



# SLEEP AND HEALTH IN COMMERCIAL FISHING

SUMMARY REPORT





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**Funding Acknowledgment:** U01OH011899-01-02

“As a fisherman, I hardly sleep. Always been like that. Don’t sleep anymore when not fishing, either.”

## WHO WE ARE

**The Northeast Center (NEC)** is one of 12 Agricultural Safety and Health Centers funded by the National Institute of Occupational Safety and Health (NIOSH), a Centers for Disease Control (CDC) agency that is responsible for developing worker health and safety solutions. Our center addresses the specific occupational health and safety needs of workers in the high-risk agricultural, forestry, and fishing industries from Maine to West Virginia.

Through research, education, program development, and partnerships, we work to understand industry safety and health challenges and collaborate with communities to identify actionable solutions so these essential workers can thrive and survive on the job.

## THE WHY

Commercial fishermen work long hard days. Getting enough sleep on the boat can be challenging. Few studies have looked at the impact of sleep on health and safety among commercial fishermen. It is well understood that a lack of sleep poses health risks and impacts to both the overall health of workers and their risk for on-the-job injuries. By gaining a better understanding of health risks associated with a lack of sleep, fishermen can better understand how to combat the negative effects of sleep deprivation and improve their overall health. Between 2019 and 2022, researchers at the Northeast Center for Occupational Health and Safety (NEC) aimed to explore this critical gap in commercial fishing health and safety.

In collaboration with fishermen in Alaska, Oregon, and Massachusetts, this study sought to better understand the sleep patterns of fishermen, the potential effects of sleep deprivation on their health and safety, and ways to better support them.

To gain the best possible understanding of sleep patterns and health impacts on commercial fishermen, the research team utilized the knowledge and skill sets of fishermen, epidemiologists, statisticians, practitioners, sleep experts, media experts, community engagement specialists, engineers, safety trainers, and fishing associations.

## STUDY OBJECTIVES

- » What is the potential for conducting fisheries sleep studies?
- » What sleep risk factors exist in the fishery sector?
- » What hypotheses should be explored in future research?



Robert Ruhle (left) and Jimmy Ruhle (right), Mid Atlantic Mixed Trawl, NC

### Our Partners



AMSEA's mission is to reduce injury and death in the marine and freshwater environment through education and training provided by a network of qualified marine safety instructors.



Oregon State University's Occupational Safety and Health Laboratory uses a variety of tools and methods to investigate workplace hazards on safety and health outcomes in working populations, including in the commercial fishing industry. The goal is to create healthy communities and workers in high-risk industries.



Through instruction, research, and service, the Department of Mechanical Engineering uses mechanical engineering to expand the intellectual culture of George Mason University and the College of Engineering and Computing leading to distinct contributions beneficial to our communities and society at large.



### **Salmon fishermen, Scallopers, Dungeness**

**Crabbers and Lobstermen** all took part in this research and were chosen as a sample based on the number of hours they spend at sea. Lobstermen were chosen as a control group, as they typically do not sleep on the boat. However, we learned that although lobstermen do not usually sleep on the boat, their quality of sleep is not significantly better than fishermen from other fisheries we studied.

To better understand fishermen's sleep patterns and the effects they have on overall health, we talked with fishermen about their sleep patterns and health concerns, administered surveys, conducted health assessments, and tested wearable technology to track sleep while fishing. We learned that fishermen's sleep is largely affected by their fishing schedule, stress, their environment, and other health concerns (like pain). Two out of every five fishermen reported pain so severe that it interfered with their sleep, and nearly half of the fishermen in our study reported they do not have great quality of sleep, and have trouble staying asleep. Though it is likely unrealistic for fishermen to get a full 8 hours sleep each night while fishing, getting quality sleep can be beneficial. Fishermen can also focus on improving other aspects of their health, like physical and mental health, diet, social support and exercise to combat the negative effects of sleep deprivation.

Additionally, for fishermen in coastal communities, setting up medical appointments can involve planning ahead six to twelve months, and if the appointment is changed it further delays access to healthcare. Going to the appointment can also mean losing a full day of fishing, or more for some offshore fishermen, which means profit loss.

We were able to offer comprehensive in-person health exams to fishermen right at the dock or at a nearby location. In many circumstances we were able to accommodate walk-ins to the clinic. This model worked very well for fishermen. Some fishermen had not seen a medical professional in many years, which highlights a need for addressing this barrier to accessible care for fishermen.


