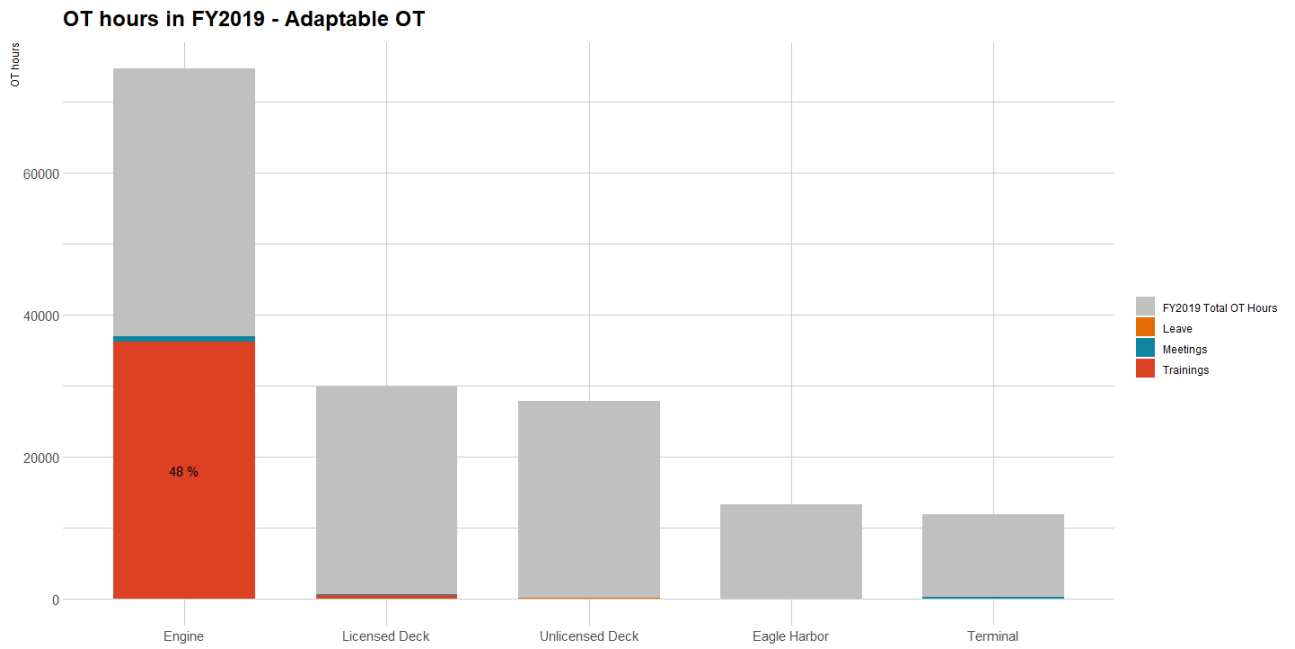


Figure 16. Categories of Overtime Hours by Unit

4. Minimum Crew Requirements

Most cancellations and overtime use can be attributed to low crew levels, particularly among the Engine Room and Deck crews. With 23.4 million customers annually and an average of more than 400 daily sailings, WSF needs a sizeable crew to ensure that all vessels abide by USCG regulations and have enough crewmembers to sail. The crew size needed to operate all vessels varies significantly throughout the year.

Winter is typically the calmest season as the cold weather curbs tourist activities in the Puget Sound area. All vessels must be crewed with at least a Maritime Engineer and an Assistant Maritime Engineer. Vessels in operations must have a Captain and a Chief Mate. To support these positions and depending on vessel class, USCG requirements also call for four to five Able-bodied Sailors, two to four Ordinary Sailors, one Oiler, one Wiper, and a Second Mate for a minority of boats (Appendix E).

This section presents the minimum number of full-time equivalent positions required to allow all scheduled sailings to occur. WSF sailing schedule data, which includes the vessel classes used for each route, is available alongside Deck and engine crew shift schedules. Additionally, linking vessel class to USCG requirements helps estimate how many employees of each position are required for each vessel to be allowed to operate. Multiplying the number of employees by their respective shift length and days worked gives the total weekly work hours needed per position. Since overtime is most prevalent for vessel-bound occupations (Licensed and Unlicensed Deck, and Engine), this section focuses on the following occupations: Captains, Mates, Ordinary and Able Sailors, Maritime Engineers, and Oilers and Wipers.

Deck crew shifts differ significantly from engine crew shifts. While Deck employees follow a typical 40 hours over seven day-workweek, engine employees work 12 hour-shifts every day for seven days on a week-on/week-off schedule. So, while the same deck crew could work two weeks in a row, this is not possible for the Engine crew as these crews must alternate every week. As a result, while the minimal crew level for Deck is the weekly required crew level, the minimal crew level for Engine will be twice the weekly required crew level.

Additionally, all workers are entitled to days off, including sick leave and paid time off. Administrative leave data provided by WSF was used to estimate the average weekly hours taken off by position (Captains, Mates, Ordinary and Able Sailor, Maritime Engineers, and Oilers and Wipers). The required weekly crew hours described earlier are then adjusted by this factor to take into account workers taking time off they are entitled to. The minimal crewing has not yet been adjusted to account for USCG or WSF required training or administrative duties, nor does it include a buffer that critical transportation infrastructure requires to allow it to absorb, adapt, and recover from shocks. The minimal crewing estimates are solely the FTE required to meet the sailing schedule.

This process is used for both winter and summer sailing schedules to estimate the required Deck Crewing level. In contrast, the Engine Room in all vessels must be fully crewed around the clock, whether the ships are sailing or not, per USCG requirements.

In the low season (winter), WSF needs the following to crew 18 vessels in operations and three vessels on standby:

Table 3. Minimum Crewing Estimates for Low Season and WSF Workforce dated September 21, 2021

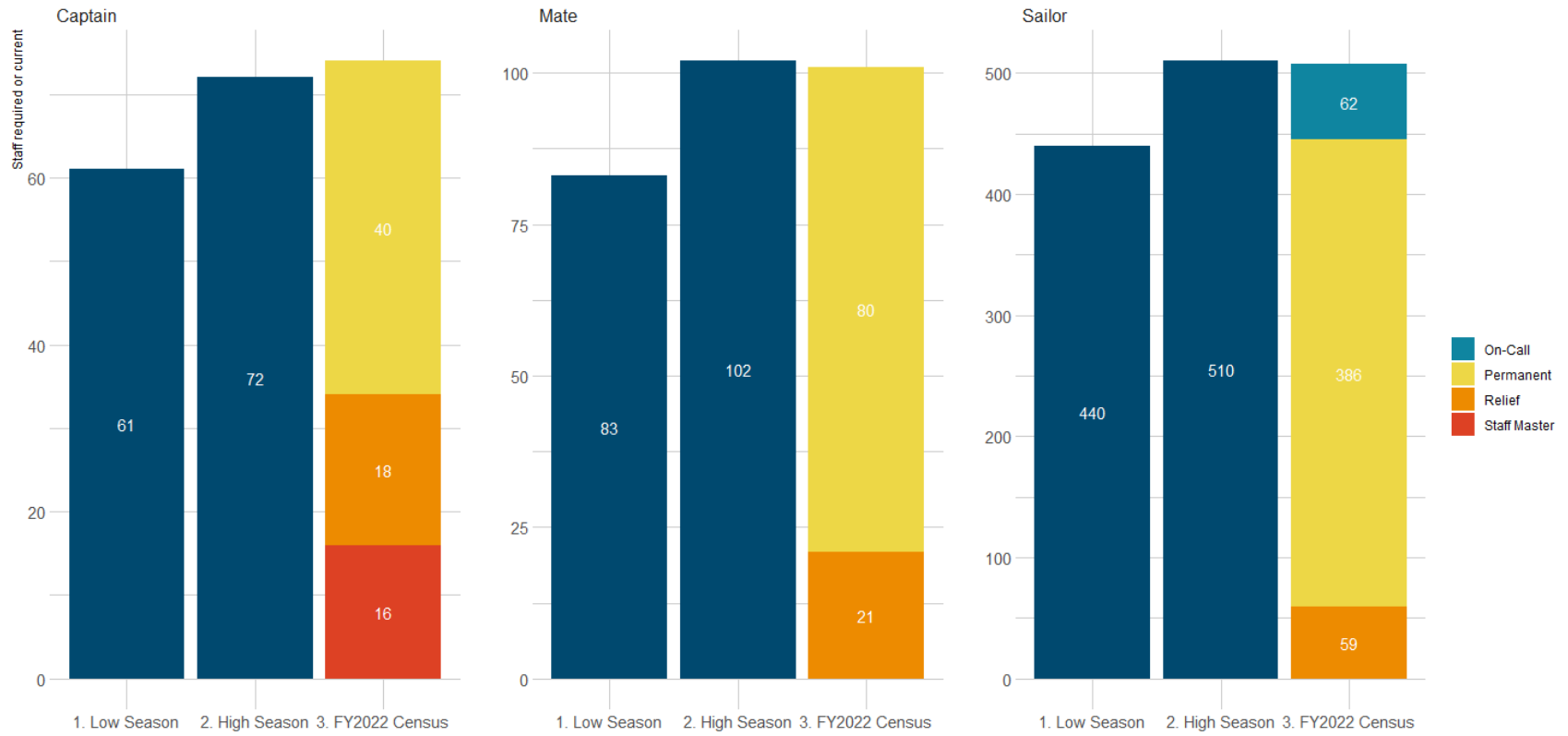
Position	Number of FTE needed for Winter Season	WSF permanent employees (As of September 21 st , 2021, adjusted for the vaccine mandate separations)	Hiring Needs (Required minus permanent)
Captains	61	40	21
Mates	83	80	3
Ordinary & Able Sailors	440	396	44
Engineers	350	142	208
Oilers & Wipers	362	154	208

