



New York Sea Grant



SEAFOOD
EAT FOOD
Local Fresh Safe

Seafood and Aquaculture Workshop
Nutrition and Safety

New York  Sea Grant

SEAFOOD

EAT FOOD

Local Fresh Safe

Seafood Nutrition

USDA 2015-2020 Dietary Guidelines

Healthy Eating Pattern

Eat Less

- Saturated & Trans Fats
- Added Sugars
- Sodium

Eat More

- Vegetables
- Fruits
- Grains (1/2 Whole)
- Fat Free/Low Fat Dairy
- Proteins (Including **Seafood**)
- Oils

Seafood 2x a Week

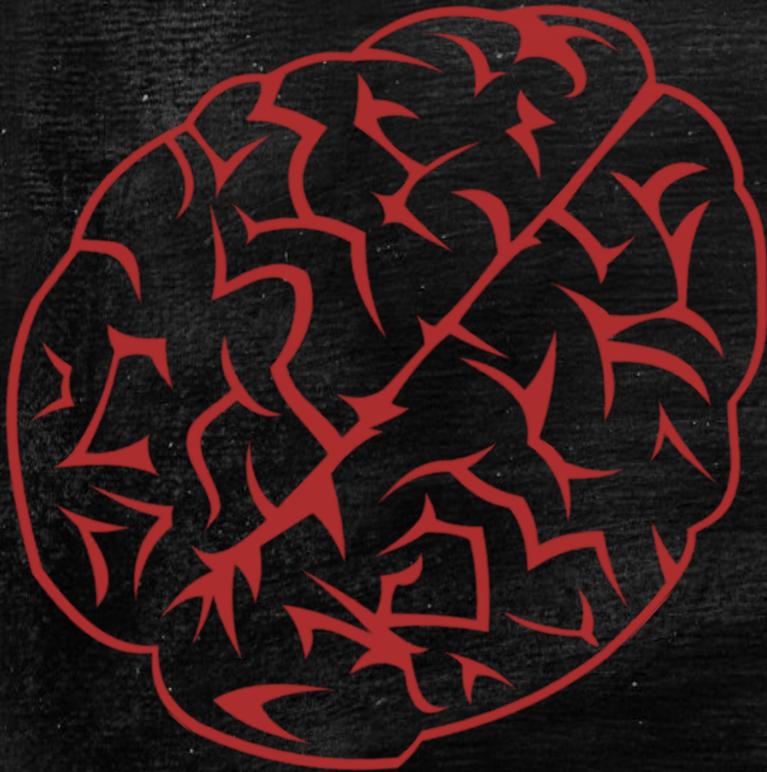
Can reduce your risk of heart
disease by

36%

and provide more energy
throughout the day

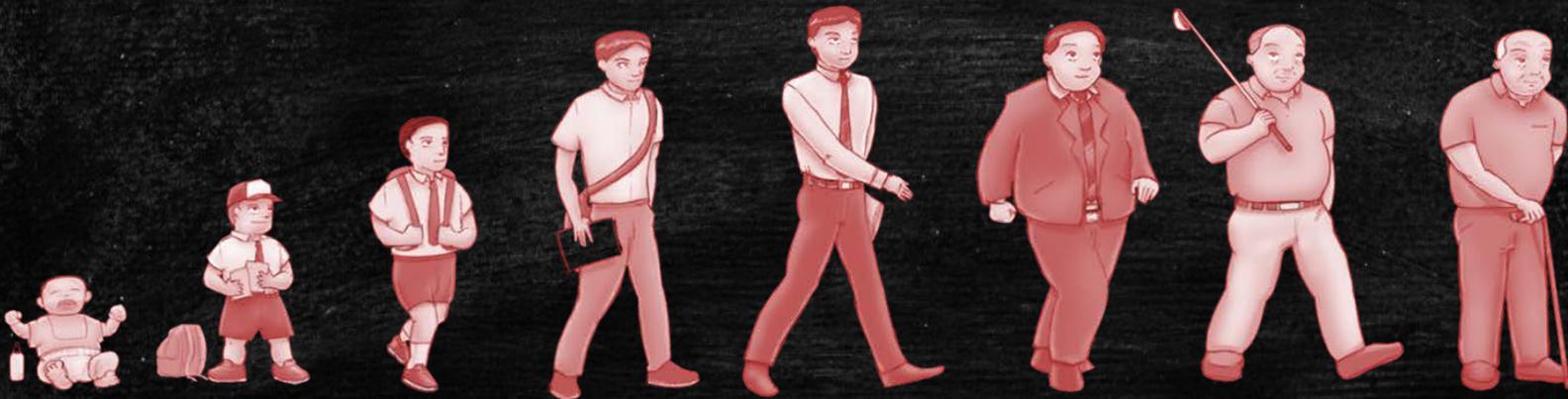
When pregnant

Consuming seafood
can enhance your
baby's brain and
eye development



Seniors and Seafood

Can exhibit enhanced cognitive function and a increase life expectancy.



Nutrition

- Omega-3
- Low saturated fats
- Lean high quality protein
 - Low calorie
- Vitamins and Minerals
 - Selenium
 - Iodine



Omega-3: EPA & DHA

Recommendation: 250mg per day

SEAFOOD PRODUCT		3 OUNCE COOKED PORTION
Herring, Wild (Atlantic & Pacific)	♥♥♥♥♥	>1,500 milligrams
Salmon, Farmed (Atlantic)	♥♥♥♥♥	
Salmon, Canned (Pink, Sockeye & Chum)	♥♥♥♥	1,000 to 1,500 milligrams
Mackerel, Canned (Jack)	♥♥♥♥	
Salmon, Wild (Sockeye, Coho, Chum & Pink)	♥♥♥	500 to 1,000 milligrams
Oysters, Wild & Farmed	♥♥♥	
Tuna, Canned (Light)	♥♥	200 to 500 milligrams
Halibut, Wild (Pacific & Atlantic)	♥♥	
Shrimp, Wild & Farmed	♥	<200 milligrams
Tilapia, Farmed	♥	

Lobster: 3oz Portion

Protein
16g

Saturated
Fat
0g

Trans-Fat
0g

Omega-3
170mg



Fat
0.5g

Sodium
410mg

Cholesterol
125mg

Calories
80

Selenium
90%

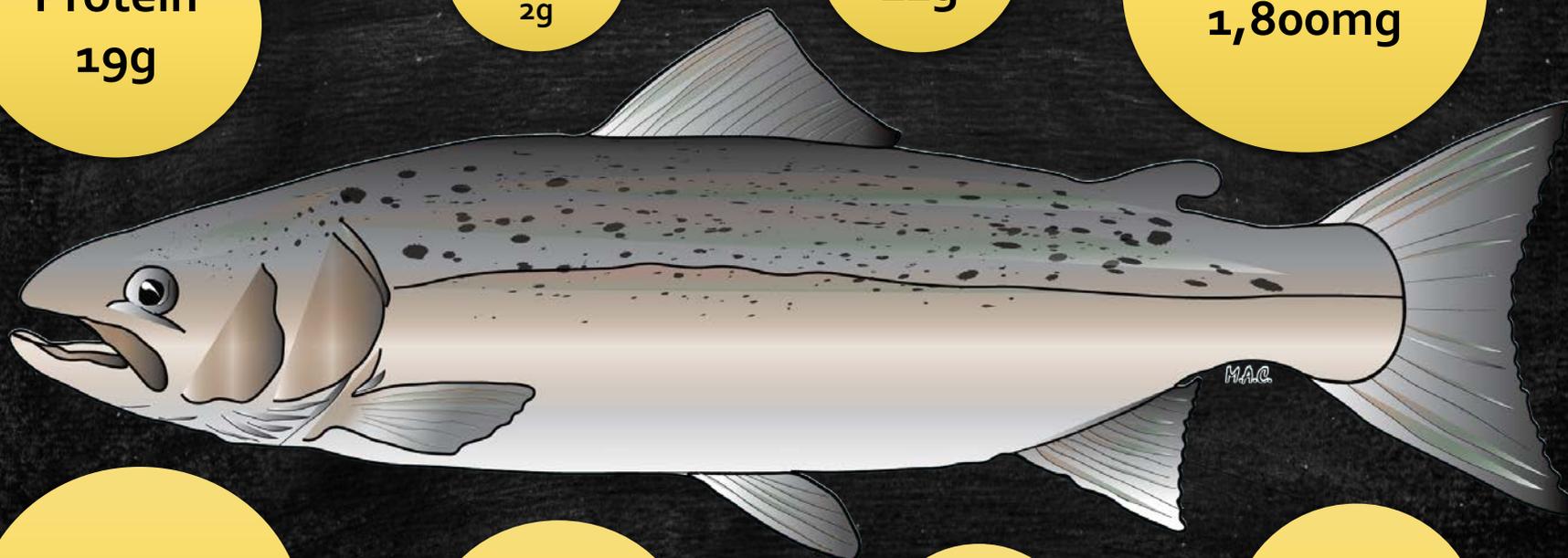
Atlantic Salmon: 3oz Portion

Protein
19g

**Saturated
Fat**
2g

Fat
11g

Omega-3
1,800mg



Calories
180

Cholesterol
45mg

Trans-Fat
0g

Selenium
50%

Salmon

Atlantic

Nutrition Facts	
Serving Size 3 oz (85g) Atlantic Salmon, cooked dry heat	
Amount Per Serving	
Calories 180	Calories from Fat 90
% Daily Value*	
Total Fat 11g	17%
Saturated Fat 2g	10%
Trans Fat 0g	
Cholesterol 55mg	18%
Sodium 50mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 19g	
Vitamin A 0%	Vitamin C 6%
Calcium 2%	Iron 2%
Selenium 50%	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Saturated Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Coho

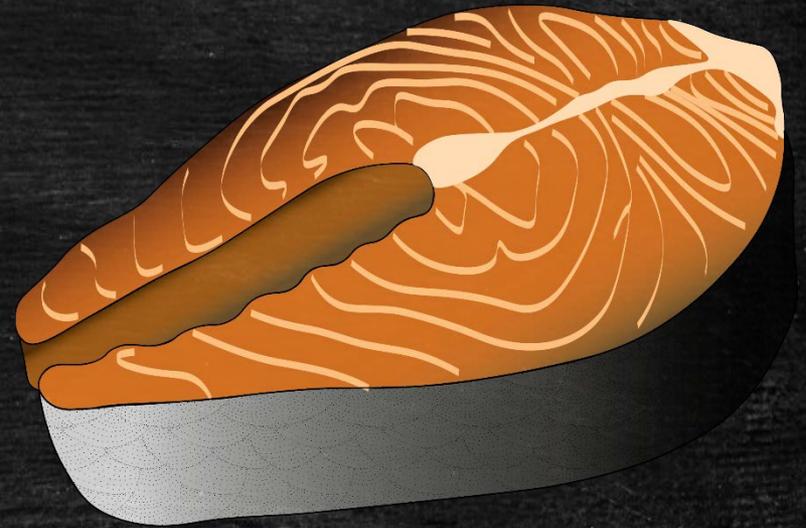
Nutrition Facts	
Serving Size 3 oz (85g) Coho Salmon, cooked dry heat	
Amount Per Serving	
Calories 120	Calories from Fat 35
% Daily Value*	
Total Fat 3.5g	5%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 45mg	15%
Sodium 50mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 20g	
Vitamin A 2%	Vitamin C 2%
Calcium 4%	Iron 2%
Vitamin D 100% • Selenium 45%	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Saturated Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Pink

Nutrition Facts	
Serving Size 3 oz (85g) Pink Salmon, cooked dry heat	
Amount Per Serving	
Calories 130	Calories from Fat 40
% Daily Value*	
Total Fat 4.5g	7%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 45mg	15%
Sodium 75mg	3%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 21g	
Vitamin A 2%	Vitamin C 0%
Calcium 0%	Iron 2%
Vitamin D 110% • Selenium 45%	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Saturated Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

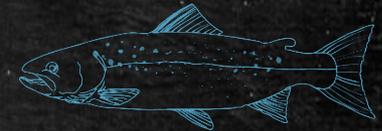
How Much?