**“I just had my annual exam, which lasted five minutes, and then came to you and had a really thorough exam that took 45 min. Thank you.”**





TIMELINE

This project began with interviews with fishermen to gain a better understanding of their sleep patterns and health concerns. Information from these interviews was used to design a survey to understand how sleep impacts fishermen’s health. These surveys were first tested with fishermen and modified based on their feedback, and completed by 262 fishermen over the phone. Based on the concerns fishermen expressed about their health, the Fishing Forward podcast was created to quickly bring sleep and health information back to fishermen by experts and other fishermen as we continued our study. Free in-person health exams were conducted with 162 fishermen in three states, and wearable technology was tested by fishermen to see which device(s) can accurately track sleep while on a boat.

	TASK	DESCRIPTION	DATE
PHASE 1	Interviews with Fishermen	In depth discussions about sleep and health, development and piloting of surveys	2019
PHASE 2	Sleep Surveys	Phone surveys with 262 fishermen	2021 & 2022
PHASE 3	Fishing Forward Podcast 	Collaboration with University of Guelph and Dalhousie University to bring sleep and health information to fishermen as quickly as we could after hearing fishermen’s concerns in the interviews	2021-2022
PHASE 4	In-Person Health Exams	Free health exams provided by healthcare teams at harbor locations for 162 fishermen	2022
PHASE 5	Wearable Technology	Identify a wearable & workable device for fishermen to accurately track sleep time and stages	2019-2022








SURVEYS

**262 fishermen** participated in surveys by phone, email or mail. Surveys covered a wide range of topics relevant to fishermen’s lifestyle choices, boat/fishery info, work role/schedule, physical health, diet, alcohol/caffeine/tobacco use, emotional health, and sleep. These surveys were used to understand sleep patterns of fishermen and see what factors impact their sleep.

HEALTH EXAMS

After surveys, **162 fishermen participated** in in-person health assessments to assess body mass index (BMI), respiratory, cardiovascular, musculoskeletal and mental health. The NEC team facilitated 31 clinic days at 10 locations: 55 salmon fishermen were recruited in AK, 30 scallopers and 28 lobstermen in MA, and 49 Dungeness Crabbers in OR. The teams were composed of a physician or nurse practitioner, RN or technician and an assistant. Survey respondents were invited to participate in the health exam. Additionally, a variety of outreach methods were used to invite additional fishermen to participate that varied by location and included radio, social media, dissemination by partners, word of mouth and dockside engagement with the population.

STUDY FISHERIES	
STATE	FISHERY
 ALASKA	Salmon (Gillnet)
 MASS	Scallop and Lobster
 OREGON	Dungeness Crab





WHAT DID WE DISCOVER?

PHASE 1 Interviews with Fishermen

Fishermen took part in interviews to share their concerns about sleep, their sleep schedules/sleep quality, and issues they encounter while working. Listening and learning from the fishermen themselves was absolutely essential for better understanding key connections between their sleep and health.

Fishermen identified three primary themes in their interviews: **health concerns, stress, and their environment.**

HEALTH CONCERNS

- » Physical Pain
- » Diet
- » Effects of Sleep Deprivation
- » Trauma/Other Medical Concerns

STRESS

- » Finances
- » Crew
- » Family/Social Life
- » Regulations

ENVIRONMENT

- » Noise, Emergencies, Equipment/Gear
- » Shift Work
- » Weather

“What keeps you awake is stress... weather, stress, and just having to work through the sleep period because of a broken boat, or because you have too many fish... you just have to keep working.”

PHASE 2 Sleep Surveys

Surveys were collected from **262 fishermen.** Here is what we learned:

How Much Sleep Are Fishermen Getting While on the Boat?

The data in the table below is all based on self-reported sleep schedules. Lobstermen served as a control in this sample as they typically do not sleep on the boat.

SLEEP MEASURES	SALMON FISHERMEN	LOBSTERMEN	SCALLOP FISHERMEN	CRAB FISHERMEN
AVERAGE TOTAL HRS	4.9 hrs.	Control	4.5 hrs.	5.0 hrs.
LEAST TOTAL HRS	1.6 hrs.	Control	1.1 hrs.	2.6 hrs.
AVERAGE CONSECUTIVE HRS	4.0 hrs.	Control	3.5 hrs.	3.7 hrs.
LEAST CONSECUTIVE HRS	1.4 hrs.	Control	1.0 hrs.	2.2 hrs.
CONSECUTIVE DAYS/ LEAST HRS	4.4 hrs.	Control	3.9 hrs.	5.2 hrs.



## How well are fishermen sleeping?

We know fishermen aren't getting enough sleep, but how good is the sleep that they **are** getting?

