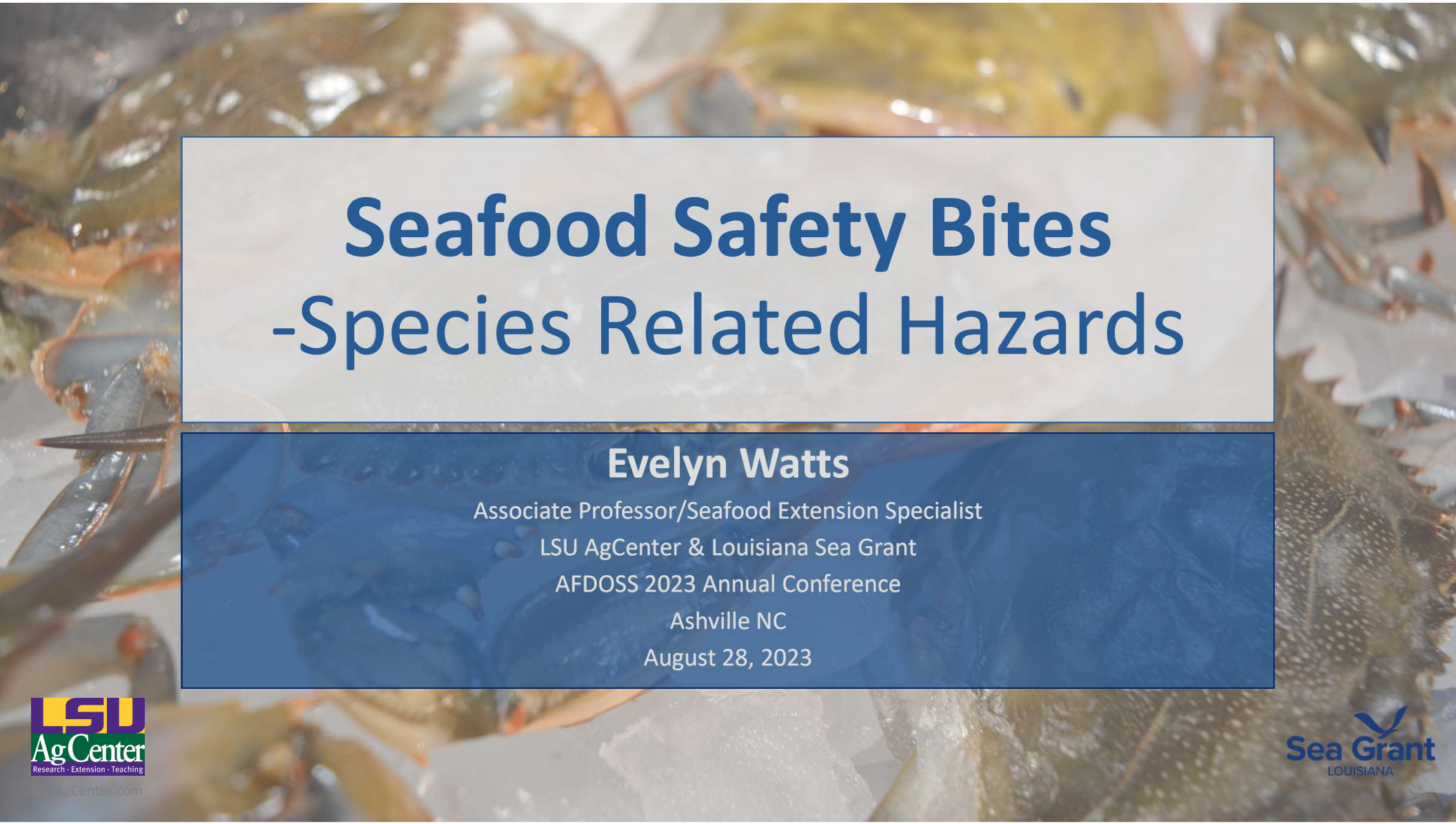

# Seafood Safety Bites
# -Species Related Hazards


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# Seafood Safety Hazards

- Seafood Safety Hazards
- Primary and Secondary Processor
- Species Related Hazards & Controls

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# Food Safety Hazard

Is a **biological**, **chemical** or **physical** agent that is reasonably likely to cause illness or injury in the absence of appropriate controls.