Comparing these estimates to the early fiscal year 2022 workforce (workforce as of September 21, 2021, reduced by employees who separated due to the vaccine mandate), WSF does not have enough permanent employees to adequately crew its Deck and Engine, even during the low season.

Winter is when the fewest number of employees will be needed throughout the year due to fewer sailings. Filling these positions with permanent year-round crew is the minimum needed to adequately crew scheduled sailings in the low season but doing so still makes no allowance for out-of-the-norm disruptions or training. Considering its current permanent workforce and relief pool, WSF would have to expand the number of permanent Captains by five, permanent Mate positions by three, and the permanent Ordinary and Able Sailors by 54 to have enough permanent year-round positions to meet crewing requirements.

The Engine Room has the largest crewing need due to stringent USCG requirements. Each of the 21 vessels requires at least one Chief Engineer, one Assistant Engineer (for 17 vessels), and one to two Oilers, depending on the ship class. This crew will work 12-hour shifts for seven consecutive days and be off the following seven days in standard conditions. Therefore, 350 engineers are needed year-round, while only 177 are currently employed by WSF (most temporary assistant engineers resigned due to the vaccine mandate). So, WSF needs to hire an additional 173 engineers. Similarly, weekly winter sailings require 326 Oilers & Wipers while WSF only employs 166 (20 oilers resigned following the vaccine mandate), resulting in a hiring need of 160 additional Oilers & Wipers.

Required Deck Crew vs FY2022 Staff Count



Required Engine Room Crew vs FY2022 Staff Count

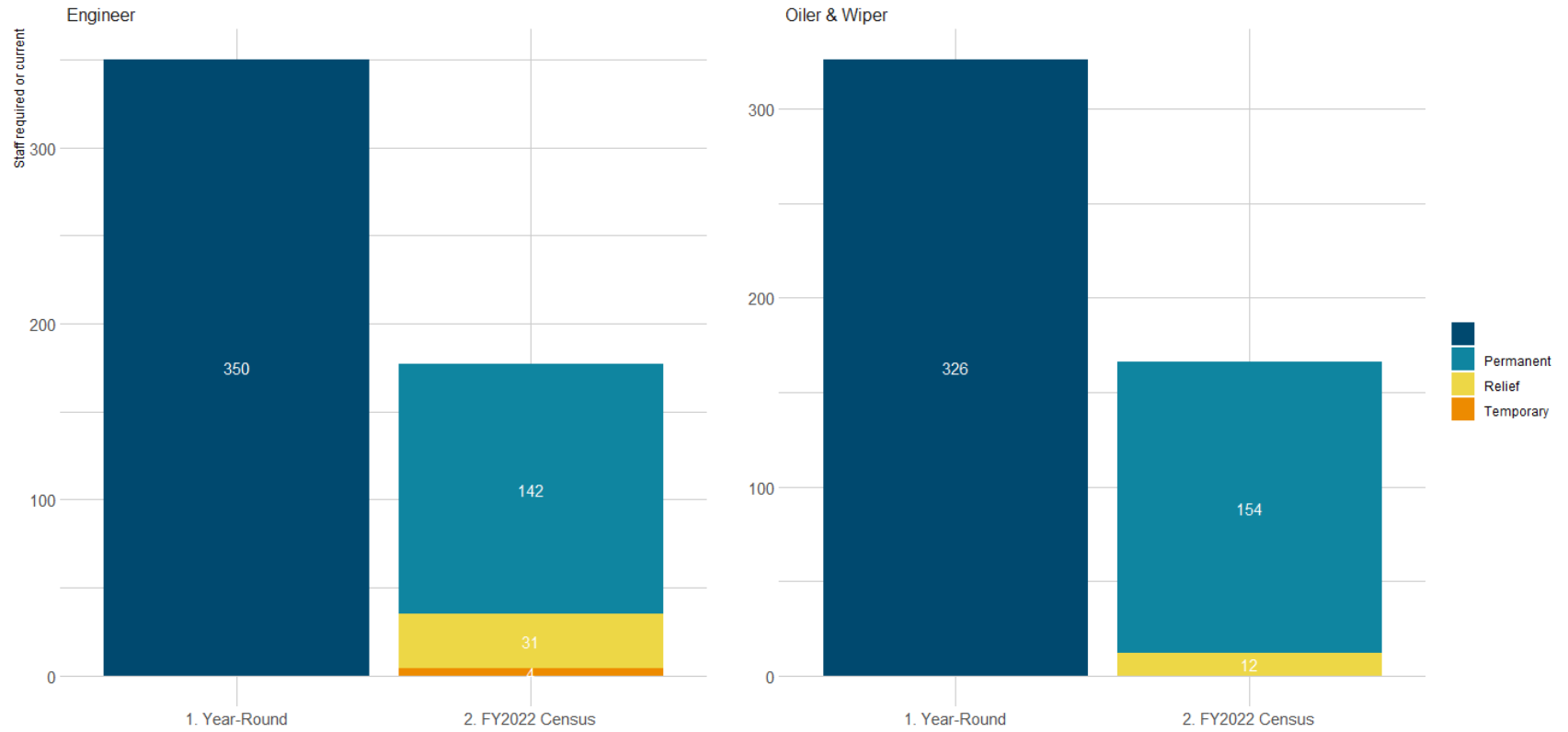


Figure 17. Minimum Crewing Level in Low and High Seasons vs. 2021 WSF Workforce

Once adequate crewing is reached to support the low season, the WSF workforce must be adjusted to ensure that all sailings scheduled during the summer will be completed. Ridership increases during the summer months because of the increase in tourism in Puget Sound. WSF needs additional crew to take on extra shifts and support enhanced business activity. Consequently, the number of full-time equivalent employees needed onboard is significantly larger than in winter.

To accommodate both the increased number of sailings and the increased capacity on those sailing, WSF needs 19 additional Mate FTEs and 70 additional Ordinary and Able Sailors FTE in the summer compared to winter. In contrast, the Engine Room crewing level remains the same year-round.