**2 in 5** fishermen reported having pain so severe that it interferes with their sleep.



Nearly **half** of fishermen reported that they do NOT have great quality of sleep.



Nearly **1 in 3** fishermen said they have trouble going to sleep.



Nearly **half** of fishermen said they have trouble staying asleep.



“I’m 56 years old.  
I haven’t had a good  
night sleep yet...  
I don’t even know  
what that is.”

Nearly **1 in 5** fishermen reported having a diagnosed sleep problem.



## In the medical community, it is known that health and safety issues can arise without sufficient sleep

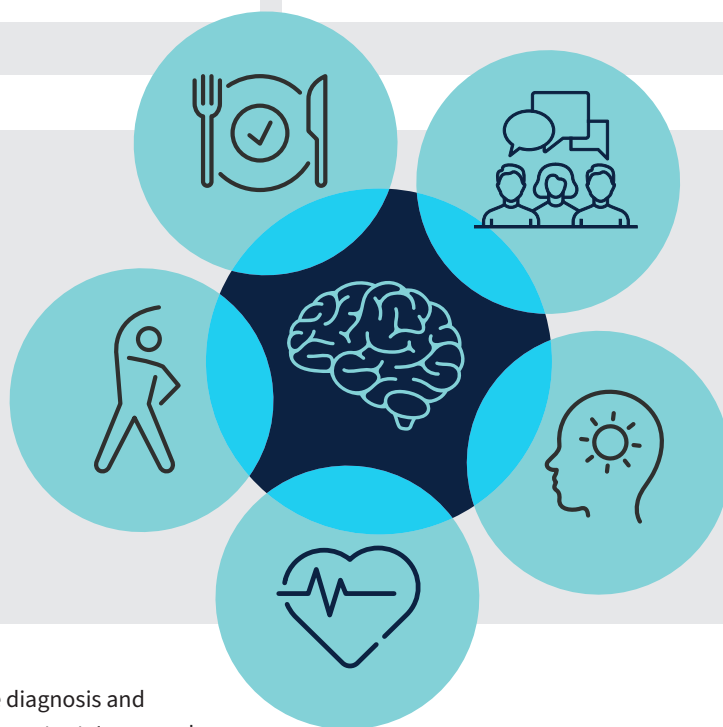
There are health and safety risks associated with not enough, and poor quality sleep. These can include:

- » Accidents/injury
- » Higher risk taking
- » Decreased immunity
- » Memory problems
- » Obesity
- » Mental health effects
- » Cancer
- » Diabetes
- » Alzheimer's

## How do fishermen combat the negative health effects of sleep deprivation?

Getting 8 hours of sleep isn't really an option for many fishermen.

If we can understand how they are doing on other pillars of brain health (**physical exercise, diet, medical health, mental health, and social support**), it will help us understand fishermen's collective neurological risks.



### Medical Health

A Body Mass Index (BMI) within the normal range is ideal, and the diagnosis and treatment of other issues such as diabetes & high cholesterol is important. In general, most fishermen rated their health as “good” or “fair”. More detailed results of medical health are discussed in Phase 04 (page 13).

### How Fishermen Rate their Own Health

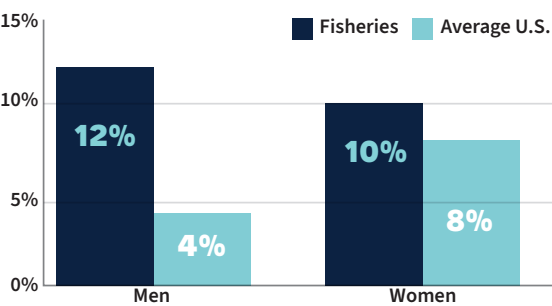
FISHERMEN	POOR	FAIR	GOOD	VERY GOOD
LOBSTER	6%	6%	55%	33%
SALMON	0%	8%	62%	30%
CRAB	4%	27%	41%	28%
SCALLOP	0%	4%	59%	37%



Mental Health/Fitness

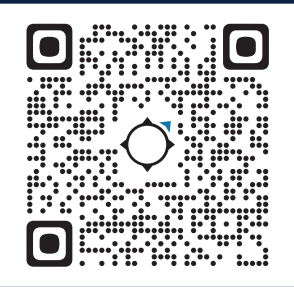
Diagnosing and treating depression or other mental health issues, like Post Traumatic Stress Disorder (PTSD) is another key facet of brain health. Our results indicate that PTSD rates in commercial fishermen (12%) are almost 3 times higher than the general male population (just under 5%).

PTSD rates in Commercial Fishermen



Did You Know?