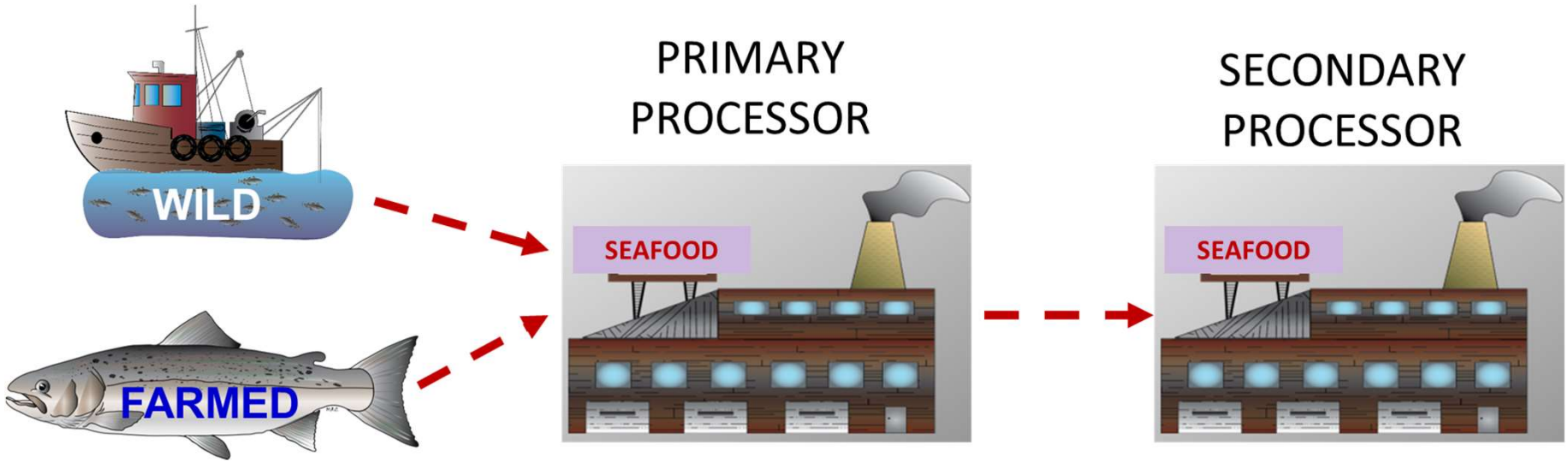
Food Safety Hazards are those that have been associated with seafood and are considered "**reasonably likely to occur**" if not subject to appropriate controls.

# Potential Seafood Safety Hazards

## Species-related hazards

## Process-related hazards

In the HACCP regulation, processors are responsible for Hazard Controls, so it is important to understand the difference between primary and secondary processing




(National Seafood HACCP Alliance)

# Species-related hazards

- Parasites (finfish and shellfish)
- Scombrotoxin or Histamine (certain species of finfish only)
- Hazards associated with harvesting/growing area
  - Pathogens from the Harvest Area (molluscan shellfish only)
  - Natural Toxins (finfish and shellfish)
  - Environmental Chemical Contaminants (wild and farm raised finfish and shellfish)
  - Aquaculture Drugs (farm raised finfish and shellfish only)

# Parasites

- Need a host to survive
- Thousands of kinds exist worldwide but only less than 100 types are known to infect people through food consumption
- Two types of concern from food or water:
  - Parasitic worms [e.g., roundworms (nematodes), tapeworms (cestodes), and flukes (trematodes)]
  - Protozoa, microscopic single-cell animal

(National Seafood HACCP Alliance)

# Parasitic Worms

- Nematodes and roundworms (*Anasakis simplex*, *Pseudoterranova dicepiens*, *Eustrongylides* spp. and *Gnathostoma* spp.)
- Cestodes or tapeworms (*Diphyllobothrium latum*)
- Trematodes or flukes (*Chlonorchis sinensis*, *Heterophyes* spp., *Metagonimus* spp., and others)