Table 4. Minimum Crewing Estimates for High Season

Position	Number of FTE needed for Summer Season	Number of WSF permanent employees (As of September 21, 2021, adjusted for the vaccine mandate separations)
Captains	72	40
Mates	102	80
Ordinary & Able Sailors	510	396
Engineers	350	142
Oilers & Wipers	362	154

Filling some of these positions with permanent year-round crew would build the buffer (to be determined) and allow WSF to backfill for training, now frequently done on overtime, if WSF concentrates training in the low season. However, filling all these positions with permanent year-round crew is not cost-effective. Minimizing total labor costs would entail hiring temporary workers hired only for the high season and paid only for these months. But the shortage of maritime workers nationwide and on the West Coast makes this problematic. The long-term workforce plan will explore options for filling these additional entry-level positions needed for the high season while encouraging current crew to earn sea time and get certified to cover more experienced positions (Mates, Captains, Oilers, and Engineers).

5. Recent Changes in Context

Merely Reducing OT is No Longer Relevant Considering Expanding Labor Shortage

This report is the first step of a multi-year proviso to curb overtime use and establish a workforce management plan for WSF. The report was intended to identify strategies to reduce overtime in the short term. However, the proviso was issued before the full impact of the Covid-19 pandemic on WSF was apparent. These recent factors severely impacted the maritime sector in Washington state. For example, WSDOT lost 402 employees to the vaccine mandate, including 120 from WSF. Additionally, eight workers chose to retire, and another 33 had been placed on leave as of October 19, 2021, while waiting to receive their second dose.²³ Similarly, the Covid-19 crisis reshaped the labor market as many workers laid-off at the beginning of the pandemic relocated, temporarily exited the labor force to reduce exposure risk, or switched careers. The labor force shrank across all industries, and the maritime sector was equally impacted. The sector lost 711 workers in Washington State between 2019 and 2021, corresponding to a 34% decline.²⁴

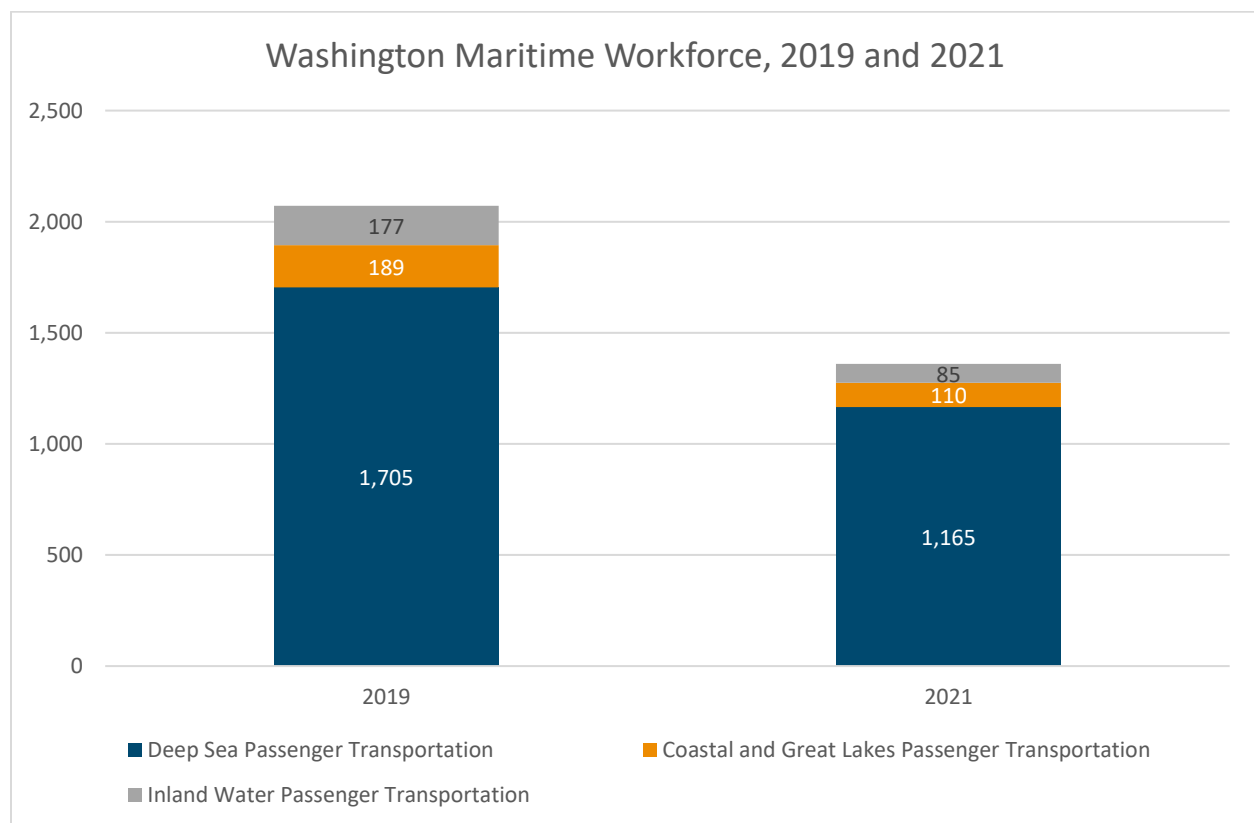


Figure 18. Maritime Workforce, Washington State, 2019 and 2021²⁴

Consequently, these recent shifts make it extremely difficult to adopt any significant short-term strategies. Solving the WSF labor shortage requires meaningful strategies that focus on increasing crewing levels, identifying new recruitment pools, developing training pathways in partnership with local

institutions, and negotiating changes in the collective bargaining agreements. These solutions will take time to develop and implement and will be described in greater detail in the Workforce Plan to be delivered to the Joint Transportation Committee in December 2022. The recommendations presented in this report are unlikely to have little immediate impact due to the overwhelming circumstances two years into a global pandemic. Though they have a smaller scope of impact, they are steps in the right direction and can be implemented in the coming year.

6. Recommendations and Conclusions

Short-Term Recommendations

Expanding Local Recruiting Network

WSF advertises vacancies through the official State of Washington Job Opportunities website.²⁵ They can only be found on the State of Washington Job Opportunities website if the individual knows that WSF is part of WSDOT or searches for a specific job title (e.g., Oiler or Sailor).

The job postings can also be found on well-known job search engines (Indeed.com and SimplyHired.com, for example), as well as maritime sector-specific websites, such as relevant unions websites and maritime education institutions. Still, these job postings will most likely be seen by those already working in the sector or familiar with WSF.

Given the current labor shortage, WSF should leverage local workforce boards,²⁶ WorkSource,²⁷ and workforce development organizations to tap into new groups of jobseekers who may be unaware of the opportunity WSF presents for stable, meaningful employment. Workforce development organizations have funding streams and case management personnel who can support new applicants in fulfilling all the application requirements detailed below.

Job Posting Wording and Advertisement

Additionally, job description wording plays a crucial role in potential candidates' decision to apply to a position. Gender- and racially-biased language or other language choices can discourage nontraditional applicants. Using male-coded language to describe the position discourages women from applying, and entry-level workers are discouraged by a strong emphasis on required qualifications. Similarly, job postings are more inviting to BIPOC candidates if they mention the employer's commitment to diversity and steps taken to diversify their workforce.²⁸ The demanding nature of on-call positions at WSF is likely off-putting to many potential applicants, particularly candidates with caretaking responsibilities (Figure 16). Additionally, there is no mention of WSF's internal diversity initiatives.

Finally, there is a general lack of clarity in the maritime industry and WSF in particular about career advancement opportunities. One of the biggest appeals of working in the maritime industry is that one can start working with no credentials and work their way up from entry-level position to captain or chief engineer based on time and on-the-job experience and training. However, it is difficult to find information about how this works. The WSF only posts jobs for on-call ordinary sailors and oilers as those are the only positions the WSF hires. However, these job postings do not routinely include information about how individuals hired on on-call eventually can bid on permanent positions with regular, guaranteed schedules. These postings also do not routinely include information about how they have the opportunity to advance from Ordinary Sailor to Able-Bodied Sailor, Mate, then Captain or from Oiler to Assistant then Chief Engineer.