The Northeast Center has partnered with the Maine Coast Fishermen’s Association and Man Therapy to bring mental health resources specific to the commercial fishing industry. Visit [necenter.org/ManTherapy](https://necenter.org/ManTherapy) or scan the QR code to see more.



## Diet

Fishermen rated their diets both while on the boat and at home. **Less than half** of them said their diets were good both on the boat and at home. In the surveys, fishermen talked about how it's hard to have a good diet, especially on the boat because of the challenges of stocking food and cooking it. **Over 1/3** of fishermen said their diet was good at home but poor on the boat.

## Caffeine Consumption

Fishermen in our study typically consume around **3 cups of coffee per day**. Department of Defense sleep researchers have indicated concerns regarding the neurotoxicity of energy drinks.

## Nicotine Consumption

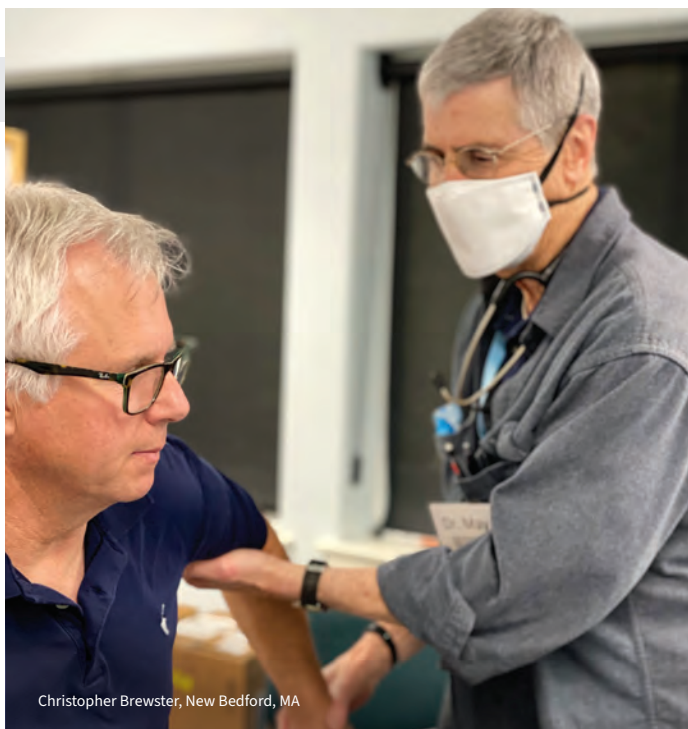
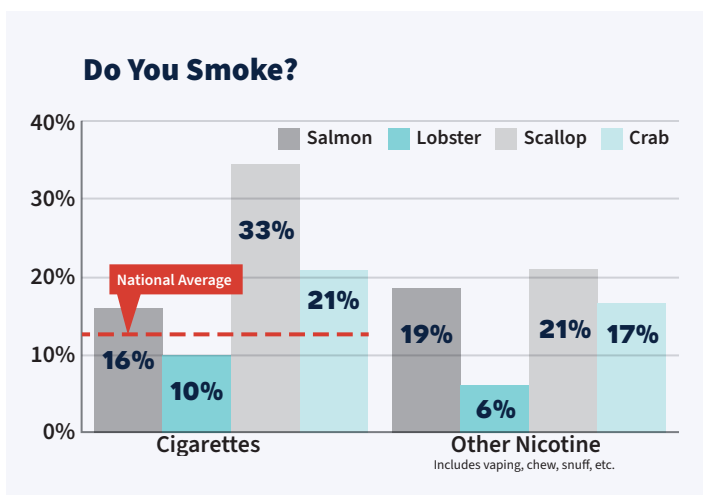
Around **33%** of scallop fishermen smoke and around **21%** of crab fishermen smoke, well above the national average of 12.5% (indicated by the red line).

## Social Support

Interaction and support are key to supporting overall health and staying intellectually stimulated. We were unfortunately unable to capture data on social support, but hope to learn more about this in future studies.

## Physical Exercise

Commercial fishing is a very physically demanding occupation. It is worth noting that several captains in our study pointed out that even though their work is physically strenuous, it does not give them the cardio workout they need, and after such a physical day, they are unlikely to go to the gym.



Christopher Brewster, New Bedford, MA

“...as far as ‘describe the quality of sleep’ when you’re on a fishing boat. There isn’t any. And lack of sleep, absolutely. It impacts everything.”



## PHASE 3 Fishing Forward Podcast: designed to keep fishermen shipshape in the fishing industry

An 18-episode podcast inspired by fishermen, for fishermen, that focuses on health, safety, and staying shipshape in the commercial fishing industry.