6-10 oz
per week



Diversity

- In 2014 there were over 129 different species of fish caught by U.S. Fishermen.
 - 98 Finfish
 - 31 Shellfish
- Aquaculture
 - 22 Finfish
 - 18 Shellfish



Bottom Line..

High Protein

Good Fats

Immune Boosting

Delicious

Low Calories

Easy to Digest

Heart Healthy

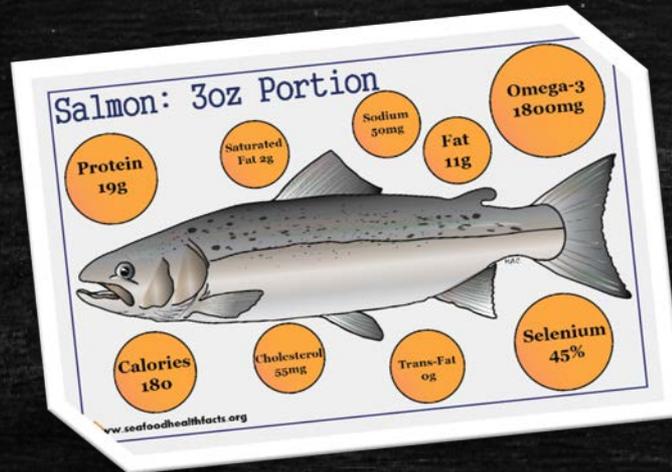
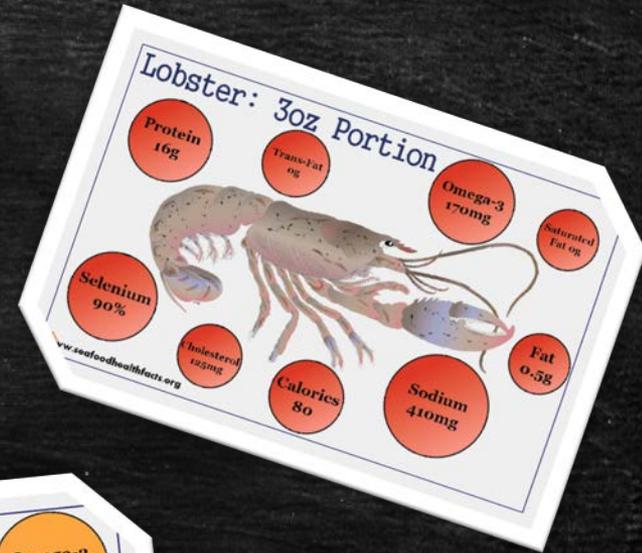
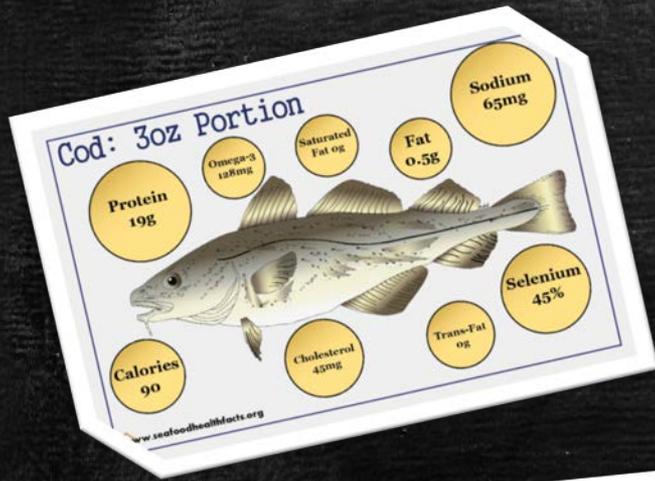
Reduced Risk of some Cancer

Nutritious

Low Saturated Fats

Reduced Risk of Stroke

Educating Consumers



New York  Sea Grant

SEAFOOD

EAT FOOD

Local Fresh Safe

Seafood Safety

Food Borne Illness

Annually in the USA

48 Million Cases

128,000 Hospitalizations

3,000 Deaths

Food Borne Illness

1998-2015

19,119 Outbreaks

373,531 Illnesses

14,681 Hospitalizations

337 Deaths

Seafood Related Illness

1998-2015

837 Outbreaks **4.4%**

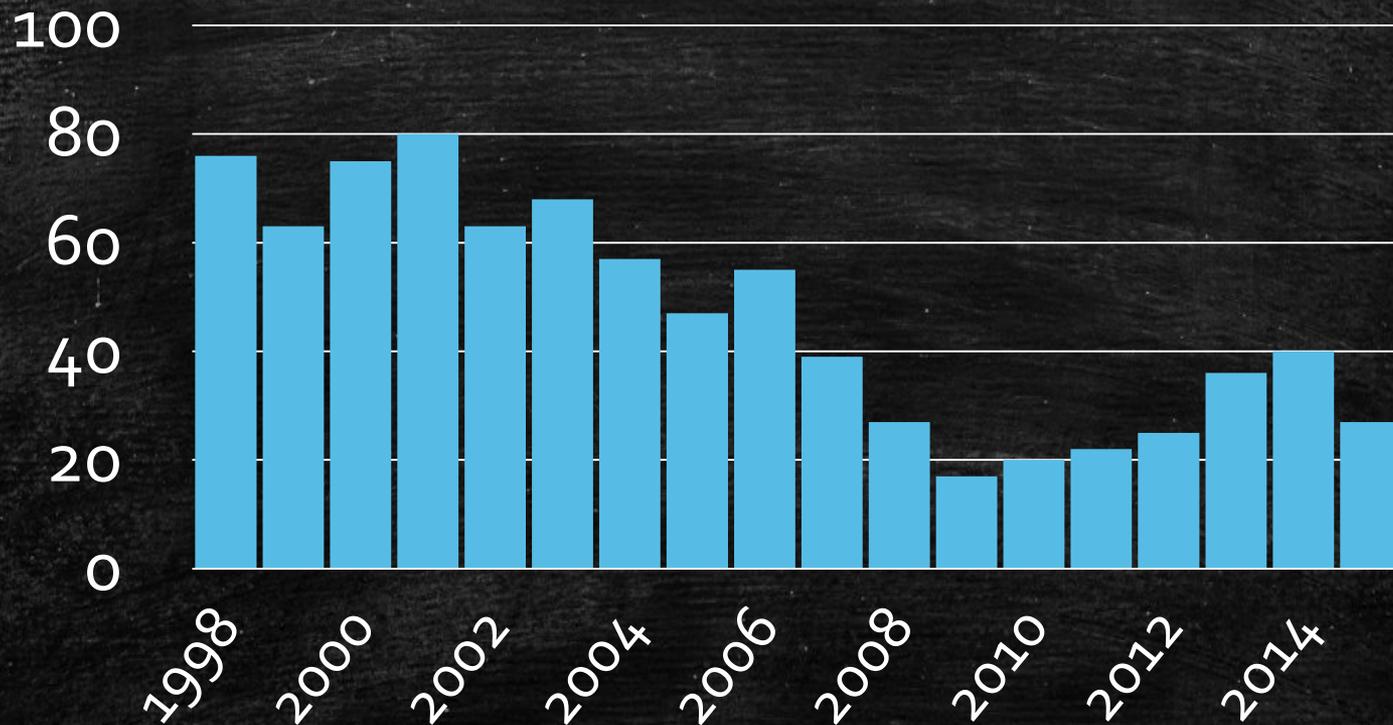
5,716 Illnesses **1.5%**

345 Hospitalizations **2.3%**

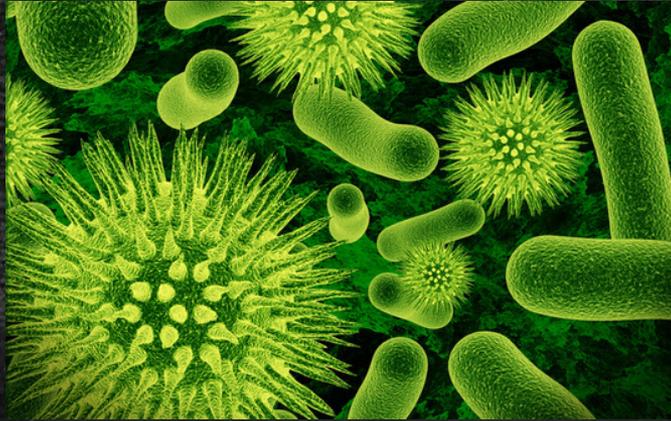
4 Deaths **1.2%**

Food Born Illness in the U.S.