WSF, which recently hired a recruiting consultant, is taking steps in this direction. They are updating job titles, eliminating the use of gendered job titles (e.g., Sailor instead of Seaman) and titles with racial baggage (e.g., Captain instead of Master). They should redesign and improve job posting wording to entice more people to apply. Current job postings can be seen as dry and unappealing. They primarily emphasize

the job's harshest aspects, particularly the requirement that on-call positions require one to be available to work 24/7 but do not guarantee work or pay. While the positions indeed call for extreme availability from workers, communicating about the job's positive aspects, for example, on work environment and potential career advancement, could foster more applications.

What to Expect

As an on-call employee, you must be available for all shifts including morning, mid-morning, evening, weekends, and holidays. These essential on-call positions provide back-up for scheduled absences, but are even more critical when it comes to filling last minute staff shortages that require a quick response time.

Among the varied range of responsibilities held within this role, you/the Deckhand will:

- Help foster a safe experience for the customers, crew, and vessel
- Assist passengers as required, including response to inquiries, assistance with boarding, response to problems escalating to the Mate when necessary
- Perform a full range of general maintenance duties: general cleaning, stripping and waxing floors, restocking supplies, clearing litter, etc.
- Operate lift to secure vehicle-loading bridge using an automated system
- Support directing traffic onto the car deck and securing the vehicles before departure and assist in removing inoperable vehicles from the deck
- Participate with crew in fire, abandon ship, and rescue drills, performing aspects of the drill such as handling fire hose for testing and preparing rescue boat for launch and recovery
- During emergencies, fulfill duties on the muster list, or duties as assigned, and assist in rescue procedures
- Participate in training as directed

Qualifications

To be considered for this opportunity, the following are required:

- High School Diploma or GED Equivalent
- A valid Transportation Worker Identification Credential (TWIC)
- A valid Merchant Mariner Credential (MMC), with a minimum of an OS or AB endorsement
- A valid United States Coast Guard Medical Certificate using the 719K long form
- A Valid unrestricted Driver's License and ability to operate heavy equipment, such as a bullnose tractor and transfer spans

It is preferred that qualified candidates also have:

- Accept work on-call 24/7, including holidays, and be punctual and reliable at all times
- Exceptional communication skills, other written and verbal
- Excellent customer service skills
- Ability to respond to vessel emergencies
- Knowledge of commonly used nautical terms
- Experience from the maritime environment

Figure 19. WSF Job Posting Advertised on Careers.wa.gov For On-Call OS/AB Deckhand

Similarly, lowering barriers for entry-level applicants would expand the applicant pool. WSF currently requires individuals to hold multiple certifications, including a Transportation Worker Identification Credential (TWIC) and Merchant Mariner Credential (MMC), to apply to a WSF vessel-bound position. Unlike some competitors (King County Water Taxi, for example),²⁹ WSF does not offer to help with the certification process, discouraging the most disadvantaged candidates from applying.

EXPERIENCE, QUALIFICATIONS, KNOWLEDGE, SKILLS:

- Ability to work effectively with others in a work environment that embraces and encourages diversity in its workforce and where differences are valued
- Demonstrates behaviors that include fairness, respect, and inclusiveness
- Knowledge of applicable regulations, emergency and safety procedures, navigation and marlinspike seamanship
- Knowledge of proper use of fire fighting and lifesaving equipment
- Knowledge of safe lifting techniques
- Knowledge of safe work practices, including proper use of personal protection equipment
- Skill in effectively handling multiple competing priorities
- Skill in working with a variety of individuals from diverse backgrounds
- Skill in establishing and maintaining effective working relationships
- Ability to respond safely, effectively and expeditiously during an emergency
- Ability to work in a team environment
- Dependable and reliable attendance
- Demonstrated excellent written and oral (English) communication skills
- Demonstrated excellent customer service and interpersonal skills

LICENSING AND CERTIFICATION REQUIREMENTS

King County Metro Marine Division will assist selected candidates to obtain a valid United States Coast Guard (USCG) Merchant Mariner's Document (MMD) or Merchant Mariner's Credential (MMC) with minimum rating of Ordinary Seaman (OS) and/or a valid Transportation Workers Identification Credential (TWIC) issued by the Transportation Security Administration (TSA).

Able Body Seaman (AB) rating is preferred.

DESIRABLE LICENSES AND TRAINING

USCG rating on your MMD or MMC at the AB level Certification in Fire Safety Training and Life Saving Training
Satisfactory completion of the training and experience necessary to qualify as a Senior Deckhand in compliance with USCG Navigation and Vessel Circular (NVIC) No. 1-91

Figure 20. King County Water Taxi Job Posting Advertised on the King County Career Portal for Marine Deckhand

Finally, it is urgent to improve training conditions for apprentices with the Maritime Institute of Technology and Graduate Studies (MITAGS) in the Licensed Deck program. Currently, apprentices are unpaid for the entire duration of their training program, unlike most other registered apprenticeships in Washington State. They must also pay for transportation to and from the vessel and provide their meals while onboard. Similarly, oiler internships pay only \$70 per day with no transportation or meals included. Many other trades compete for interested jobseekers that provide paid apprenticeships in Washington State. Though apprenticeships are largely seen as superfluous in the maritime industry as one can work as a sailor and gain the necessary sea time to advance to mate and then captain, apprenticeships make other resources available to apprentices. The structure, support, and resources available through an apprenticeship can be critical for people with high barriers completing the training and advancing to more senior positions. A partnership between WSF, MITAGS, and the unions could lead to a paid pathway from apprenticeship to permanent positions and help WSF maintain a baseline workforce for positions experiencing a significant labor shortage.

Fund TWIC and Other Documentations

Over the years, the list of certifications required by the USCG, and thus WSF, for mariner positions has expanded significantly. As mentioned above, candidates must hold multiple certifications to be recruited by WSF. First, all employees working aboard vessels, in the trades at Eagle Harbor, and at the terminals as ticket sellers and takers, terminal attendants, or shore gang must hold a valid TWIC card (Transportation Worker Identification Credential).

Created by The Transportation Security Administration in 2007³⁰ following the Maritime Transportation Security Act of 2002, this card is required of workers to help maintain security conditions at maritime facilities and aboard vessels. The Department of Homeland Security issues the card following a security threat assessment in which the applicant undergoes drug tests and a comprehensive background check

that includes terrorist watch lists, immigration status, criminal history, and outstanding warrants. This credential must be renewed every five years and costs \$125.³⁰

After obtaining their TWIC card, mariners must obtain a Merchant Mariner Credential (MMC) from the USCG that sanctions their aptitude for relevant job duties. Complete applications include an application form, relevant training course certificates, periodic drug tests, a fee ranging from \$140 to \$280 depending on the applicant's position.

§ 12.405 Examination and demonstration of ability for able seaman (A/B) endorsements.

- (a) Before an applicant is issued an endorsement as an A/B, he or she must prove, to the satisfaction of the Coast Guard, by oral or other means of examination, or by actual demonstration in a Coast Guard-approved course, his or her knowledge of seamanship and the ability to carry out effectively all the duties that may be required of an A/B, including those of a lifeboatman or lifeboatman-limited.
- (b) The examination, whether administered orally or by other means, must be conducted only in the English language and must consist of questions regarding -
 - (1) The applicant's knowledge of nautical terms, use of the compass for navigation, running lights, passing signals, and fog signals for vessels on the high seas, inland waters, or Great Lakes, and distress signals; and
 - (2) The applicant's knowledge of commands in handling the wheel by obeying orders passed to him or her as helmsman, and knowledge of the use of the engine room telegraph.
- (c) The applicant must provide evidence, to the satisfaction of the Coast Guard, of the knowledge of principal knots, bends, splices, and hitches in common use by actually making them.
- (d) The applicant must demonstrate, to the satisfaction of the Coast Guard, knowledge of pollution laws and regulations, procedures for discharge containment and cleanup, and methods for disposal of sludge and waste material from cargo and fueling operations.