(National Seafood HACCP Alliance)

**Methods of preventing transmission of parasites to foods by fecal contamination include:**

Good personal hygiene practices by food handlers,

Proper disposal of human feces,

Elimination of insufficiently treated sewage to fertilize crops, and

Proper sewage treatment

(National Seafood HACCP Alliance)

## Some controls for *Anisakis simplex, P. decipiens* and *D. latum* parasites in seafood:

(National Seafood HACCP Alliance)

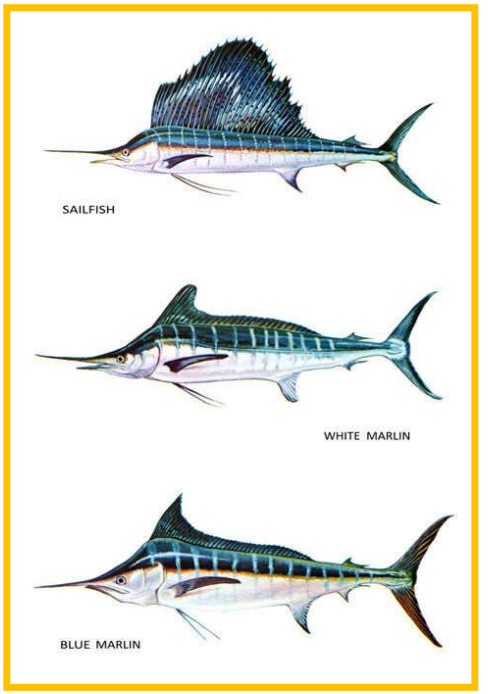
| | |
|---|---|
| Freezing | Proper freezing |
| Cooking | Proper cooking |

# Scombrotoxin

- **Scombroid toxin-forming species -**tuna, bluefish, mahi mahi, and other species, whether or not in the family Scombridae, in which significant levels of scombrotoxin (histamine) may be produced in the fish flesh as a result of exposure of the fish after capture to temperatures that permit the growth of mesophilic bacteria.

# Scombrotoxin (cont.)

- The Scombridae family fish-100 species
- Mahi-mahi
- Mackerel
- Marlin
- Swordfish
- Tuna
  - Yellowfin
  - Albacore
  - Bigeye
  - Bonito or Skipjack




# Scombrotoxin (Histamine) poisoning

- It is not a natural toxin!
- Is produced by bacterial spoilage due to time and temperature abuse of certain species of fish.
- Symptoms –tingling or burning around mouth and throat, rash or hives, drop of blood pressure, headache, dizziness, itching, nausea, vomiting, diarrhea, asthmatic like constriction, palpitations, respiratory distress.
- Symptoms occur within minutes to a few hours of consumption and last for 12 h to few days.

# Scombrotoxin control

- Proper chilling and refrigeration of fish from harvesting to consumption

Source:Arcata Pizza & Deli - Tripadvisor

## Species-Related Hazards Associated with the Harvest/Growing Area

- Pathogens from the harvesting area
- Natural Toxins
- Environmental Chemical Contaminants
- Aquaculture Drugs

# Pathogens from the harvesting area

- Bacteria
  - *Vibrio* spp.
  - *Salmonella* spp.
  - *Shigella* spp.
  - *Campylobacter jejuni*
- Viruses
  - Hepatitis A
  - Norovirus

# Pathogens from the harvesting area

- Particular concern in molluscan shellfish
  - Growing environment commonly subject to contamination from naturally occurring pathogens (*Vibrio* spp.)
  - May be present in relatively low numbers –may increase to more hazardous levels if exposed to time temperature abuse.