Seafood Related Outbreaks



Top Safety Concerns



1. Microbial Growth

Bacteria

Virus

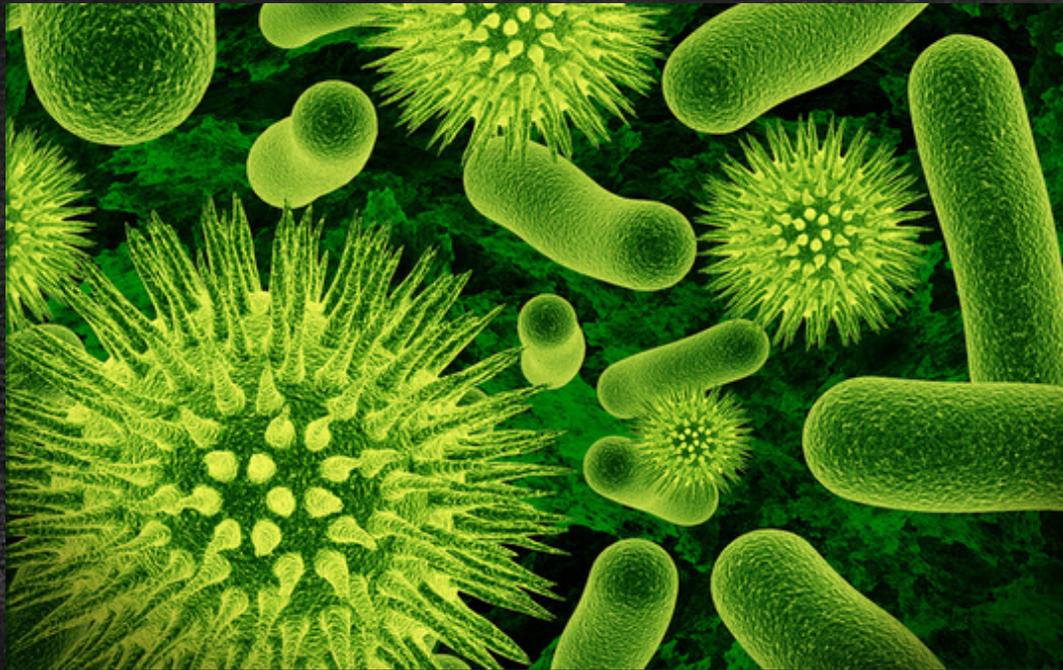
2. Chemical Contamination

Natural toxins

Environmental Contaminants

Aquaculture Drugs





Microbial Growth

Top biological concern: Bacterial Pathogens

Pathogens

Blurred
Vision

Headache

Diarrhea

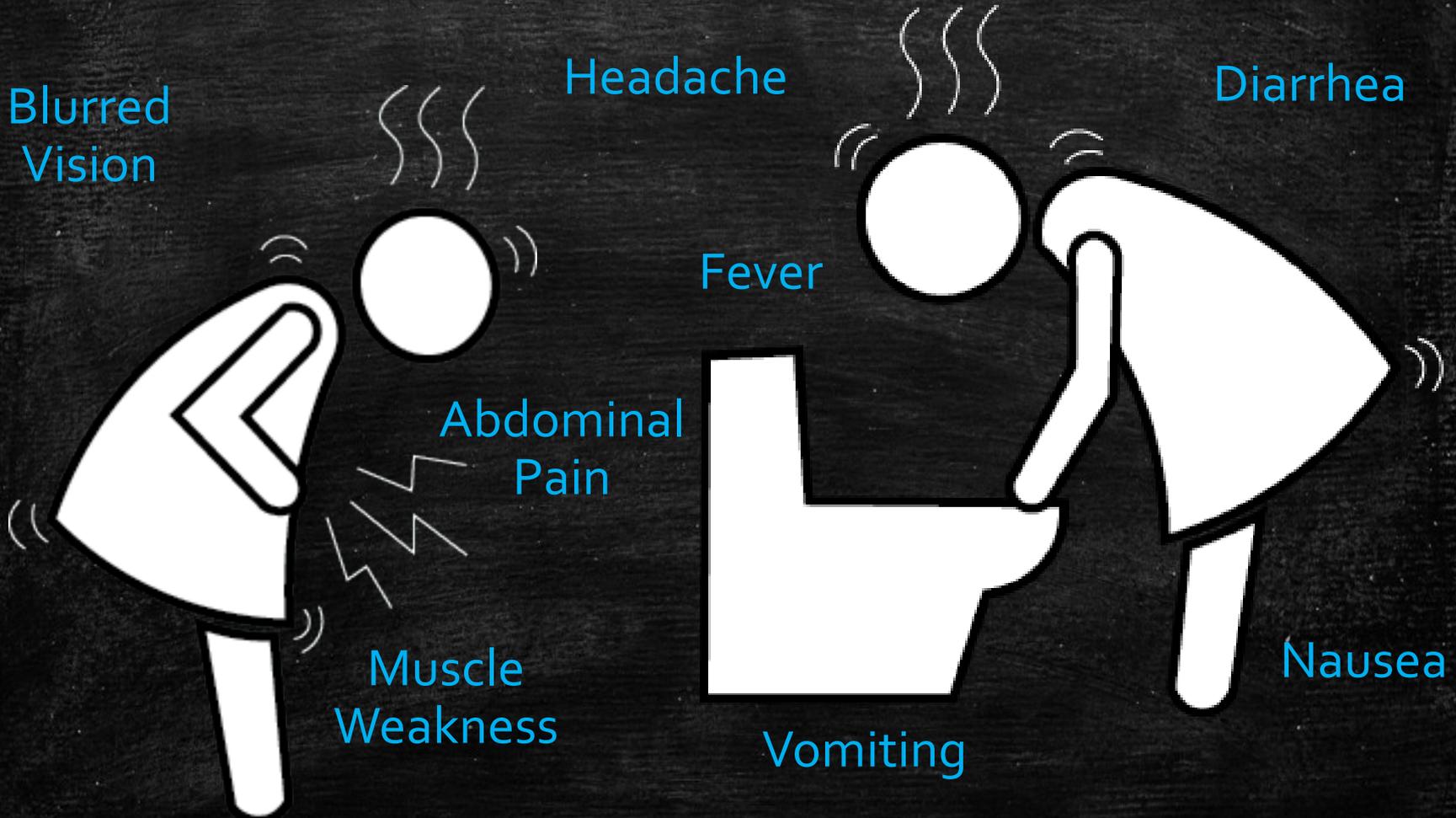
Fever

Abdominal
Pain

Muscle
Weakness

Vomiting

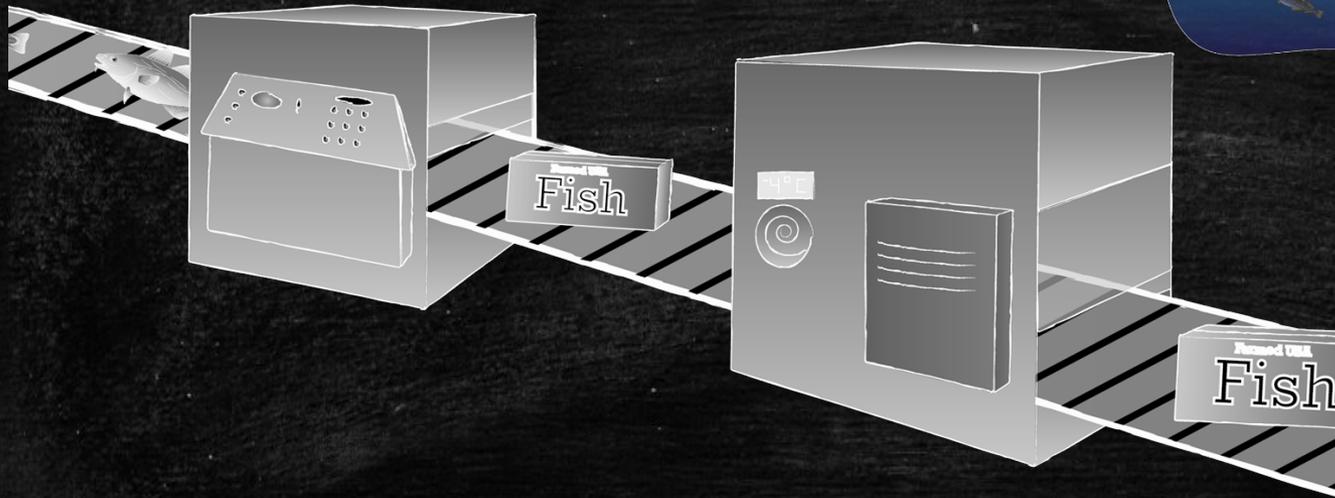
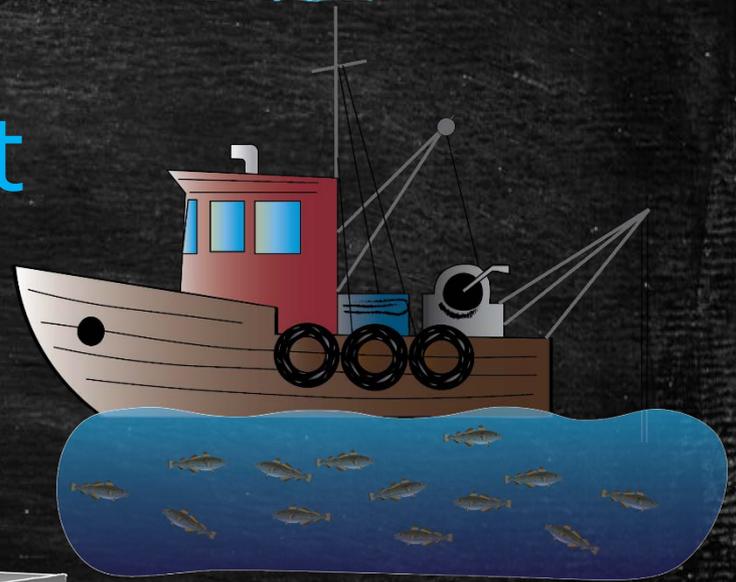
Nausea