Figure 21. Merchant Mariner Credential Ability Requirements for Able Seaman Endorsements³¹

WSF does not pay for any of these credentials, costing up to \$405. Applicants must also spend time researching information, gathering documentation, and sending their applications with little to no guidance. These many steps could prevent low-income candidates and those who have limited access to the internet from getting proper certification.

The decision not to pay for these credentials has a rationale. They are issued to the worker and are not tied to the employer, which means that if an employer pays for a worker's certification, there is no guarantee that the worker would stay with the employer for much longer. However, in a context of severe labor shortage and intensive competition among employers, a little would go a long way in attracting candidates. The State of Washington could invest in getting more residents qualified to work not only for WSF but more broadly in the maritime industry by funding these credentials and providing support for entry-level workers navigating the somewhat complicated process of getting and maintaining credentials. This would help attract applicants and help diversify the WSF workforce and the maritime workforce in Washington overall.

More Inclusive Training: Swimming Classes

The International Convention sets physical and qualification standards for ship personnel on Standards of Trainings, Certification, and Watchkeeping for Seafarers (STCW). The STCW Basic Safety Training is required to obtain a mariner's license and STCW certification (required to work on the international route to Sydney, BC). Therefore, applicants to Merchant Mariner Credential must submit a medical evaluation form and undergo a series of fitness tests to ensure their ability to support ordinary and emergency

operations at sea. Most physical fitness requirements relate to strength (lifting and carrying heavy objects, for example) and agility (moving through restricted openings). Similarly, emergency response procedures require helping passengers should an evacuation happen, putting on a personal flotation device, and swimming in open water. Therefore, maritime academies require swimming exams before graduation.

However, most institutions do not offer swimming lessons despite significant racial disparities in swimming ability. 64% of African American children in a study completed by the USA Swimming Foundation possess poor swimming ability, compared to 40% of white children.³² Similarly, 79% of children in families with household income below \$50,000 have no to low swimming ability. Drowning death rates are also twice as high for American Indian or Alaska Native than for White people aged 29 or younger, and 1.5 as high for Black or African Americans. The reasons that communities of color have low rates of swimming proficiency are complex and stem from a history of discrimination, segregation, and income disparity, among other factors.

Learning how to swim can be a lengthy process that can discourage many and swimming lessons can be a financial burden for families. These obstacles de facto reduce the available labor pool in the maritime sector and restrict its diversity. Maritime academies partnering with WSF for training could help close swimming racial disparities and make the maritime sector more diverse by offering swimming classes in their program.

Increase core crewing beyond minimum USCG requirements

As mentioned earlier in this report, USCG revised minimum crewing requirements twice between 2012 and 2013. This move restricted the conditions in which a vessel can sail by increasing the required crew level for most ships. For example, the minimum number of Ordinary Sailors went from one to two from Jumbo Mark I class vessels (running the Bainbridge and Edmonds-Kingston). Similarly, Superclass vessels (running the Anacortes-San Juan and Bremerton routes) now require one licensed Mate (in addition to the previously required Mate and First-Class Pilot), an additional Ordinary Sailors, and an Assistant Engineer to allow sailing.

COI manning levels for the Jumbo Mk I Class (2000 pax):

Previous COI Manning	New COI Manning Level
1 Master & 1 st Class Pilot	1 Master & 1 st Class Pilot
1 Mate & 1 st Class Pilot	1 Mate & 1 st Class Pilot
1 Licensed Mate	1 Licensed Mate
4 Able Seamen	4 Able Seamen
1 Ordinary Seaman	2 <i>Ordinary Seamen</i>
1 Watchman	1 Watchman
1 Chief Engineer	1 Chief Engineer
1 Assistant Engineer	1 Assistant Engineer
1 Wiper	1 Oiler
1 Watchman	1 Wiper

COI manning levels for the Super Class (1868-2000 pax)*:

Previous COI Manning	New COI Manning Level
1 Master & 1 st Class Pilot	1 Master & 1 st Class Pilot
1 Mate & 1 st Class Pilot	1 Mate & 1 st Class Pilot
	1 <i>Licensed Mate</i>
4 Able Seamen	4 Able Seamen
1 Ordinary Seaman	2 <i>Ordinary Seamen</i>
1 Watchman	1 Watchman
1 Chief Engineer	1 Chief Engineer
	1 <i>Assistant Engineer</i>
1 Oiler	1 Oiler
1 Wiper	1 Wiper

Figure 22. USCG Change in WSF Crewing Requirements³³

Despite this increase in the required crewing level, WSF's budgeted crewing level remained constant, preventing the agency from hiring additional crew members and reducing WSF's buffer, impacting its capacity to handle disruptions. Before these changes, the WSF workforce was large enough to manage absences and replace crew who could not come to work due to injury or illness or who encountered traffic delays on their way to work. For example, if WSF had two Ordinary Sailors scheduled in 2011, the ferry could still sail if one sailor could not work. Post-2013, both are required to be present for the vessel to sail, and the vessel cannot leave if one sailor is late or absent, and WSF cannot find a replacement before scheduled sailing. Increasing the WSF budget would allow the agency to hire additional Sailors and Assistant Engineers, ideally to the minimum levels presented in the Minimal Crewing section above.

7. Next Steps

In the coming year, Seattle Jobs Initiative, Segal, and Emsi Burning Glass will be undertaking the following:

- Fully develop an optimal staffing model that includes allocations for training, administrative duties, and a critical transportation infrastructure buffer.

- Based on insights from the above and additional analysis of payroll and human resources data as well as in-depth interviews with WSF staff and crew, develop strategies in collaboration with the Working Group to:
 - Attract qualified mates, captains, and engineers, including direct hire.
 - Address real and perceived disparities between positions in WSF and between WSF and the maritime industry.
 - Improve job attractiveness by changing scheduling and job advancement processes, including reassessing what positions WSF hires for and use of apprenticeships.
 - Further expand recruitment pools beyond those identified in the short-term strategies to meet specific needs and hiring goals.

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Appendix A: Methodology

WSF Background

Washington State Ferries Human Resources provided the project team with employee censuses containing unique identifiers, hire date, position at exported from their system on August 9, 2018, June 30, 2020, and September 9, 2021. A separate file was provided on November 5, 2021, with all employee separations by category from July 1, 2018 to November 4, 2021.

The project team drew on interviews and reflections during working group meetings and then searched the Lexis Nexis newspaper database for the key dates. The search was limited to Washington state for "Washington State Ferries" and identified news articles with relevant key events, cross-referenced with interviews and working group notes.

National and Regional Maritime Labor Market

The national and regional statistics for each occupation in the Washington state, Pacific Coast state, and the US were drawn from the Emsi Labor Market Analytics, 2021.²⁴ Additional data was pulled from the US Bureau of Labor Statistics¹⁸ and Washington State Employment Security Department.¹⁹

Overtime Analysis

Washington State Ferries provided files for all overtime hours by day by employee from Fiscal Year 2013 through Fiscal Year 2021. They also provided updated files with all hours, both straight time and overtime by day by employee from Fiscal Year 2013 to Fiscal Year 2021. The project team categorized the type of overtime using the guides and discussions with the WSF budget and operations department.

Minimum Crewing Requirements

Files detailing the minimum crewing requirements for each vessel under different operating conditions were provided by the WSF operations department. Using Winter 2020 and Summer 2019 sailing schedules, we constructed a weekly sailing schedule showing the vessel class, route, deck shift hours, and vessel minimum crewing requirements. This data allows us to estimate the number of Captains, Mates, Sailors, Engineers, and Oilers needed for the boats to be allowed to sail. Additionally, using historical leave data, these numbers are adjusted for the probability of crew going on sick leave and vacation. However, more research is needed to account for other factors preventing work, such as staff going on training or attending meetings.