# Controls for Pathogens from the Harvesting Area

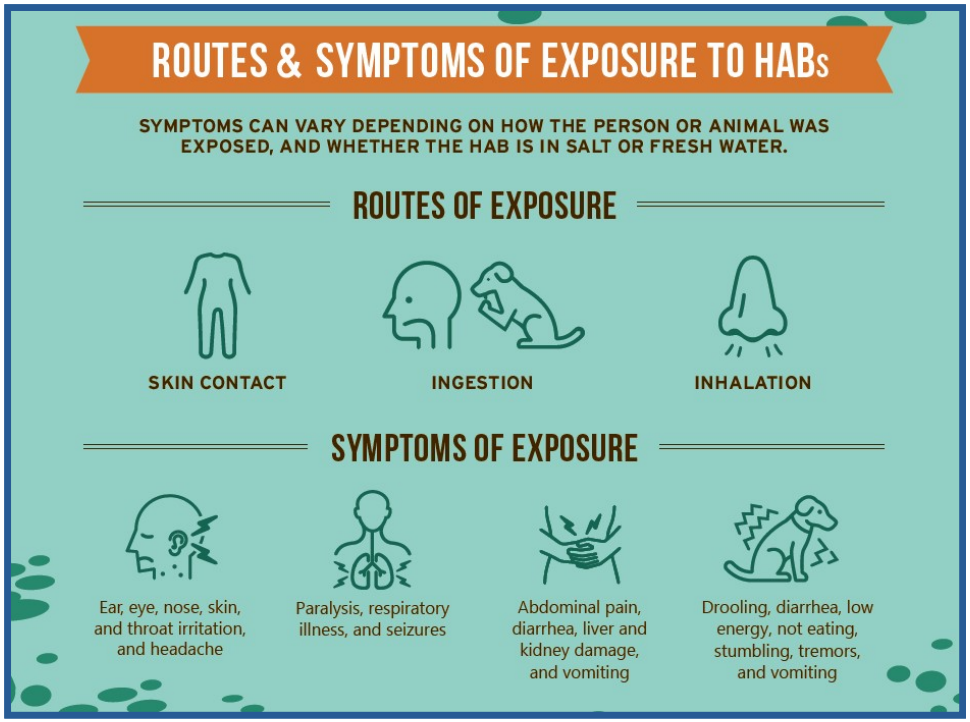
- Shellfish control authorities
- Limits from the time of exposure to air to refrigeration
- Dependent upon the Average Monthly Maximum Air Temperature

# Seafood Natural Toxins

- Fish and shellfish contaminated with natural toxins from the waters they lived can cause consumer illness
- These toxins are produced by naturally occurring algae
- Natural toxins are more common in warm months
- However, natural toxins are sporadic and not all fish/shellfish from a given species or location are toxic

# Main forms of harmful algal bloom (HAB)

- Skin exposures
- Ingestion of contaminated water
- Inhalation exposures
- **Foodborne exposure**