Where do they come from

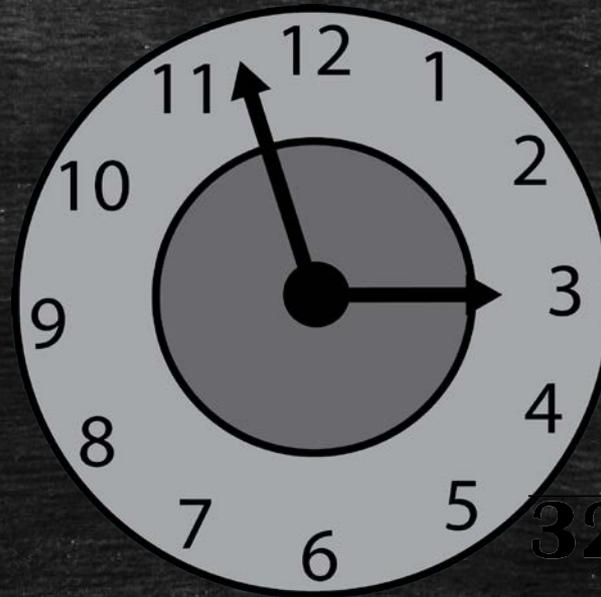
Natural Environment

Ubiquitous



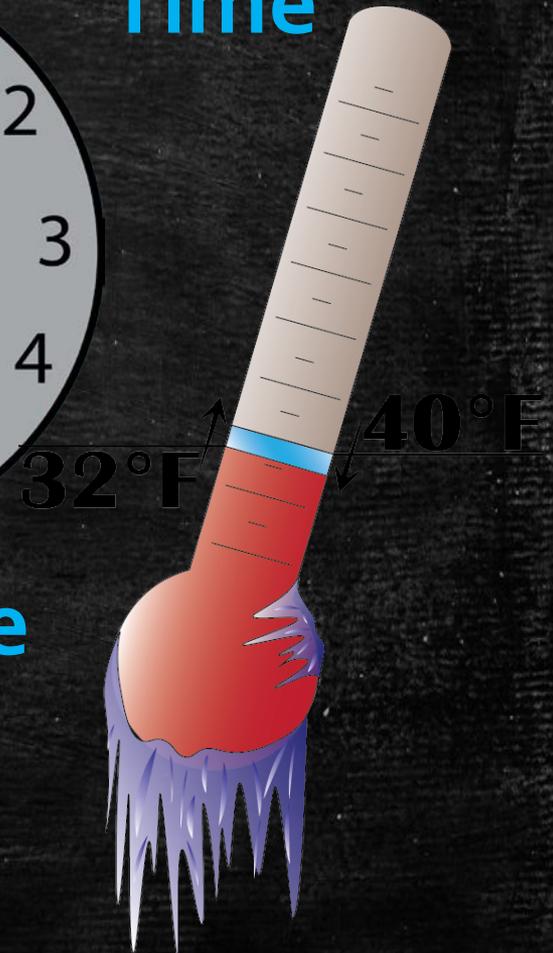
Key to Control

Sanitation

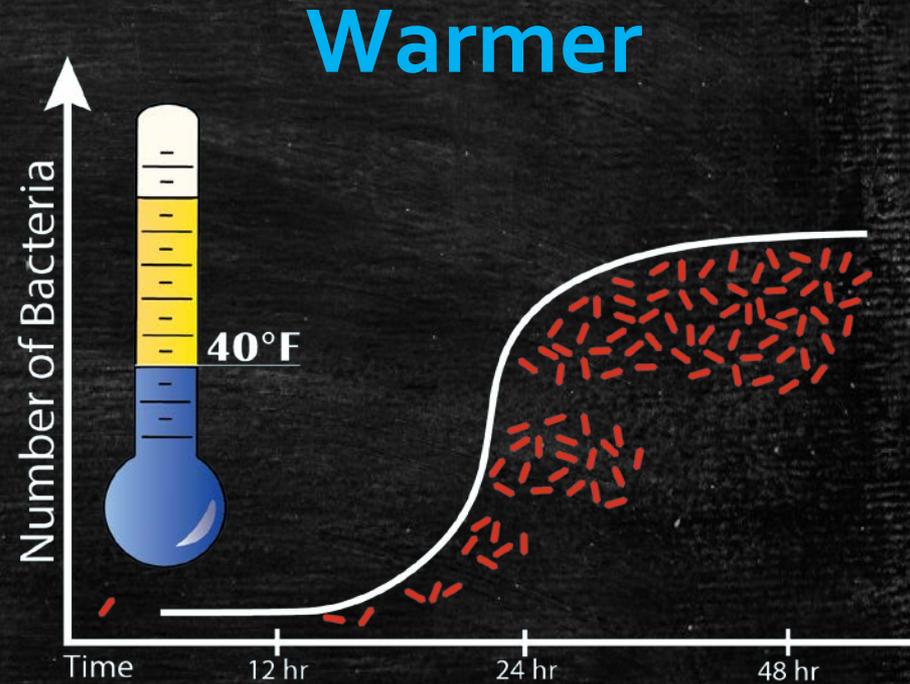
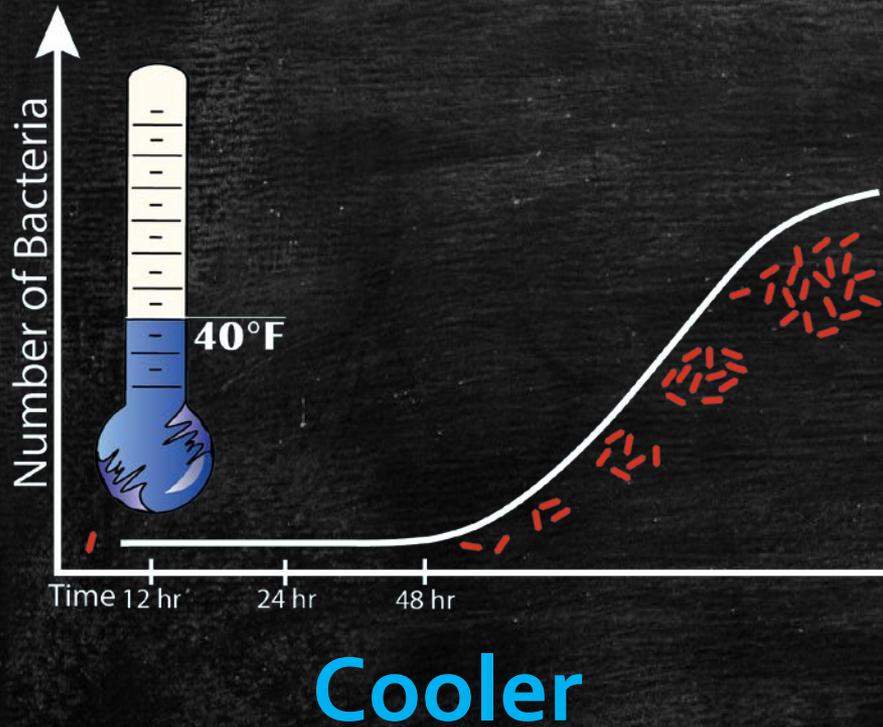


Time

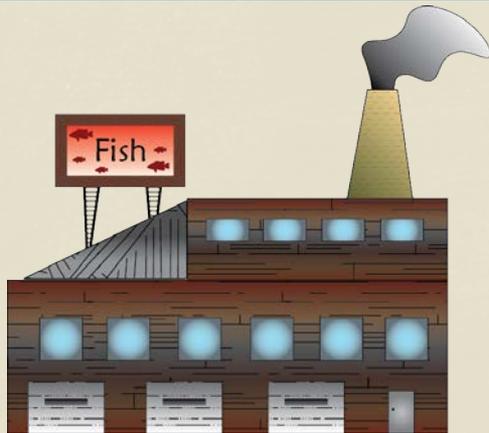
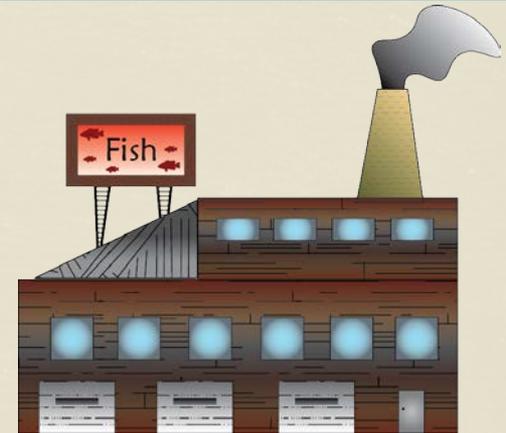
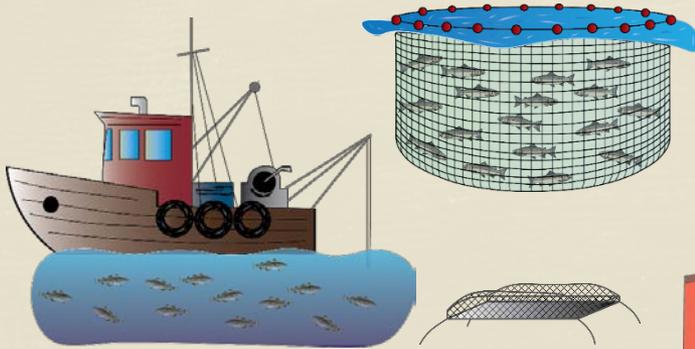
Temperature



Time and Temperature



When to Control

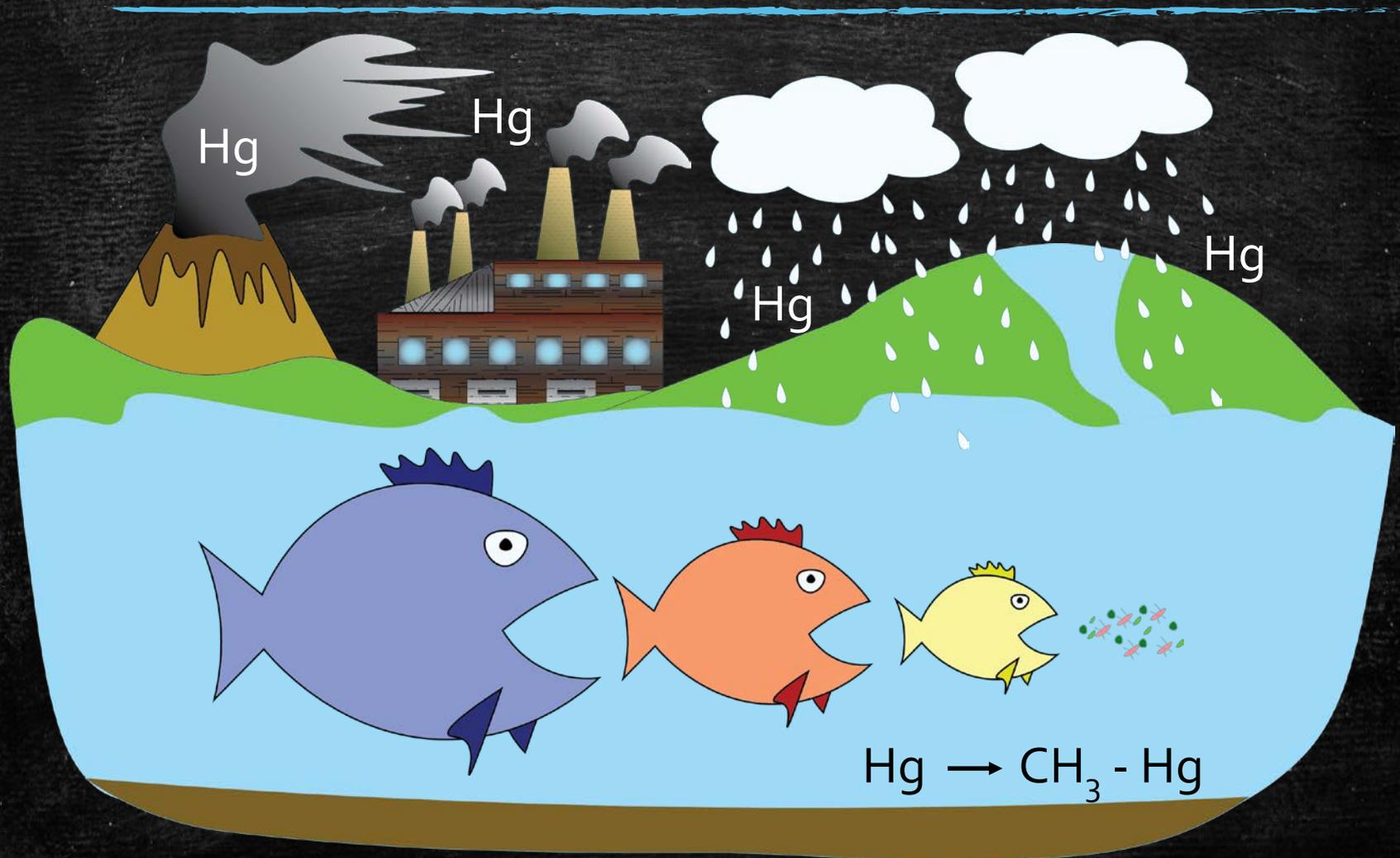




Chemical Contamination

Top Consumer Concern: [Mercury](#)

Source of Mercury



High Mercury

WHICH FISH AND HOW MUCH?