Cancellations

Cancellation data was compiled via the Washington State Department of Transportation's Gray Book.⁵

Appendix B: Unions and Collective Bargaining Agreements

Union	Bargaining Agreement	Occupations	Number Represented
Ferry Supervisors and Project Administrators Association (FASPAA)	Ferry Agents, Supervisors and Project Administrators Association (FASPAA) ³⁴	Terminal Supervisors	40
Inland Boatmen's Union of the Pacific (IBU)	Inland Boatmen's Union of the Pacific (IBU) ³⁵	Bosun	55
		Able Seaman	175
		Ordinary Seaman	245
		Quartermaster	57
		Info Agent	21
		Shore gang	17
		Terminal Attendant	161
		Ticket Seller/Taker	167
Marine Beneficial Association (MEBA)	Licensed Engineer Officers (MEBA L) ³⁶	Staff Chief	36
		Chief Engineer	74
		Assistant Engineer	118
	Unlicensed Engine Room Employees (MEBA UL) ³⁷	Oiler	185
		Wiper	1
Port Engineers (MEBA PE) ³⁸	Port Engineer	6	
Masters, Mates, and Pilots (MM&P)	Captains (MM&P Masters) ³⁹	Captain	58
		Staff Captain	16
	Watch Supervisors (MM&P WCS) ⁴⁰	Fleet Security Officer	3
		Watch Supervisor	7
	Mates (MM&P Mates) ⁴¹	Workforce Development Lead	4
		Chief Mate	75
		Second Mate	28
Puget Sound Metal Trades Council (IBEW Local 46, IAMAW Local 79, SMWIA Local 66, IBT Locals 117 and 174, IBBISBFH Local 104, UAJAPPI Local 32)	Metal Trades Unions ⁴²	Boilermaker	12
		Electrician	17
		Machinist	15
		Pipefitter	14
		Sheetmetal	11
		Storekeeper	5
		Truckdriver	1
		General Foreperson	1
		Office and Professional Employees	Office and Professional Employees
Accountant Assistant	7		

Union	Bargaining Agreement	Occupations	Number Represented
International Union Local 8 (AFL-CIO) (OPEUI 8)	International Union Local No. 8 (OPEIU 8) ⁴³	Bid Administrator	2
		Buyer	6
		Contract Coordinator	5
		Dispatch Coordinator	4
		Dispatcher	5
		Inventory Agent	1
		Mail Clerk	1
		Maintenance Materials Coordinator	1
		Program Assistant	5
		Purchasing Agent	1
		Safety Systems Specialist	1
		Secretary	2
		Pacific Northwest Regional Council of Carpenters	Pacific Northwest Regional Council of Carpenters ⁴⁴
Shipwright	17		
Service Employees International Union Local 6 (SEIU 6)	Service Employees International Union Local 6 (SEIU 6) ⁴⁵	Janitor	6
Professional and Technical Employees Local 17	Professional and Technical Employees Local 17 (PROTEC17) ⁴⁶	Transportation Engineer	26
		Transportation Planning Specialist	2
		Transportation Technician	6
Washington Federation of State Employees (WFSE)	Washington Federation of State Employees ⁴⁷ . Error! Bookmark not defined.	Communications Consultant	4
		Fiscal Analyst	3
		Forms & Records Analyst	1
		Library & Archival Professional	2
		Management Analyst	2
		Program Specialist	2
		Safety Officer	3
		Telecommunications Specialist	1
		Technical Training Consultant	1
Transport Systems Technician	2		

Appendix C: Interview & Focus Group Lists

Interviews

Last Name	First Name	Role
Churchwell	Brian	IT Assistant Director
Cirkovich	Stephanie	Director of Community Services & Planning
Crawford	Jane	Training & Credentialing Manager
Dabney	Marcus	WSF IT Applications Manager
Distefano	Anthony	IBU Representative
Garman	Ann	Transportation Planning Specialist 5
Hanbey	Matt	Operating Program Manager
Lathan	Dale	Director of Safety Systems
Mast	Terri	IBU
McIntosh	Nicole	Chief of Staff
Mooney	Jay	Port Captain
Morrison	Rachel	Sr. Bid Administrator
Phillips	Eben	Deputy Director of Vessel Engineering & Maintenance
Rustabello	Patty	Assistant Secretary of Washington State Ferries
Schweyen	Bill	Senior Port Engineer/Captain
Servais	Austin	Crew Resource Manager
Singer	Rick	Direction of Finance & Administration
Sowers	David	Director of Terminal Engineering
Twohig	Dan	MM&P United Inland Regional Representative
Von Rudden	Matt	Director of Vessel Engineering & Maintenance System Electrification Program Administrator
Williamson	Alec	Project Management Engineer
Winge	Eric	MEBA

Focus Groups

Unit	Route	Watch/Captain
Deck Crew and Engine Room	Seattle-Bainbridge	B Watch: Jorge Pinzon A Watch: Randy Kesteren C Watch: Scott Schrader E Watch: Erich Ackermann
Deck Crew and Engine Room	Seattle-Bremerton	F Watch: Steven Standaert D Watch: Eric Hairston
Deck Crew and Engine Room	San Juan Islands	H Watch: Glen Hogarth G Watch: David Lawton C Watch: Brandon Moser
Dispatch	N/A	N/A

Appendix D: Job Descriptions

Unit	Position	Description	Minimum Qualifications
Licensed Deck	Captain	Exercises full command of a vessel of any gross tons, manager of and responsible for entire vessel operations. Has authority over all persons on board. Also serves as licensed pilot.	<ul style="list-style-type: none"> • TWIC • USCG license as Master of Motor Vessels of any gross tons • Endorsement as First Class pilot for all routes operated • Radar observer endorsement • FCC marine radio operator permit • STCW certification • Electronic Chart Display & Information System (ECDIS) certified.
	First Mate/Pilot	Serves as Chief Officer, second in command of vessel of any gross-tons. Directs other officers and all members of the deck crew on all matters pertaining to the safe operation and deck maintenance of the vessel. Stands as watch officer in charge on bridge during normal operations.	<ul style="list-style-type: none"> • TWIC • USCG license as Mate of Motor Vessels of any gross tons • Endorsement as First Class Pilot on all routes, on vessels of any gross tons • Radar observer endorsement • FCC marine operator permit • STCW certification. • Electronic Chart Display & Information System (ECDIS) certified.
	Second Mate	Deck officer next in rank below First Mate of a vessel of any gross tons. Directs other officers and all members of the deck crew on all matters pertaining to the safe operation and deck maintenance of the vessel.	<ul style="list-style-type: none"> • TWIC • USCG license as Mate of Motor Vessels of any gross tons • Endorsement as First Class Pilot on all routes, on vessels of any gross tons • Radar observer endorsement • FCC marine radio operator permit • STCW certification. • Electronic Chart Display and Information System (ECDIS) certified