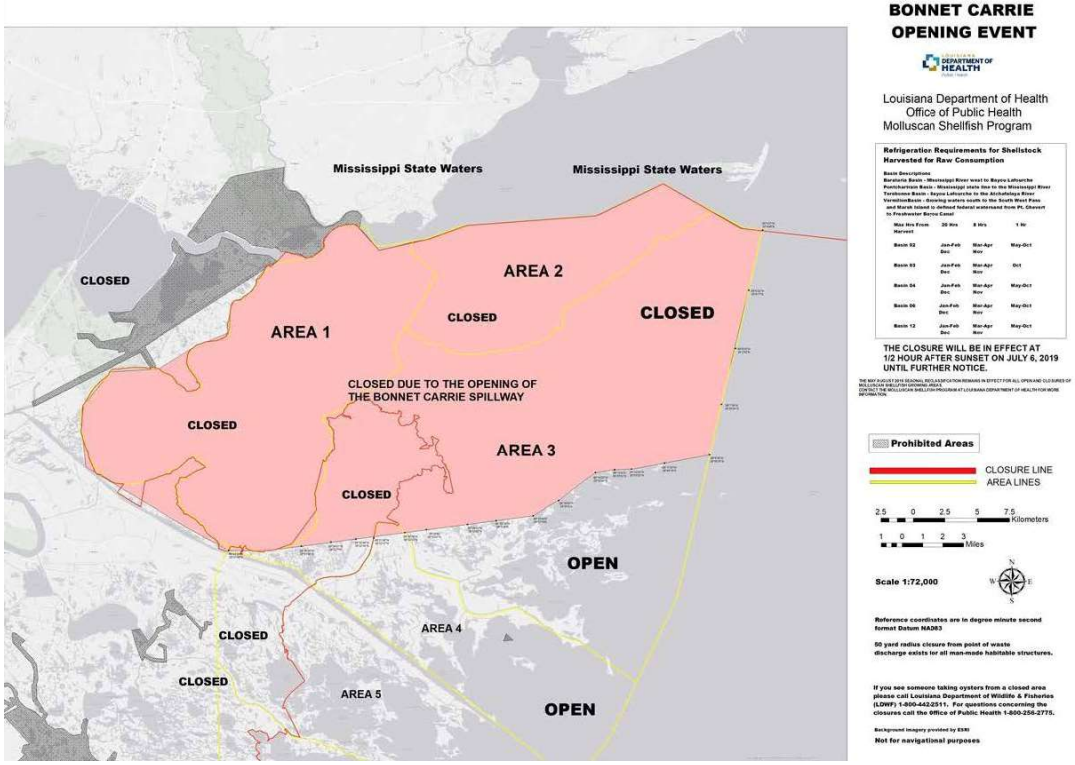

Source: https://clark.wa.gov

# Seafood Natural Toxins (cont.)

- Most are heat stable and resistant to freezing
- Onset of symptoms is quick and with neurological effects
- 30 to 70 cases per year in U.S. (CDC 2015,2016 & 2017)

# Natural Toxin Poisoning Control

- Molluscan shellfish Control Authorities
- Authorize waters for harvesting of molluscan shellfish
- Monitor harvesting areas
- Issue closures during algae bloom




https://www.fox8live.com/2019/07/03/la-health-dept-closes-some-oyster-beds-due-low-salinity-levels/

# Environmental Chemicals Contaminants

- Heavy metals
- Pesticides
- Industrial chemicals

- Affect farm-raised and wild caught
- Accidentally or deliberately enter the environment
- Industrial or agriculture use,

  or
- Naturally present in environment
- Long-term exposure

# Environmental Chemicals Contaminants

Controls for Environmental Chemical Contaminants (Pollutants)

Do not harvest or sell fish or shellfish from waters that have been closed by federal, state, or local authorities due to environmental pollution

Properly locate and monitor aquaculture farming operations to prevent pond contamination from runoff and previous or new human activities

# Control Strategies for Environmental Chemical Contaminants

- On farm visit
- Supplier's certification
- Records of testing and monitoring
- Chemical contamination testing
- Third-party farm certification program
- Source control for wild caught fish other than molluscan shellfish
- Source control for molluscan shellfish

# Aquaculture

- Defined as farming of both animal and plants in a natural or controlled environment
- Implies interventions such as stocking, feeding, protecting from predators, improvement of water quality, enhancement of animal health conditions (prophylactic or treatment)
- Can occur in freshwater, coastal, and marine environments

# Aquaculture Drugs

The most common reasons for the use of animal drugs in aquaculture are:

- to treat, control or prevent disease,
- to control parasites,
- to affect reproduction and growth,
- to provide tranquilization/sedation (e.g., for weighing, harvest), and
- for skeletal marking of fish fry (larvae) and fingerlings.

# Aquaculture Drugs

- Use of unapproved drugs or miss use of approved drugs may result in residues in edible tissue and pose a potential risk to human health from long-term exposure

## Some controls for use of aquaculture drugs:

| | |
|---|---|
| Use | When necessary, only use certain controlled drugs in the manner prescribed by a recognized veterinary expert. |
| Test | Test for any excessive residuals in final products. |

# Control Strategies for Aquaculture Drugs

- On farm visit
- Supplier's certification
- Processor's pre-qualified supplier program
- Records of drug use
- Drug residue testing
- Third-party farm certification program
- Control during holding/transportation

# Thanks!!!

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