(Estimates of servings for a 130 lb. woman)

VERY HIGH MERCURY

More than 0.5 Parts per million

Eat Rarely



Tilefish (Gulf of Mexico)



Bluefin tuna



Swordfish



King Mackerel

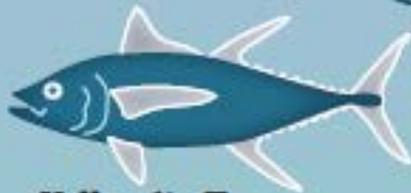


Shark

HIGH MERCURY

Between 0.25 and 0.5 ppm

About 2 times per month



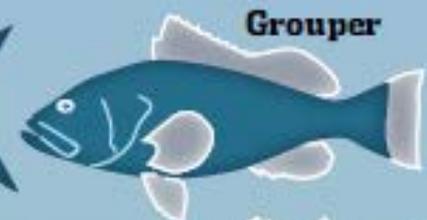
Yellowfin Tuna



Chilean Sea Bass



Bigeye Tuna



Grouper



Albacore Tuna (solid white)



Bluefish

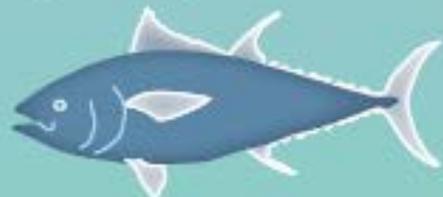


Wild Striped Bass

Medium Mercury

MEDIUM MERCURY

Between 0.1 and 0.25 ppm
Up to once per week



Skipjack Tuna
(chunk light)



Mahi-Mahi



Ocean Perch



Pacific Cod



Lobster



Snappers



Halibut



Flounder

**Don't Avoid
Eat Responsibly**

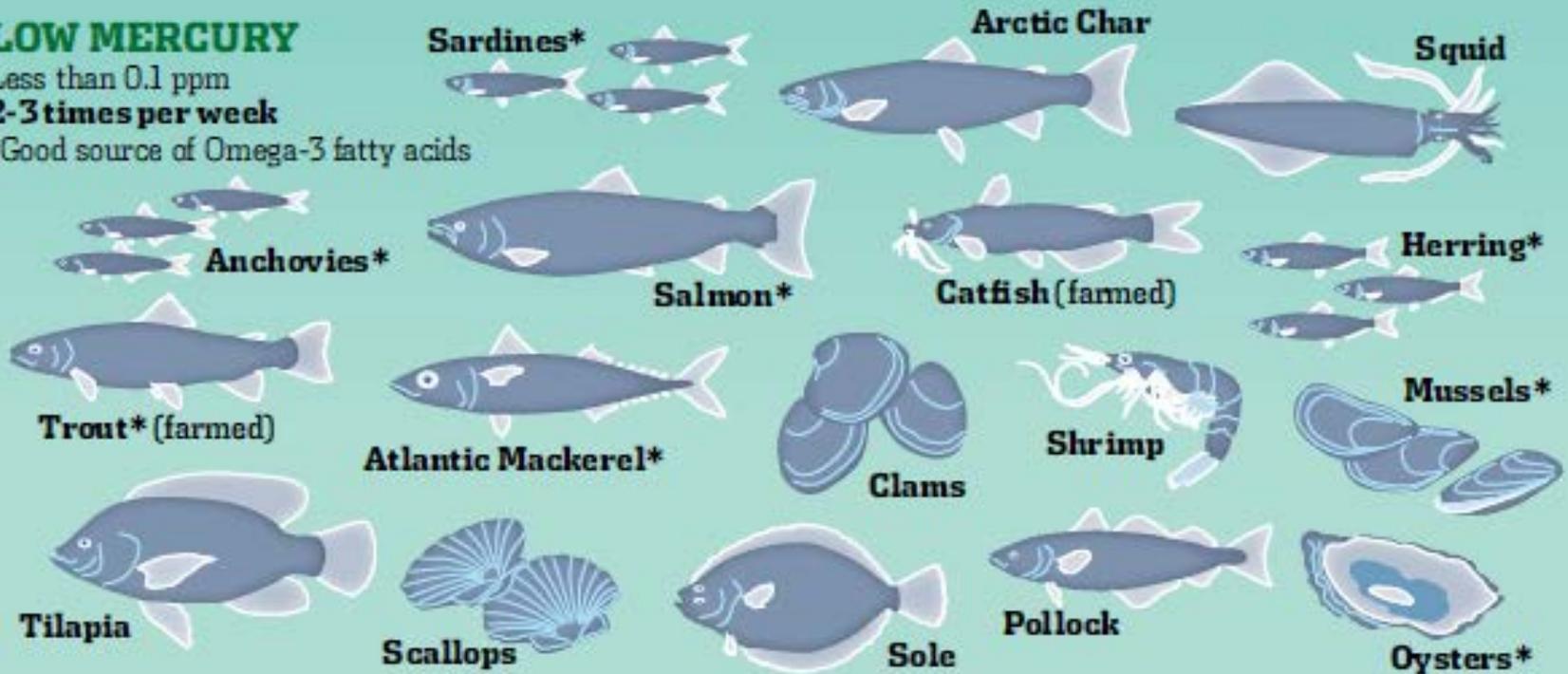
Low Mercury

LOW MERCURY

Less than 0.1 ppm

2-3 times per week

*Good source of Omega-3 fatty acids



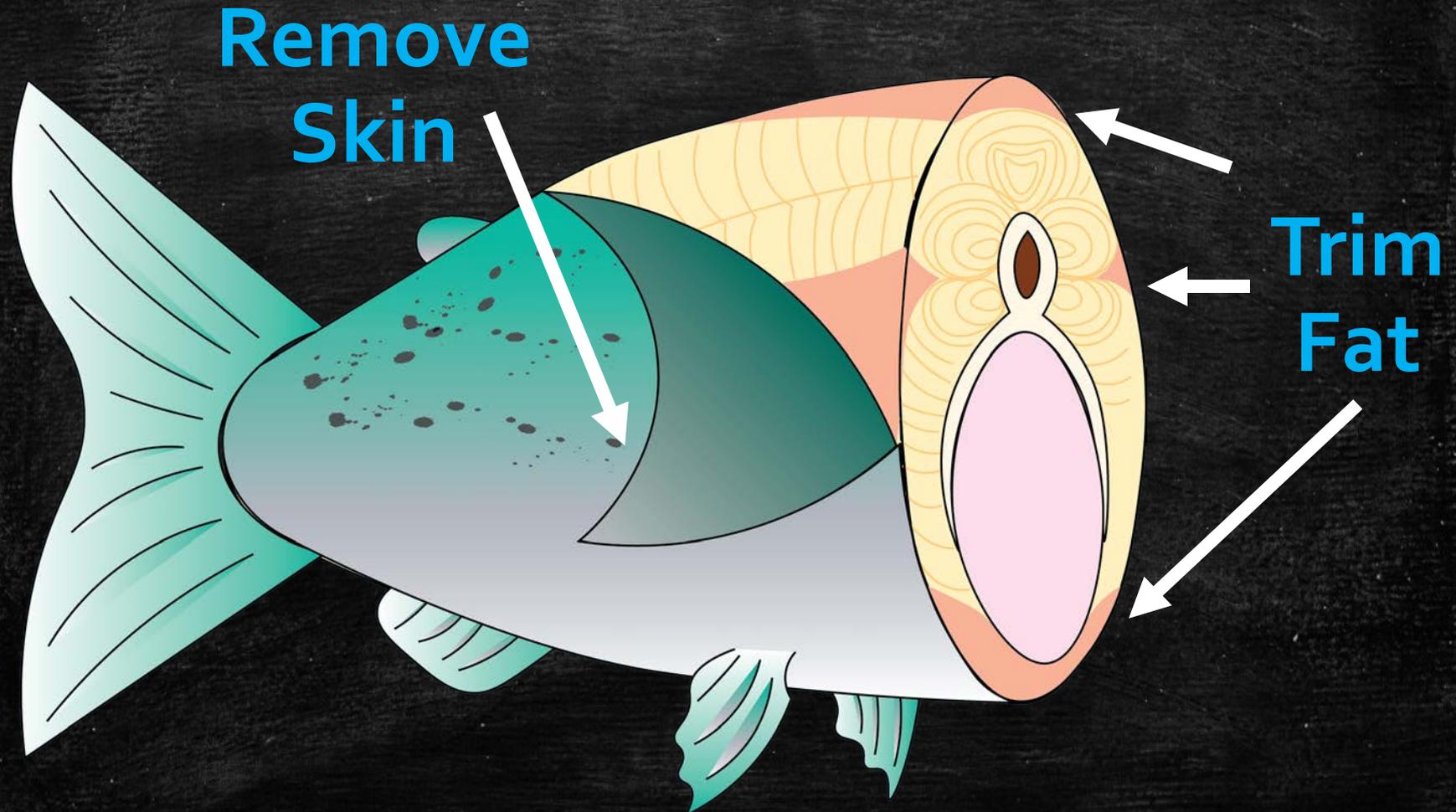
Karimi et al., 2012, Environmental Health Perspectives, A quantitative synthesis of mercury in commercial seafood and implications for exposure in the U.S.

Seafood during Pregnancy



Fish	Meals/Week for Max Benefits	Meals/Week for Adverse Effects
Anchovies, Herring, Shad	3	~150
Fresh Salmon	3-4	~330
Fresh Cod	2-3	~70
Canned Light Tuna	2-3	~90