Unit	Position	Description	Minimum Qualifications
Unlicensed Deck	Able Sailor (Able Sailor/Bos'n)	Highest rated unlicensed deck employee. May act as Bos'n or Quartermaster.	<ul style="list-style-type: none"> • TWIC • USCG certificate as Able Bodied Seaman - Limited. • STCW certification
	Ordinary Sailor	During a shift maintains passenger cabin area, assists passengers with vessel egress, assists with vehicle loading, stands a gangplank watch, assists in line handling, stands as lookout, acts as watch, fills a position on vessel muster list.	<ul style="list-style-type: none"> • TWIC • USCG certificate as Ordinary Seaman - Limited • STCW certification
Engine	Staff Chief Engineer	Supervises and ensures the efficient operation and maintenance of all propulsion and electrical systems of the vessel. Supervises and coordinates the activities of all engine room employees assigned to the vessel. Establishes vessel procedures for all engine room operations and maintenance	<ul style="list-style-type: none"> • TWIC • USCG license as Chief Engineer Limited Near Coastal of Motor Vessels • STCW certification
	Chief Engineer	Under general direction of vessel's Staff Chief Engineer, is in full charge of Engine Department. Ensures that the vessel's mechanical and electrical machinery is properly maintained and serviced. Assigns licensed and unlicensed engine room employees to duty stations. Maintains strict discipline of engine room crew.	<ul style="list-style-type: none"> • TWIC • USCG license as Chief Engineer Limited Near Coastal of Motor Vessels of the necessary horsepower rating to cover the assigned vessel horsepower. • STCW certification
	Assistant Engineer	Responsible for running, operation and maintenance of propulsion and electrical systems aboard the	<ul style="list-style-type: none"> • TWIC • USCG license as First, Second, or Third Assistant Engineer of Motor Vessels or • Assistant Engineer - Limited of Motor vessels (Inspected), of

Unit	Position	Description	Minimum Qualifications
		vessel. General maintenance duties may extend throughout entire vessel. Routinely inspects and maintains all equipment; reports malfunction and makes adjustments or repairs as directed by Chief Engineer's instructions.	the necessary horsepower rating to cover the vessel's assigned horsepower
	Oiler	Serves as the highest rated of the unlicensed members of the engine department. Under supervision of the licensed engineering officer(s) on watch, performs inspection, maintenance and repair duties throughout the vessel.	<ul style="list-style-type: none"> • TWIC • USCG certificate as qualified member of the engine department in the rating of oiler
	Wiper (not currently hired by WSF)	Serves as the entry level of the unlicensed engine department crew. Under supervision of the licensed engineering officer(s) assists in and learns inspection, maintenance and repair duties throughout the engine department of the vessel.	<ul style="list-style-type: none"> • TWIC • USCG certificate as Wiper
Terminal	Ticket Taker	Collects tickets and visually verifies that proper ticket has been sold; assists with traffic control and Terminal equipment operation and janitorial and/or light maintenance duties.	<ul style="list-style-type: none"> • TWIC • High school diploma or equivalent
	Terminal Attendant/Watch	Assists in janitorial and light maintenance duties, traffic control, terminal equipment operation and/or serves as watch during vessel tie-up.	<ul style="list-style-type: none"> • TWIC • High school diploma or equivalent
	Information Agent	Maintain direct communication with users in person and on the telephone	<ul style="list-style-type: none"> • High school diploma or equivalent • Call center and computer experience
	Web Information Agent	Maintains Washington State Ferries website information	<ul style="list-style-type: none"> • Three years of customer service experience

Unit	Position	Description	Minimum Qualifications
		and provides customer service related to service issues, customer issues and customer operational concerns	<ul style="list-style-type: none"> • Basic HTML code knowledge • Ability to write • Excellent written and oral communication skills • Knowledge of WSF system
	Shore Worker	Gang Performs skilled refit and preventative maintenance work on vessels and docks.	<ul style="list-style-type: none"> • USCG certificate as Ordinary Seaman - Limited • MMC • TWIC
	Terminal Supervisor	Serves as field supervisor for terminal operations	<ul style="list-style-type: none"> • TWIC
Administration	Port Captain	Management representative and responsible for enforcement of USCG regulations and organizational policies for all deck personnel	<ul style="list-style-type: none"> • TWIC • College degree • 5-10 years of experience in management of passenger vessel operations
	Port Engineer	Responsible for management of vessel maintenance and day to day engine department operations for assigned vessels, including facilities and personnel	<ul style="list-style-type: none"> • TWIC • USCG Chief Engineers License • 4 years of sailing experience • 3 years in charge of an engine room