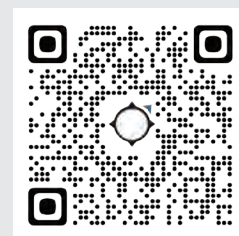
Fishing Forward podcast was funded by the Northeast Center for Occupational Health and Safety and produced by the team at Coastal Routes Radio at the University of Guelph and Dalhousie University in Canada. We would like to extend a big thank you to our partners for working with us on this collaborative endeavor: AMSEA; Oregon State University; Fishing Partnership Support Services; Maine Coast Fishermen's Association; The Southwest Center for Agricultural Health, Injury Prevention and Education; NORA Agriculture, Forestry, and Fishing Sector Council; and the National Institute for Occupational Safety and Health.

We would also like to thank Hannah Harrison and Phil Loring, who were instrumental in the production of this podcast.



### EPISODES:

- Ep. 1 - The Professional Fishing Athlete
- Ep. 2 - The Professional Fishing Athlete, Part 2
- Ep. 3 - Diet and Nutrition
- Ep. 4 - Hydration
- Ep. 5 - Cooking and Relationships
- Ep. 6 - Sleep, Part 1
- Ep. 7 - Sleep, Part 2
- Ep. 8 - Sleep and Stimulants
- Ep. 9 - Sleep and Relationships
- Ep. 10 - Trauma and PTSD
- Ep. 11 - Anxiety, Stress, and Moral Injury
- Ep. 12 - Pain and Disorder, Part 1
- Ep. 13 - Pain and Disorder, Part 2
- Ep. 14 - Health in Fishing Communities
- Ep. 15 - Crew, Aging Fleets, and Infrastructure
- Ep. 16 - Hearing, Noise, and Vibration



All episodes are available at [coastalroutes.org/fishingforwardpod](http://coastalroutes.org/fishingforwardpod)


**Fishing Forward Podcast**  
 July 22, 2022 · 🌐

Fishing Forward co-host Hannah Harrison was featured on [Global Halifax](#) this morning talking about our latest podcast episodes and the human side of seafood. Check out her interview!



1:28 / 5:26  
 Global NEWS


**Global Halifax** 🌐  
 July 22, 2022 · 🌐

We check in with Hannah Harrison to find out more about Fishing Forward, a new podcast that showcases the trials, tribulations and trauma of working in the fisheries as told by fisherman themselves. More Global News Morning videos can be found here: <http://globalnews.ca/halifax/videos/>

# PHASE 4

## In-Person Health Exams

Health exams were conducted at **31 clinic days** across **10 locations** in AK, OR and MA for **162 fishermen**. Teams included a Physician or Nurse Practitioner, RN or technician and an assistant. Data collected during exams included: medical history, BMI, vision, peak flow, random glucose, cholesterol, 10-year cardiovascular risk, PTSD, sleepiness using the Epworth Sleepiness Scale, and then a thorough physical from the clinic provider. Fishermen were all given a “Health Score Card” to summarize their health information with information on how to interpret the data. Below are some key findings:

### Demographics

	AK SALMON		MA LOBSTER		MA SCALLOP		OR CRAB	
AGE: MEDIAN (RANGE)	52 (22-72)		59 (27-77)		46 (23-65)		42 (18-73)	
GENDER (#)	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
	47	8	27	1	30	0	47	2

**Body Mass Index (BMI)** is a measure of an individual’s weight to height ratio. Though it is not a direct measure of body fat, calculated BMI is just as useful as other direct measures of body fat in offering insight into metabolic and disease outcomes.

### Body Mass Index (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
UNDERWEIGHT (<18.5)	1.8	0.0	0.0	0.0
NORMAL (18.5-24.9)	29.1	21.4	30.0	22.4
OVERWEIGHT (25-30)	50.9	39.3	46.7	42.9
OBESE (>30)	18.2	39.3	23.3	34.7



# WHAT DID WE DISCOVER?

## Blood Pressure (percentage of fishermen by category)

NOTE: It is important to note that one blood pressure measurement cannot make a diagnosis. Numbers reported here are trending toward the listed categories, but repeated measurements are needed to accurately diagnose hypertension.

		AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
NORMAL	$\frac{<120}{<80}$	34.5	7.1	36.7	20.4
ELEVATED	$\frac{120-129}{<80}$	21.8	3.6	3.3	14.2
HYPERTENSION 1	$\frac{130-139}{80-89}$	27.3	50.0	50.0	26.5
HYPERTENSION 2	$\frac{\geq 140}{\geq 90}$	16.4	39.3	10.0	38.8

## Respiratory Health

Peak Flow measurements were taken for each fisherman to measure how fast air was coming out of their lungs when exhaled forcefully. This measurement can help to recognize early signs of worsening asthma. The majority of fishermen (both men and women) had readings within the normal range.