Minimizing Risks



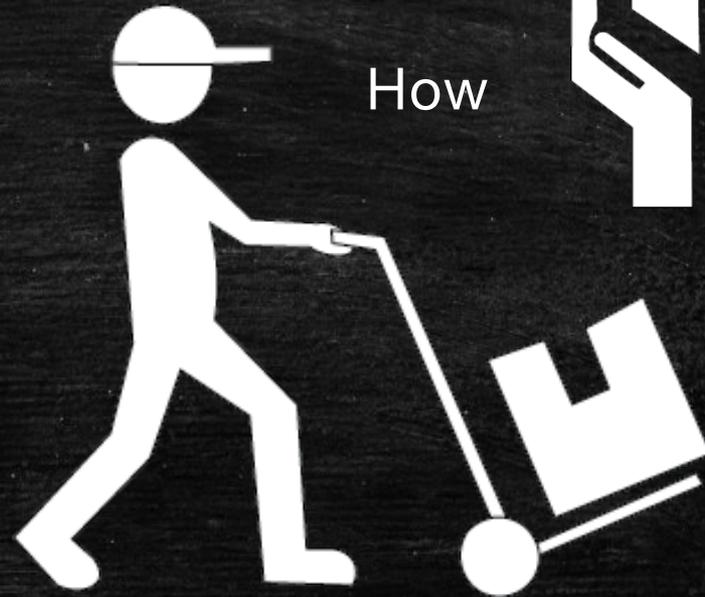
Ensuring Safety

Source Handling



Who

Where



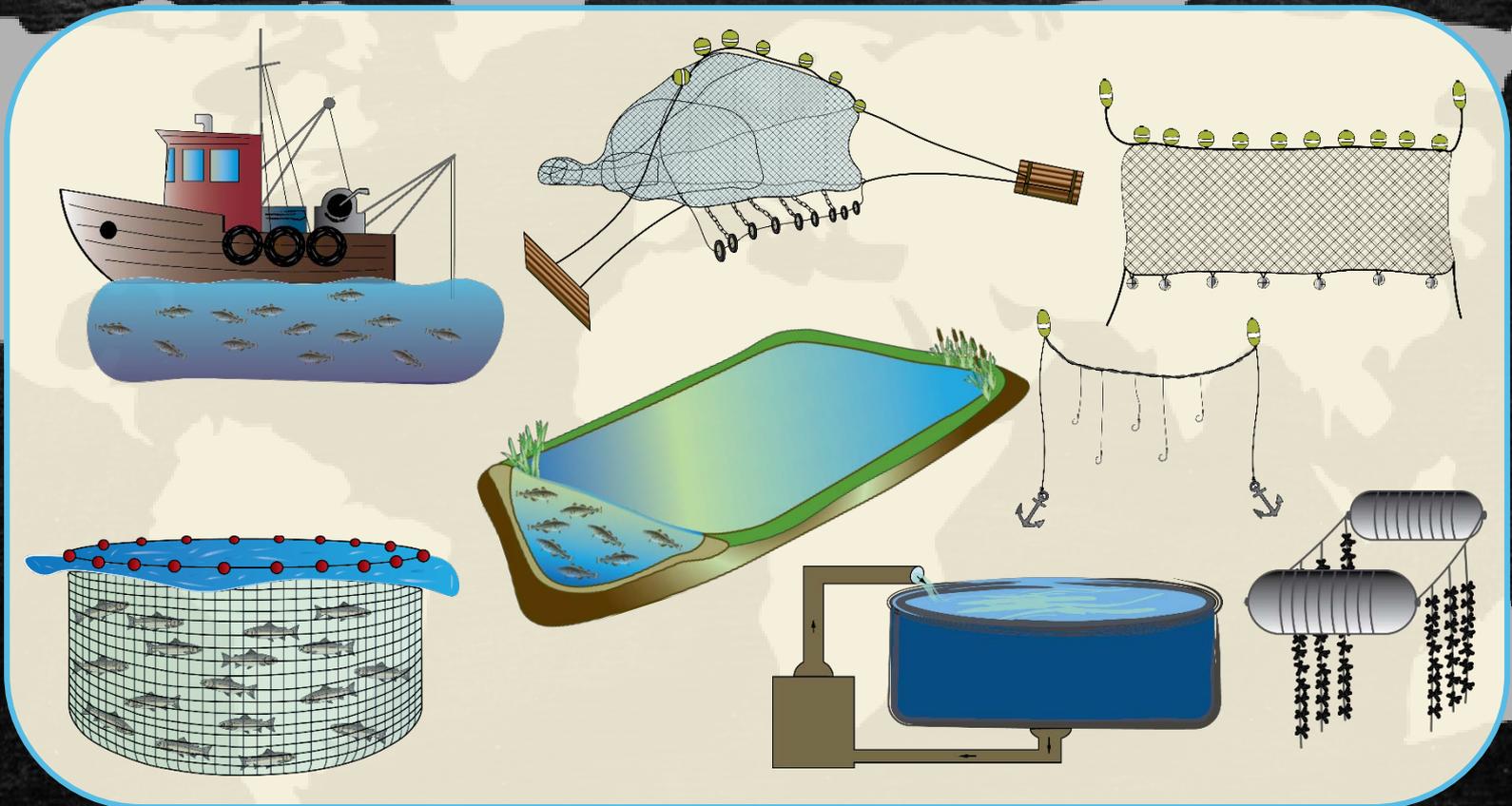
How



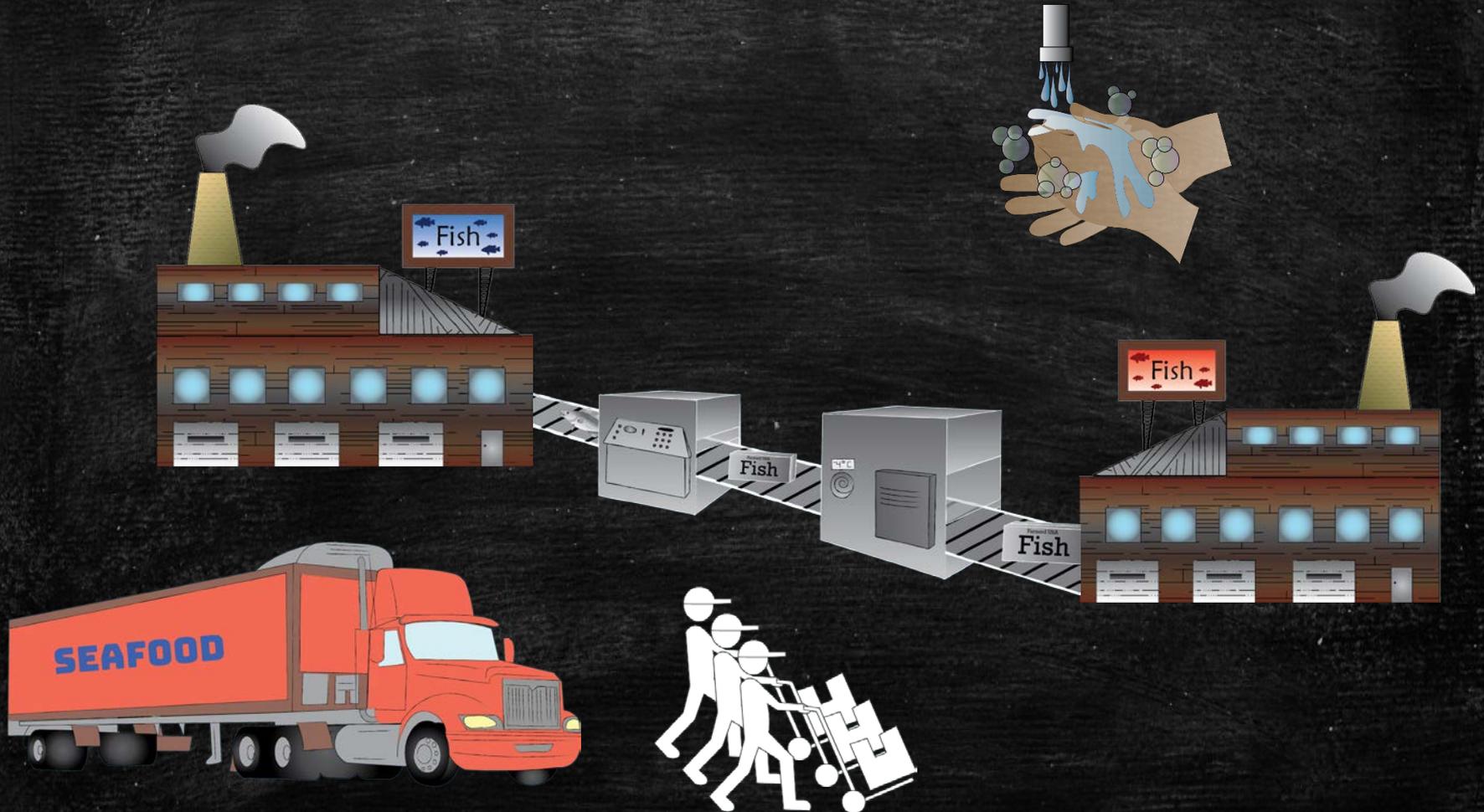
Source- Geographic



Source- Production



Handling



Seafood Regulatory Network



HACCP

**Sanitation Control
Program (SCP)**

**Good Manufacturing
Practices (GMP)**

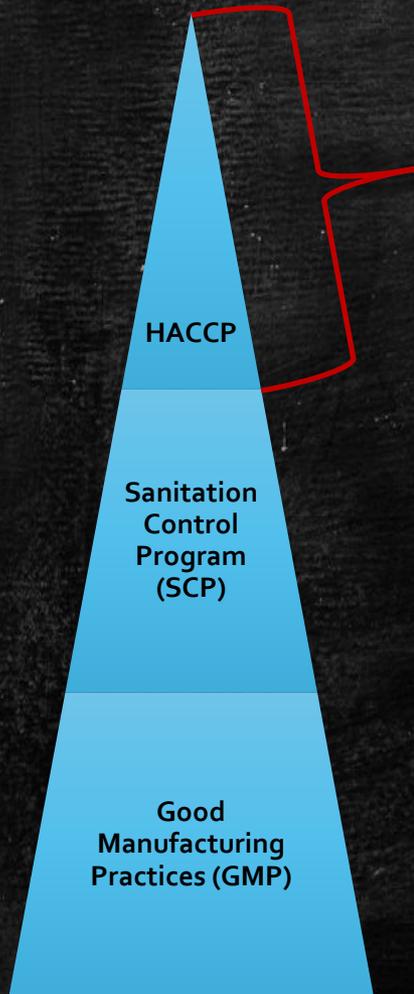
Environmental Controls



General Facility
Construction, Maintenance,
and Cleanliness

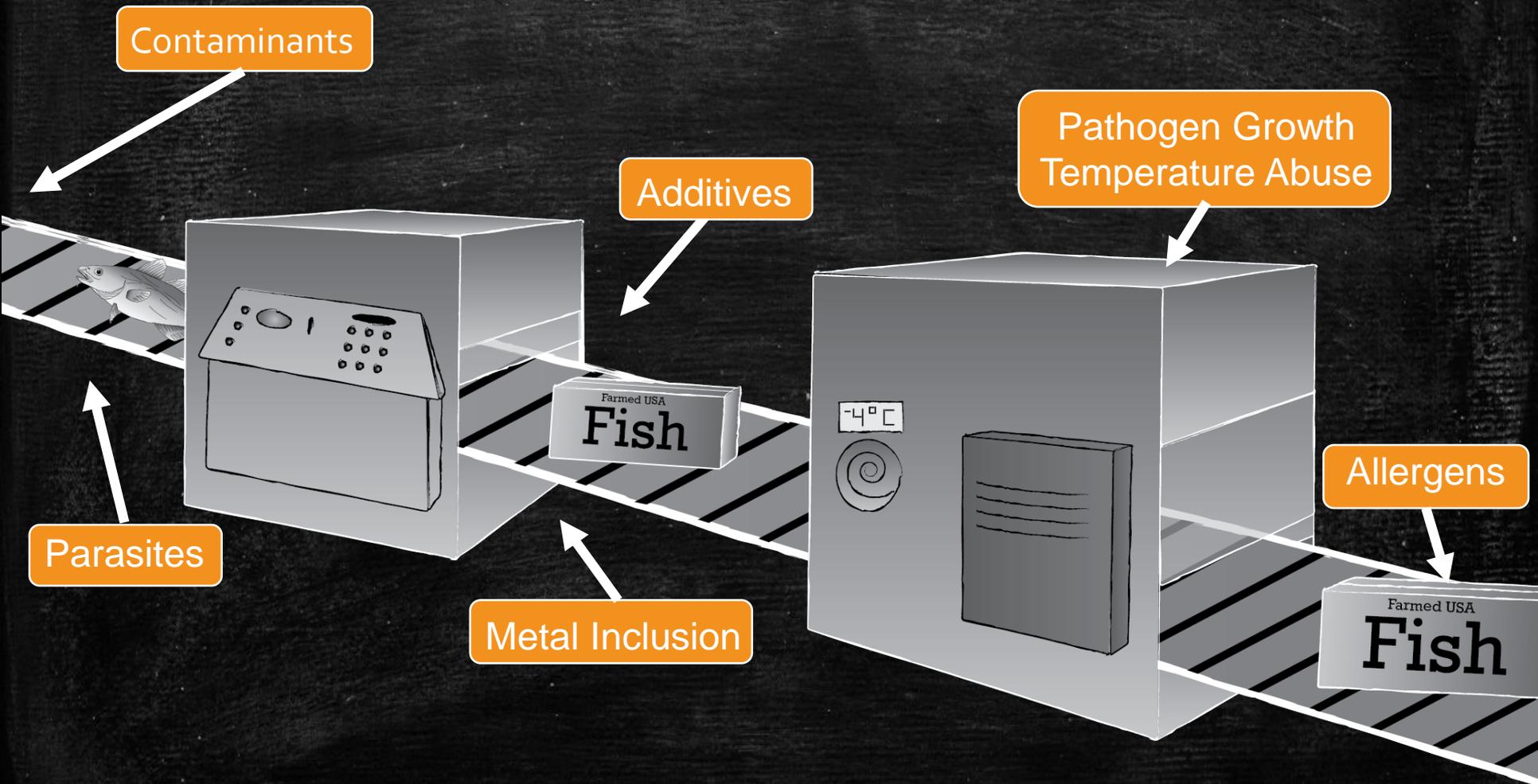
Product and Process Controls

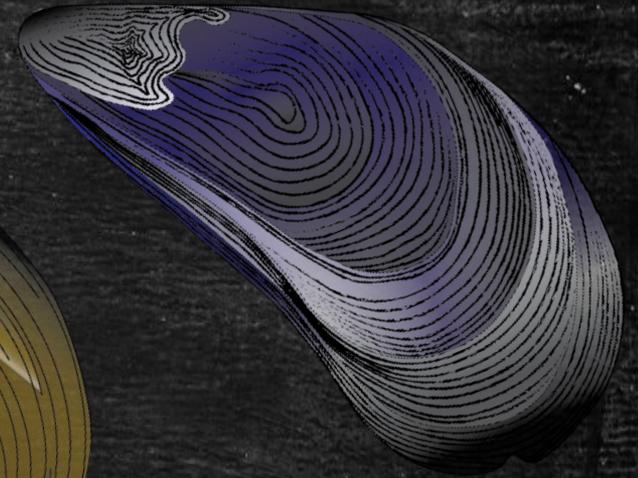
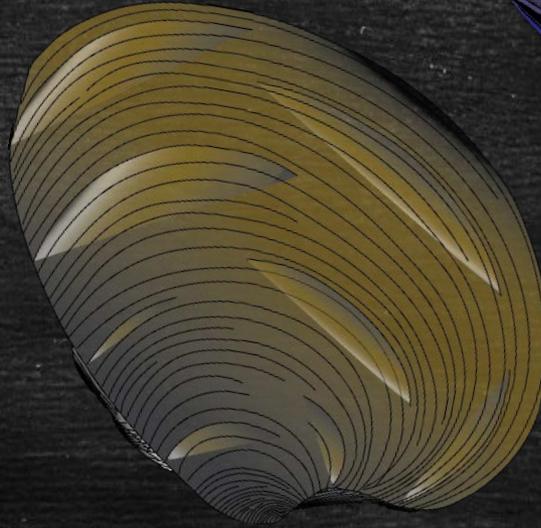
Hazard Analysis and Critical Control Points



1. Hazards
2. Critical Control Points (CCP)
3. Critical Limits
4. Monitor
5. Correct
6. Verify
7. Record

Hazards





Shellfish

ISSC

Interstate Shellfish Sanitation Conference

- Federal government, state government, industry and academia
- Develop procedures for uniform state programs
- Establish regulatory Guidelines to ensure that the shellfish produced are safe and sanitary
 - National Shellfish Sanitation Program