Appendix E: Career Progression for Deck and Engine

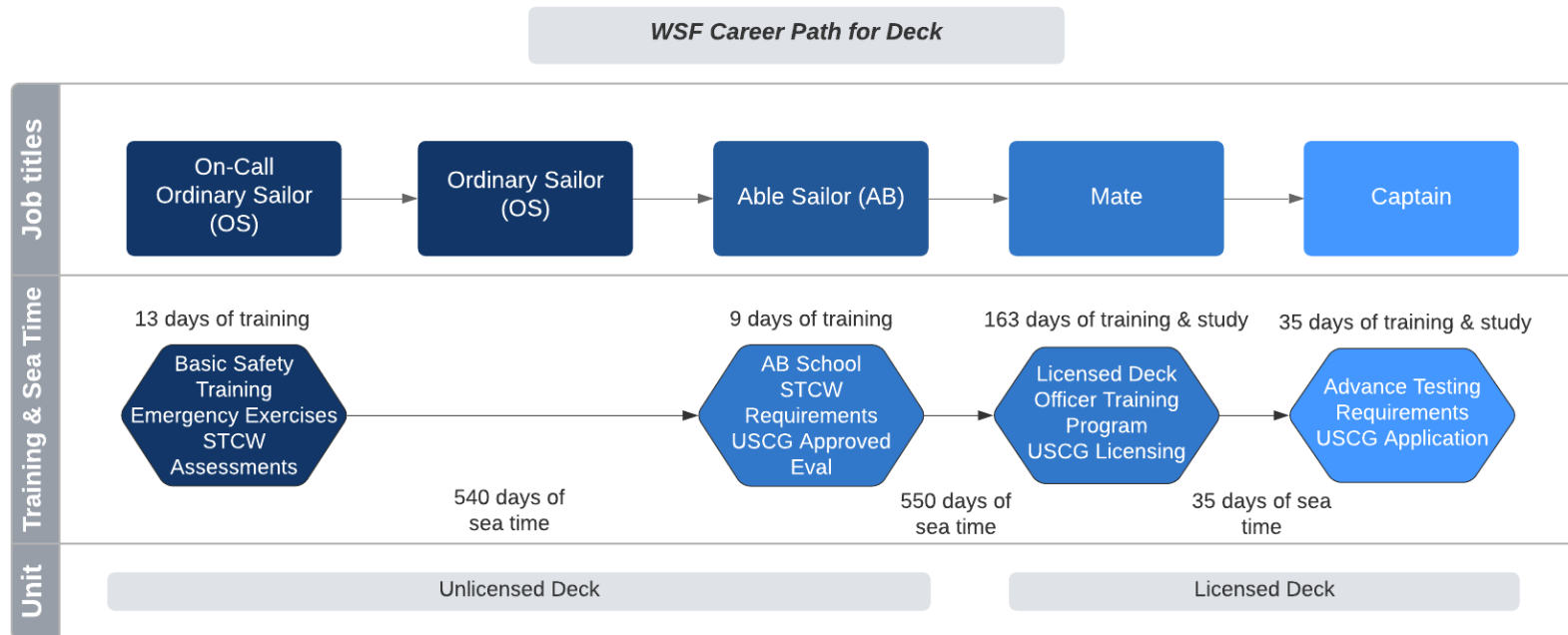


Figure 23. WSF Career Path for Deck

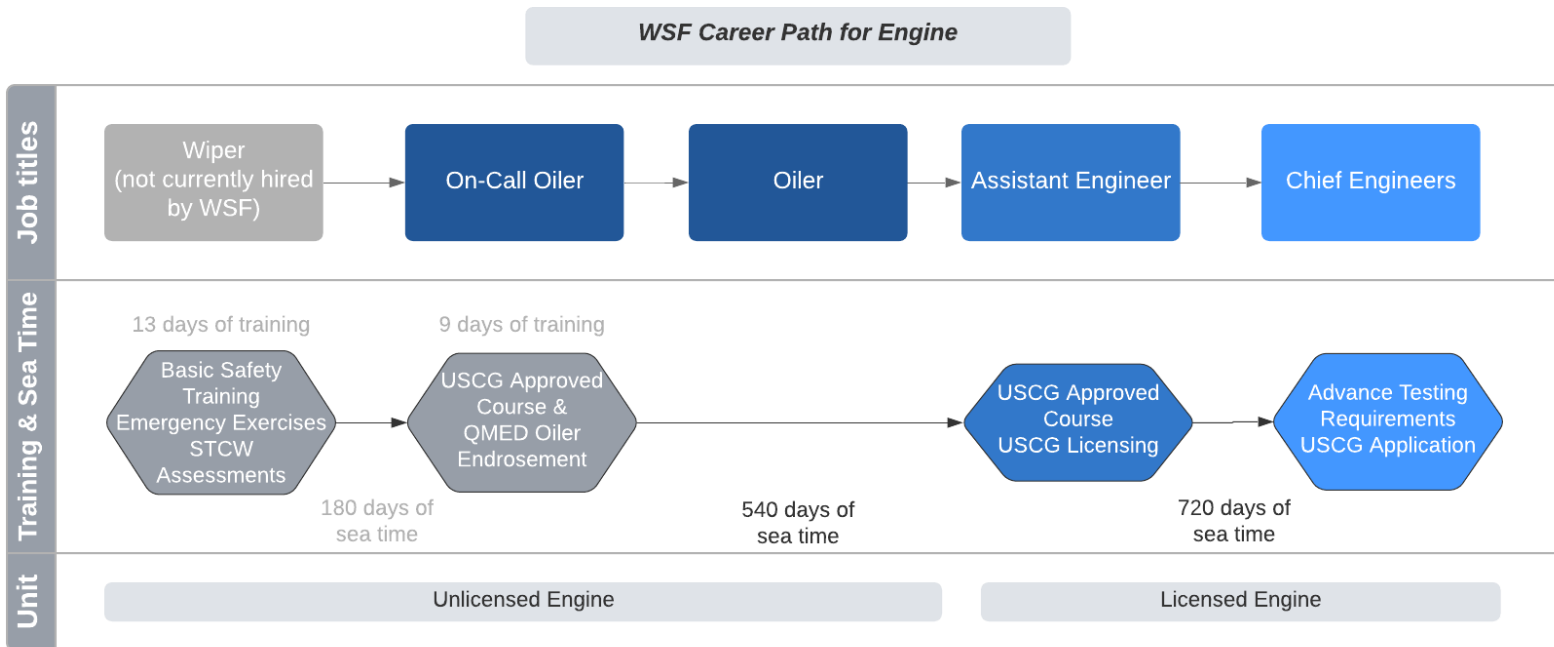


Figure 24. WSF Career Path for Engine

Appendix F: USCG Mandated Crewing Requirements for WSF Vessels

Class	Vessel	Walk-On Cap	Cars	Condition	Passenger Limit	Master	Chief Mate	Second Mate	Able-bodied Sailors	Ordinary Sailors	Chief Engineer	Assist. Engineer	Oiler	Wiper	Emer Evac Per.	Total	+Additional
Jumbo Mark II	Puyallup, Tacoma, Wenatchee	450	202	Standard	1791	1	1	1	4	4	1	1	1	1	-	15	6
Jumbo	Spokane, Walla Walla	450	188	Standard	1793	1	1	1	4	3	1	1	1	1	-	14	5
Super	Kaleetan, Yakima	300	144	Standard	1195	1	1	1	4	3	1	1	1	1	-	14	3
	Kaleetan, Yakima	300	144	Prom. Deck closed, 450 passengers	450	1	1	1	4	2	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	October 1 to June 15 San Juans, Prom. Deck closed, Galley open, 450 passengers	450	1	1	0	4	3	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	October 1 to June 15 San Juans, Prom. Deck closed, 450 passengers	450	1	1	1	4	2	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	or	450	1	1	0	4	3	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	Prom. Deck closed, 300 passengers	300	1	1	1	4	1	1	1	1	1	-	12	3
	Kaleetan, Yakima	300	144	October 1 to June 15 San Juans, Prom. Deck closed, Galley open, 300 passengers	300	1	1	1	4	2	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	or	300	1	1	0	4	3	1	1	1	1	-	13	3
	Kaleetan, Yakima	300	144	October 1 to June 15 San Juans, Prom. Deck closed, 300 passengers	300	1	1	1	4	1	1	1	1	1	-	12	3
	Kaleetan, Yakima	300	144	or	300	1	1	0	4	2	1	1	1	1	-	12	3
Olympic	Chimacum, Samish, Suquamish, Tokitae	300	144	Standard	1500	1	1	-	5	4	1	1	1	1	-	15	5
	Chimacum, Samish, Suquamish, Tokitae	300	144	Standard at Bremerton	1500	1	1	1	5	3	1	1	1	1	-	15	5
	Chimacum, Samish, Suquamish, Tokitae	300	144	Sun deck closed at Bremerton	768	1	1	1	4	3	1	1	1	1	-	14	5

Class	Vessel	Walk-On Cap	Cars	Condition	Passenger Limit	Master	Chief Mate	Second Mate	Able-bodied Sailors	Ordinary Sailors	Chief Engineer	Assist. Engineer	Oiler	Wiper	Emer Evac Per.	Total	+Additional
	Chimacum, Samish, Suquamish, Tokitae	300	144	Sun deck closed elsewhere	768	1	1	-	4	3	1	1	1	1	-	13	5
Issaquah	Cathlamet, Issaquah, Kitsap, Kittitas	300	124	Standard	1196	1	1	-	4	3	1	1	1	-	-	12	4
	Cathlamet, Issaquah, Kitsap, Kittitas	300	124	At Point Defiance, Vashon- and Mukilteo, 300 Passengers	300	1	1	-	4	2	1	1	1	-	-	11	4
	Chelan	300	124	Standard on International	1195	1	1	-	4	3	1	1	1	-	1	13	4
	Chelan	300	124	Standard on Domestic	1196	1	1	-	4	3	1	1	1	-	0	12	4
	Chelan	300	124	Domestic at Point Defiance, Vashon- and Mukilteo, 300 Passengers	300	1	1	-	4	2	1	1	1	-	0	11	4
	Sealth	300	90	Standard	1196	1	1	-	4	2	1	1	1	-	-	11	4
	Sealth	300	90	At Point Defiance, Vashon- and Mukilteo, 300 Passengers	300	1	1	-	4	1	1	1	1	-	-	10	4
Evergreen	Tillikum	150	87	Standard	596	1	1	-	4	2	1	-	1	1	-	11	4
	Tillikum	150	87	At Point Defiance, Vashon- and Mukilteo, 300 Passengers	300	1	1	-	4	1	1	-	1	1	-	10	4
Kwa-di Tabil	Chetzemoka, Kennewick, Salish	188	64	Standard	748	1	1	-	4	3	1	-	1	1	-	12	0
	Chetzemoka, Kennewick, Salish	188	64	384 passengers	384	1	1	-	4	1	1	-	1	1	-	10	0

Appendix G: Working Group

Last Name	First Name	Affiliation
Catterson	Dave	Washington State Legislature
Cirkovich	Stephanie	Washington State Ferries
Crawford	Jane	Washington State Ferries
Forty	Jenna	OFM
Griffith	Reema	Transportation Commission
Halbert	Aaron	Transportation Commission
Macintosh	Nicole	Washington State Ferries
Mast	Terri	IBU
Masterson	Danny	Senate Transportation Committee
Neal	Paul	Washington State Legislature
Nevey	Steve	Washington State Ferries
Redfield	Beth	House Transportation Committee
Servais	Austin (Ozzy)	Washington State Ferries
Thompson	Harry	IBEW 46
Twohig	Dan	MM&P
Vezina	John	Washington State Ferries
Winge	Eric	MEBA
Quam	Dana	House Republican Caucus
McCarty	Hannah	Senate Democratic Caucus
Othan	Loren	House Democratic Caucus
Presley	Martin	Senate Republican Caucus

Appendix H: Project Team

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