Exhaled carbon monoxide (CO) was also measured (how much CO is in your body). This test can show you if you're being exposed to dangerous levels of CO from smoking, being exposed to secondhand smoke, or other sources of CO like working on diesel engines in enclosed spaces.

## Exhaled Carbon Monoxide (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
0-6 PPM (NON-SMOKER)	54.5	75.0	56.7	53.1
7-10 PPM (LIGHT SMOKER)	16.4	14.3	13.3	14.3
11-20 PPM (SMOKER)	16.4	3.6	6.7	18.4
>20 PPM (HEAVY SMOKER)	12.7	7.1	23.3	14.3

## Cholesterol

Total cholesterol is the combined amount of low density lipoprotein (LDL/bad cholesterol), and high density lipoprotein (HDL/good cholesterol) in your blood. This measurement shows how your body is handling fats and can be used as an indicator for risk for heart disease and stroke.

### Total Cholesterol (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
<200 (DESIRABLE)	74.5	67.9	86.2	79.6
200-239 (BORDERLINE)	12.7	28.9	6.9	16.3
>240 (HIGH)	12.7	3.6	6.9	4.1

**High Density lipoprotein (HDL- good cholesterol)** moves cholesterol out of your arteries. A high HDL number lowers your risk for coronary heart disease. The majority of fishermen across all fisheries were in the 'desirable' category.

### HDL Cholesterol (percentage of fishermen by category)

	AK SALMON	MA LOBSTER	MA SCALLOP	OR CRAB
<40 (AT RISK)	9.1	14.3	13.8	10.2
40-60 (DESIRABLE)	50.9	60.7	72.4	63.4
>60 (PROTECTS HEART)	40.0	25.0	13.8	26.5

## Sleep & Cognitive Function

All fishermen filled out the Epworth Sleepiness Scale which is used as a subjective measure of a person's sleep, designed to assess daytime sleepiness. The overwhelming majority of fishermen across all fisheries fell within the normal range of sleepiness.

Fishermen also took the Short Blessed Test which evaluates cognitive changes by assessing orientation, registration and attention. Scores range from 0-28 and represent normal cognition, questionable impairment, or impairment with dementia. The vast majority of fishermen in all fisheries fell within the 'normal cognition' category.



Robert Kemp, Newport, OR













## PHASE 5 **Wearable Technology**

This component of our research was led by Dr. Leigh McCue-Weil, an engineer and researcher from George Mason University. In this trial we had hoped to identify a device that fishermen could wear comfortably which would accurately track sleep times and sleep stages. To identify our sleep tracking device options we reviewed the literature and compared device capabilities. We also reviewed the options with fishermen to get their feedback. In selecting devices to trial at sea, we hoped to avoid items that might be considered higher risks for entanglement (many fishermen don't wear rings for fear of catching it on gear). We also expanded the ways they might wear a device (e.g. the actigraph could be worn on the wrist, ankle, or waist). As you'll see in the table, we ended up choosing fitbits, actigraph watches, Dreem devices, an oura ring and Hexoskin smart shirts. As indicated in the table, these devices store data in different ways, most are water resistant and track sleep stages (although the Dreem device is not water resistant and actigraph watches do not track sleep stages).

### The leading issues we encountered with these devices were:

1. Comfort: The Dreem device, in particular, was considered too uncomfortable.
2. Data Storage: The Fitbit would only retain data for 7 days before being overwritten, but our fishermen were frequently at sea for longer sessions, with no access to WiFi.
3. Accuracy: Movement of the boat raised concerns about the validity of actigraphy devices, as these track sleep through movement and the movement of the vessel could impact accuracy.

### Comparison of Wearable Technology Devices

DEVICE	STORAGE	WATER RESISTANCE	SLEEP STAGES	CONSIDERATIONS
FITBIT CHARGE 3	Cloud			No raw data Only available as a wrist watch 7 days of data storage
ACTIGRAPH WGT3X-BT	Device			Movement only 30-day battery life Raw data
DREEM 2	Cloud			Limited battery Discomfort EEG data
OURA 2ND GENERATION	Cloud			No raw data Only available as a ring Customized fit
HEXOSKIN SMART	Cloud			Manual sleep log for tagging Customized fit

It is likely unrealistic for most fishermen to get a full 8 hours of sleep while fishing. However, there are other practical solutions that fishermen can utilize to offset the effects of sleep deprivation.