The screenshot shows the FDA website header with the logo and navigation menu. The main content area is titled "Food" and includes a breadcrumb trail: Home > Food > Guidance & Regulation > Federal/State Food Programs. A blue button labeled "Federal/State Food Programs" is visible. Below it, the text "Milk Safety Programs & Shippers List" is partially visible. The main heading is "National Shellfish Sanitation Program (NSSP)". At the bottom, there are social media sharing options: f SHARE, t TWEET, in LINKEDIN, p PIN IT, e EMAIL, and p PRINT.

NSSP

National Shellfish Sanitation Program

- Program guidelines
 - Certification
 - Risk management
 - Laboratory procedures
 - Growing area classification
 - Farming
 - Harvesting
 - Transporting
 - Processing
- Promote and improve sanitation and safety



Regulation in NY

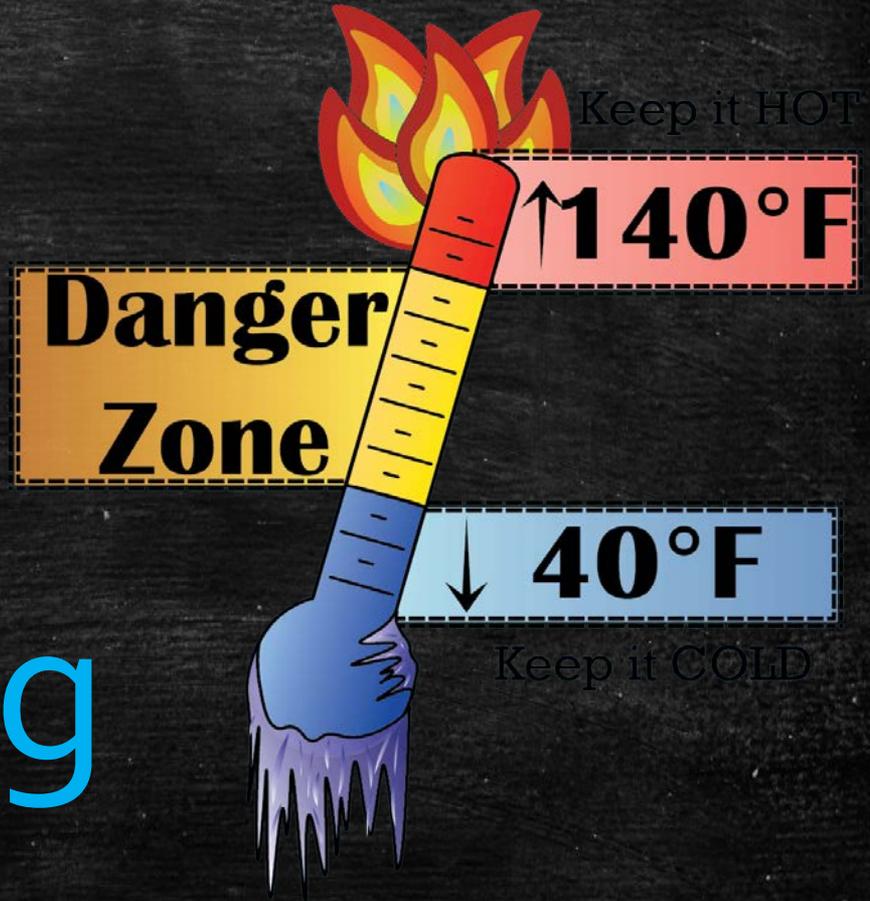
- [Food and Drug Administration](#)
- [NOAA National Marine Fisheries Service](#)
- [NYS Agriculture and Markets](#)
- [Department of Environmental Conservation \(DEC\)](#)
- County Health Departments
- YOU!



Everyone is Responsible

Source

Handling

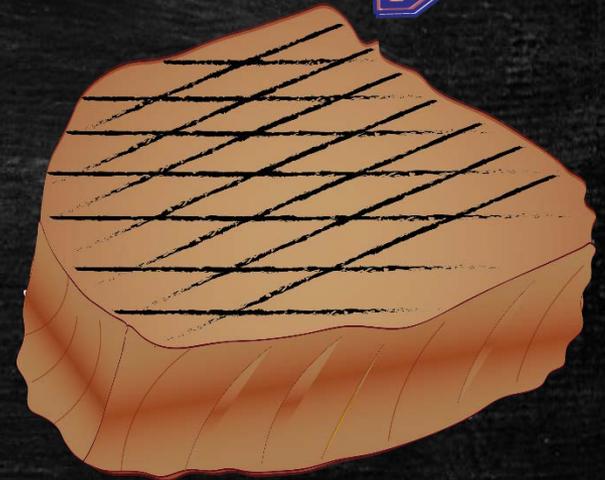
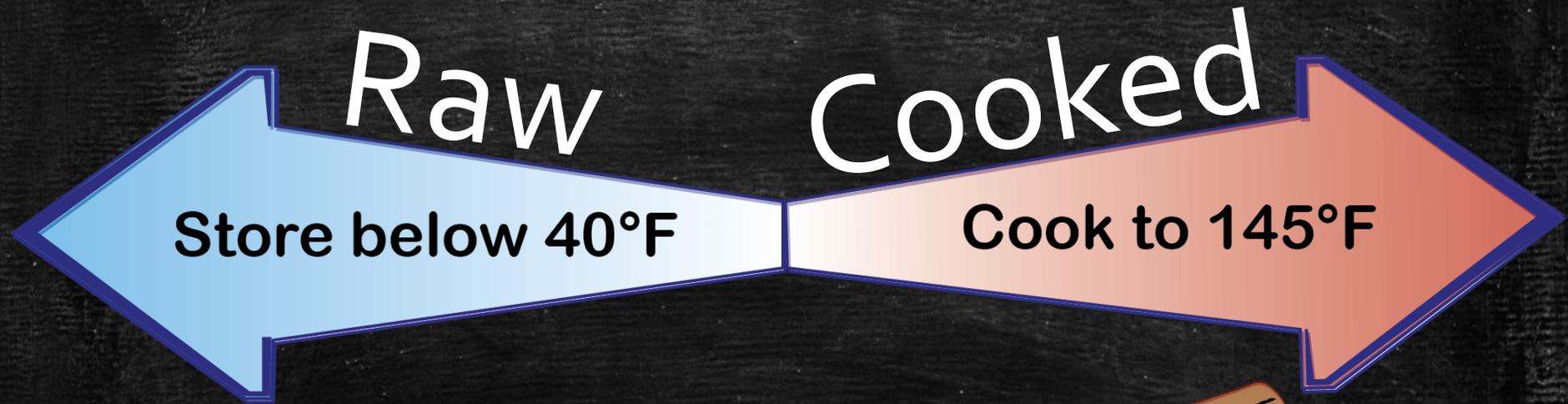


Keep it Clean

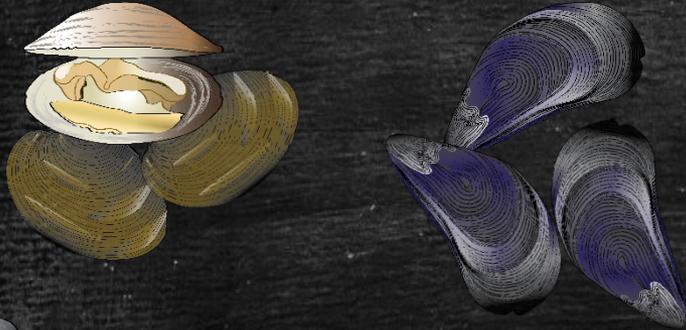
Hands
Utensils
Surfaces



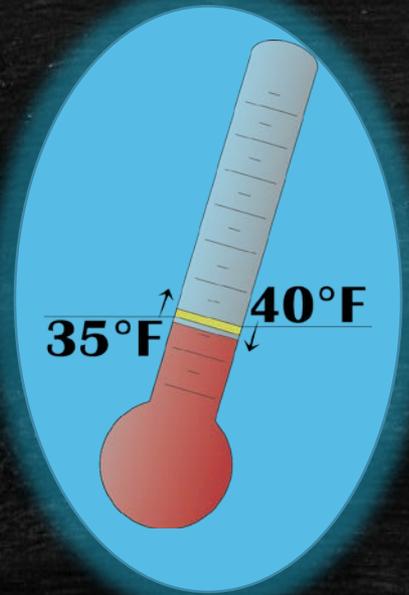
Keep it Separate



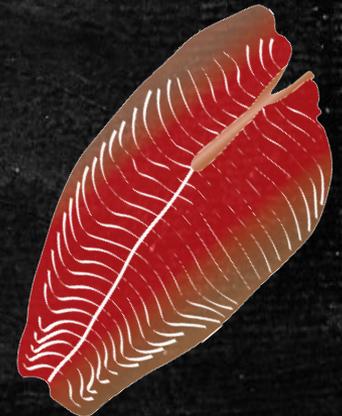
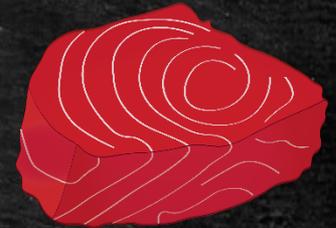
Keep it Cool