Diet and reducing inflammation

Focusing on your diet and eating anti-inflammatory foods can promote good health and combat the negative effects of sleep deprivation. In fighting inflammation, your diet is one of the most powerful tools that you have! Many major diseases like cancer, heart disease, diabetes, arthritis, depression and Alzheimer’s have been linked to chronic inflammation.

“I feel a lot better when I am able to rest correctly and eat correctly.”

Increasing Hydration

Tie drinking more water into your routine! Every time you wake up, use the bathroom, eat a meal, take a break, etc., have some water. If you’re not a fan of water, flavor it with powder or liquid water enhancers. Eating fruits and veggies with high water content is also helpful!

Signs of dehydration include fatigue, confusion and short term memory loss, headache, dizziness and/or lightheadedness, dry mouth, lips and eyes. It is important to note that dehydration has been linked to repetitive musculoskeletal injuries, a prevalent risk for fisheries workers given repetitive and strenuous work tasks.

Anti-inflammatory Foods



Tomatoes



Fruits

Strawberries, oranges  
blueberries, cherries, etc



Nuts

Almonds, Walnuts,  
and other nuts



Olive Oil



Leafy Greens

Spinach, kale,  
collards, and more



Fatty Fish

Salmon, mackerel,  
tuna, and sardines

Inflammatory Foods



Fried Foods



Sodas



Refined Carbs



Lard



Processed Meats

Correct Hydration



TRANSPARENT

You’re overhydrated.  
Hold off on the water  
for a bit.



LEMONADE

This is optimal  
hydration. Keep doin’  
what you’re doin’.



LIGHT BEER

You’re still hydrated  
and doin’ great.



AMBER

No need to fret, but  
time to drink some  
water. You could be  
mildly dehydrated.



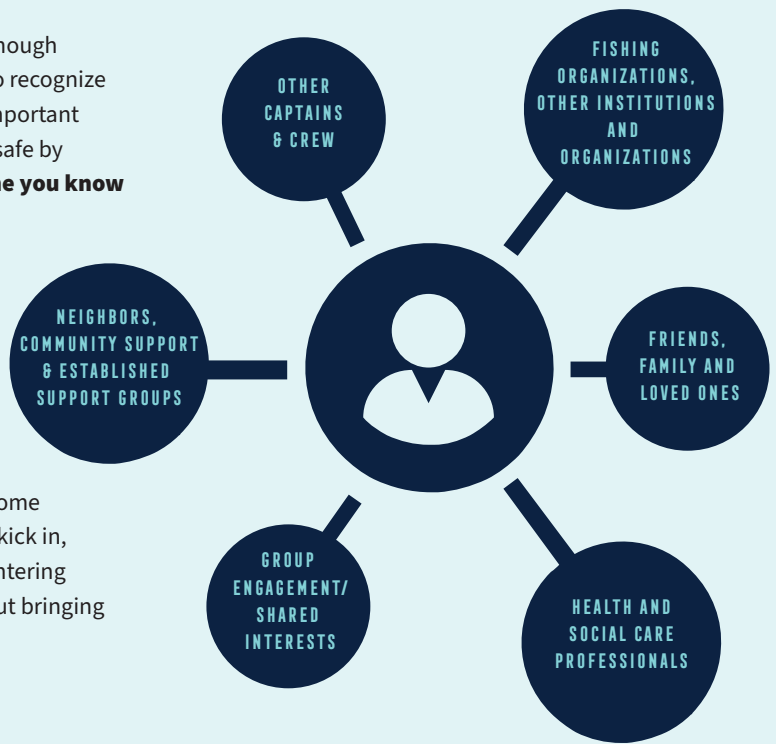
BURNT ORANGE

You’re definitely  
dehydrated. Drink  
lots of water and  
electrolytes.



## Social Support

Social support both on and off the boat are important. Having enough crew onboard allows everyone to sleep in shifts. Learning how to recognize the signs of fatigue in both yourself and your crewmembers is important to maintaining health and keeping you and your crewmembers safe by avoiding accidents and injuries. **Remember, call 988 if someone you know is in mental health crisis.**



## Strategic Napping

Strategic napping can help you to feel more rested. If you have some caffeine, take a 20 minute nap. By the time the caffeine starts to kick in, your nap is done and you're ready to keep fishing. Short naps (entering light sleep) can be helpful in dissipating the need to sleep without bringing you into REM (rapid eye movement) sleep.