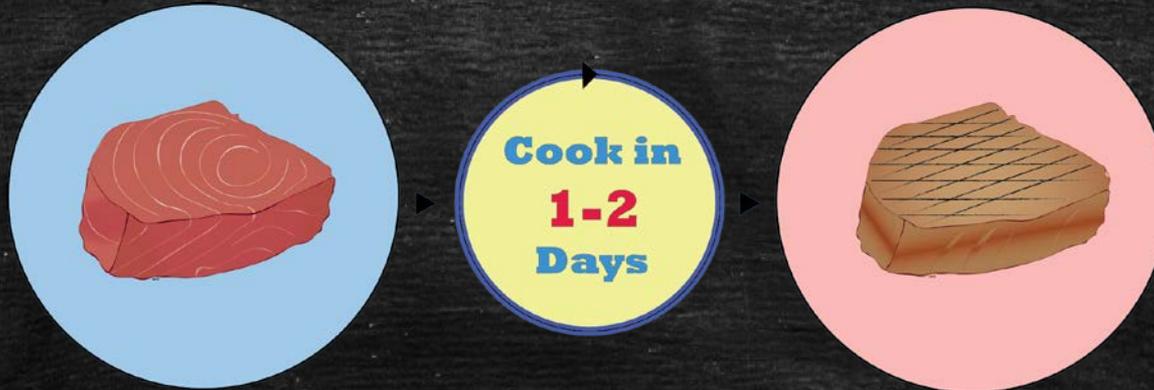
Live
Molluscs



Fresh Fish



Keep it Moving



Product	Purchased Commercially Frozen for Freezer Storage	Purchased Fresh and Frozen at Home	Never Frozen, Thawed, or Previously Frozen and Refrigerated at Home
Cod, Flounder	10-12 months	6-8 months	36 hours
Salmon (cleaned)	7-9 months	NA	36 hours
Crab (king)	12 months	9 months	7 days
Squid	8-9 months	4 months	36 hours

Shelf Life

Fish	Shelf Life	50 °F for 48 hr
Halibut	18	10
Chum Salmon	13	5
Pollock	5	0

Maximum Shelf
Life in Days at 32°F



Shelf life after
temperature abuse



Educating Consumers

General Guidelines for Handling Seafood

Keep Clean

- Hands, workspace and utensils

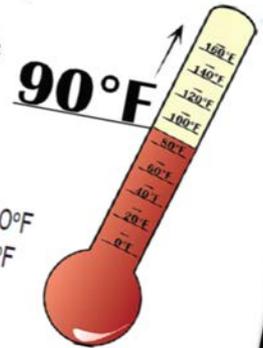
Keep Separate

- Don't store or prepare raw fish with other foods



Storing Leftover Seafood

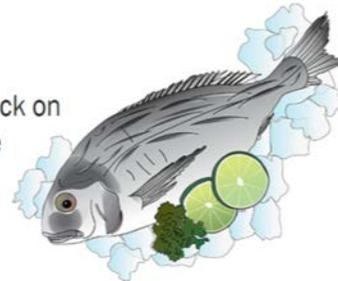
- Wash hands, containers and utensils before handling
- Refrigerate or freeze in a shallow container within:
 - 2 hours if room temperature < 90°F
 - 1 hour if room temperature > 90°F



Handling Fresh Fish

Whole Fish

- Handle gently and pack on ice and/or refrigerate (<40°F)



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Seafood Consumers

Consumer Trends

68%

Of consumers are more likely to visit restaurants that offer locally produced foods.

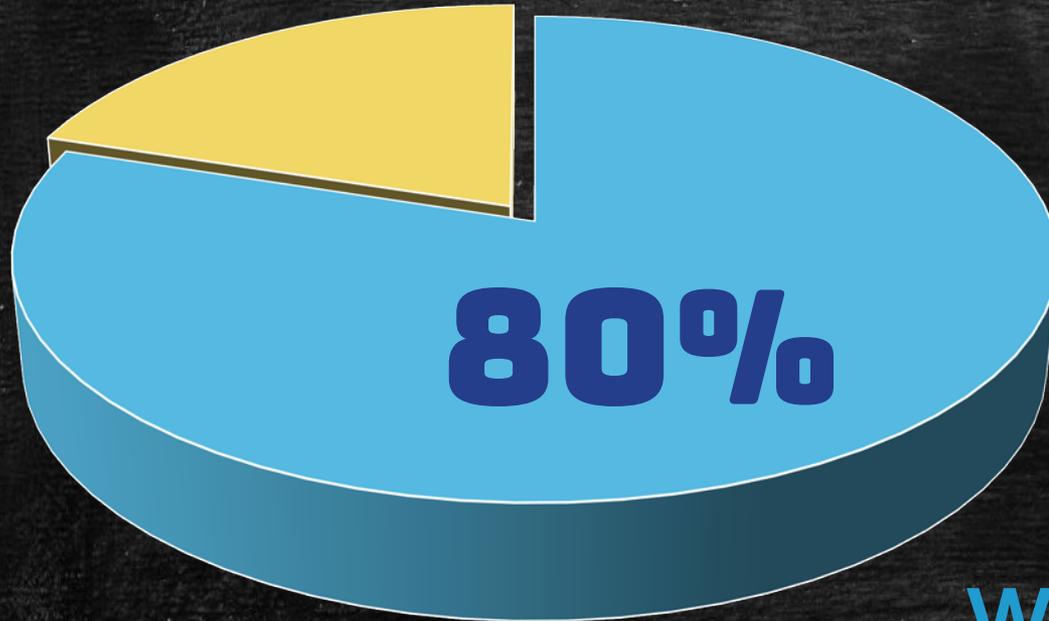
60%

Of consumers say they are more likely to eat at restaurants that serve eco-friendly foods.

70%

Of consumers are already making healthier choices in the foods they eat out compared to two years ago.

Connection



Want to know how
their food is produced
and more transparency
from producers.

**JWT INTELLIGENCE
(FEBRUARY, 10 2012)**

Millennials

BORN 1979-2000

16-37 years old

1/4 of US
Population

75% of Workforce
by 2025

They are not only looking for a **healthy** meal but treat food as **entertainment** and a means of **self expression**

Changing Trends

2015 MILLENNIALS

14.5 Billion Visits
\$96 Billion Spent
23% of Sales

Restaurant
sales surpass
grocery sales
for first
time...Ever!

FEEDSTUFFS
(APRIL, 27 2016)

Everyone's Talking

Millennials crave more seafood options

April 20, 2015 - by Monica Watrous

Share This:



BUSINESS



Fish sticks for millennials! Seafood industry rebrands 'trash fish'

By Associated Press

January 21, 2016 | 9:20am

Search for similar articles

Marketing to millennials: It's all about the story

By Michelle McNickle, Digital Product
Publisher

They like to win: Millennials driving restaurant spending

By Lauren Kramer, Contributing Editor

SHARE Published on Wednesday

Seafood Expo 2016: Selling seafood to Millennials

by Liz Webber in SN Social

Key to boosting US seafood consumption is tapping into trends of 'millennials'

Mar

F

January 21, 2014, 5:34 pm

Tom Seaman

What Matters Most

Late night bar experiences, events and menus

Fast Service

Innovative services (Technology)

Unusual Ingredients

Ready to eat and To Go options

Happy hour

Small plate

Exotic

Organic

Separate dining spaces

High top tables

Local ingredients

Separate checks

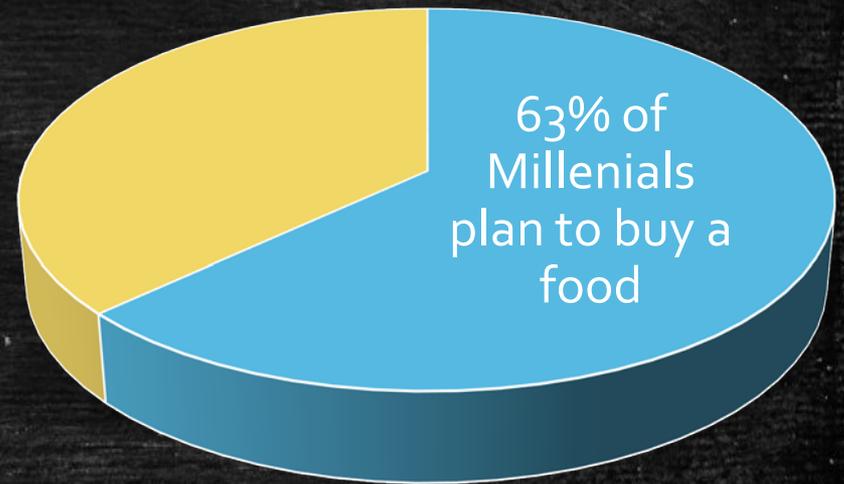
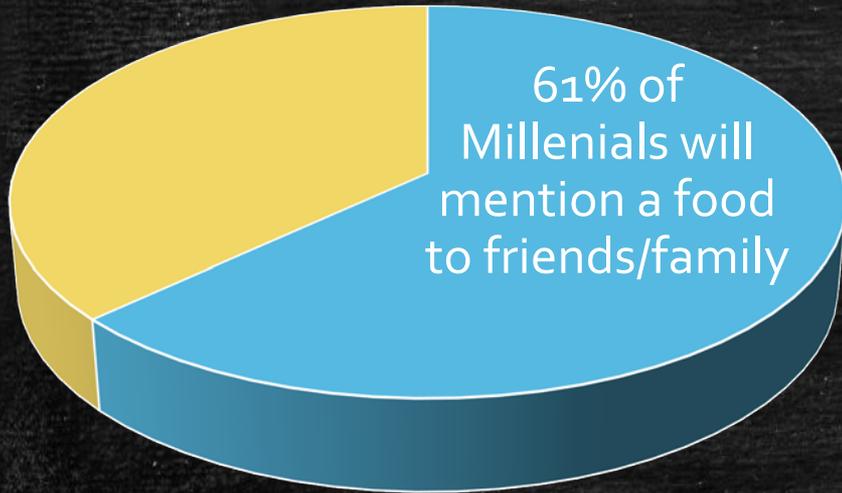
Plate sharing options

Ready to eat and To Go options

New food and beverage combinations

Print Matters

After reading about a food for the first time.



What if they could taste it then and there?

The role of local seafood

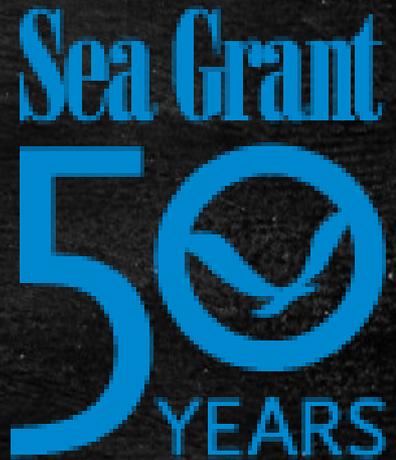
- Know source (better traceability)
- How it was raised/caught
- Better transparency
- Opportunity for local relationships
 - Stories to provide connection
- Highly regulated on federal, state and local levels

Foodservice Role

- Local seafood connection
- Connect directly to the consumers
- Platform to share the stories of the producers
 - Further supports industry
 - Fosters trust and loyalty from consumers
- Relay safety and nutrition information

Thank

You!



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