## Sleep Cycle



Anna Capri, Newport, OR



Peter Farland Sr., New Bedford, MA

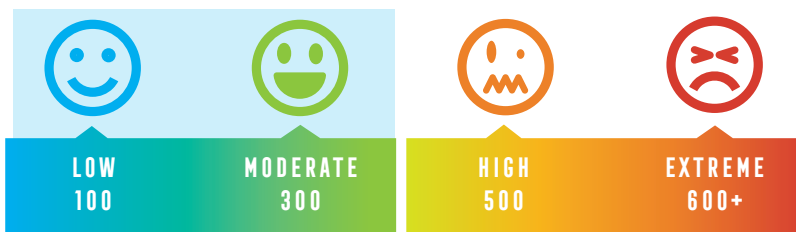


Chris Roebuck, Cape May, RI

## Caffeinating Strategically

Caffeine blood levels peak between 30 minutes and 2 hours after consumption. They stay high for about 3-4 hours, **and low doses of caffeine have the best impact on brain performance.** By focusing on low dose consumption of caffeine every few hours, you will trigger greater effects on cognition and brain activation (compared to higher doses). **Any beverage that offers over 200mg of caffeine is not providing additional performance enhancements**, but can have negative health effects. Some forms of low dose caffeine, like green tea, supply antioxidants. Others, like green tea with ginger or turmeric are anti-inflammatory, too!

### Caffeine Intake: How Much is Ideal? (in milligrams)



### Good Sources of Caffeine



**COFFEE**  
~100 MG Caffeine/Cup



**BLACK TEA**  
~26 MG Caffeine/Cup



**MATCHA**  
~152-352 MG Caffeine/Cup



**YERBA MATE**  
~85 MG Caffeine/Cup



**GUAYUSA**  
~66 MG Caffeine/Cup



**YAUPON**  
~66 MG Caffeine/Cup



# You are an industrial athlete. Train like one!

If you can't get a full night sleep regularly, increase other healthy lifestyle factors.

## Healthy lifestyle factors include:

- ✓ Healthy Diet
- ✓ Hydration
- ✓ Thoughtful Pain Management
- ✓ Caffeinate Effectively
- ✓ Avoid Alcohol, Tobacco
- ✓ Avoid Inflammatory Foods
- ✓ Avoid Energy Drinks
- ✓ Increase Heart Health
- ✓ Overuse Injury Prevention Strategies





CONCLUSIONS

You are just as important as your boat and should put as much effort into maintaining your body as you do your boat.

Feeling healthier may make work easier- you'll have more energy and increased mental sharpness!

Prioritizing you and your crew's health and safety can help you catch more fish over time!

Fishermen feedback:

95% are interested in a future free health exam

75% are interested in a webinar on study results

Interested in dental care: 63%  
Interested in primary care: 57%

80% would use a dockside clinic if available

“...the exam was thorough. Ten times more so than my annual physical with my PC...”

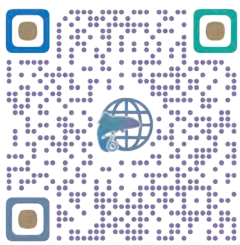
Fishermen's Memorial, Petersburg, AK



NEXT STEPS

Results will be shared with the fishing community and other researchers through social media, webinars, academic journals and conferences (such as IFISH6). What are your suggestions for next steps? Please let us know at 800-343-7527 or info@necenter.org.

The IFISH6 conference will be held January 8-12, 2024 in Rome, Italy. Workshops, presentations and poster sessions featuring new occupational health and safety research findings and innovations will be taking place, and fishermen are encouraged to attend and share their experiences. If you are unable to attend, we are happy to share information after the conference.



THANK YOU!

We would like to acknowledge the incredible fishermen who made this project possible, for your guidance, your support and your participation!

We would also like to thank our partner organizations that helped to make this study a success.



Top Row L to R: Paul Jenkins; Leigh McCue-Weil; Kayla Johnson, Judy Graham & Brian Quinn; Middle Row: Andy Demma & Jessica Salerno; Jessica Salerno, Julie Sorensen & Mandy Roome; Jerry Dzugan; Edward Dellecese, fisherman; Bottom row: Hunter Major, fisherman; Kayla Johnson, John May, Judy Graham, Laurel Kincl & Amelia Vaughan; Rebecca Weil & Michael Levenstein



**“This study represents the most comprehensive assessment of fishermen’s sleep and health in the U.S. to date. We look forward to building on what has been learned in this study to improve the health and wellbeing of fishermen in the years to come.”**

**Julie Sorensen, Principal Investigator**







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