Exhibit C

Public Correspondence Received to June 20, 2025

BORISCH Roxann B * ODFW

From: Roxann.B.BORISCH@odfw.oregon.gov
Subject: FW: RoxieFW: Octopus Report
Attachments: Outrageously Unnatural.pdf

From: Amanda Fox <amandafox.ari@gmail.com>
Sent: Wednesday, June 4, 2025 10:10 AM
To: DEHART Keith B * ODFW <Keith.B.DEHART@odfw.oregon.gov>
Subject: Octopus Report

Hello,

My name is Amanda Fox and I've been working with a partner at ODFW on adding octopuses to the Oregon Prohibited Species. We were asked to deliver our report before the June meeting. I have it here attached. Could we schedule a short meeting to discuss the findings, or can you tell me how this will be handled? I'm not entirely familiar with the ODFW meeting and review process. Thank you.

Amanda Fox

-Sent from my mobile device

---------- Forwarded message ---------
From: **Amanda Fox** <amandafox.ari@gmail.com>
Date: Fri, May 30, 2025 at 9:18 AM
Subject: report
To: Kerrie Espuga <KerrieEspuga@gmail.com>

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ANIMAL RESEARCH INITIATIVE

Outrageously Unnatural: The Dangers of Octopus Farming

Authors: Amanda Fox
Date: 21 May 2025

Abstract

Octopus farming research is a burgeoning industry attempted for decades, almost at the tipping point of emergence. Companies claim they have completed the birth cycle in captivity and want to move forward with mass harvest. However, octopus farming poses an alarming risk of extremely high quantities of known apex-predators entering the ecosystem. Unnatural influxes of artificial concentrations of these highly sentient animals would hybridize with and decimate local populations of native octopuses, and would prey on crustaceans, consuming large quantities of wild populations, causing a potential collapse. Their intelligence and capacity for suffering demand higher ethical standards than aquaculture methods can provide, and are therefore unsuitable for farming. Research has shown that under intensive farming conditions, octopuses experience extreme stress, violence, self-mutilation, and cannibalism. In an industrial facility rapidly accelerating their genetic life cycle, they could become more venomous, more aggressive, and more adept to escape. Farmed octopuses are considered reservoirs for various parasitic infectious pathogens that can spread to wild populations and even humans. If 100,000 octopuses were released, each eating 1–3 crustaceans per day, they could decimate a million crabs, shrimp, or lobster in a single week, permanently damaging ecosystems with no possibility of return. Octopus farms that utilize on-land tanks are entirely dependent on uninterrupted electricity, and in the event of common and unpredictable outages, mass die-offs are inevitable. Industrial octopus farms threaten to accelerate the collapse of already strained crustacean fisheries, intensify harmful algal blooms, introduce parasitic and pathogenic risks to marine ecosystems and human health, and burden public resources via taxpayer funded disaster relief programs. Based on these findings, we recommend proactively rejecting aquaculture models that profit from ecological imbalance, specifically octopus farming.

Introduction

Octopus farming research is a burgeoning industry attempted for decades, almost at the tipping point of emergence. Companies claim they have completed the birth cycle in captivity and want to move forward with mass harvest. Due to their high intelligence, escape potential, sensitivity to power outages, and the frequency of water-related emergencies, octopus farming presents a

serious taxpayer burden - one likely to result in repeated indemnity payouts through the Emergency Livestock Assistance Program. Octopus farming poses an alarming risk by introducing large numbers of apex predators into marine ecosystems. Research shows hatcheries cause rapid genetic changes, and unnatural influxes of artificial concentrations of these highly sentient animals would hybridize with and decimate local populations of native octopuses, and would prey on crustaceans - consuming large quantities of wild populations, causing a potential collapse. Resource intensive diets of seafood-based feed are known to accelerate harmful algal blooms and marine ecosystem die-off, while spreading pathogens transmissible to humans during consumption.

Where Is Interest Coming From?

Research on octopus breeding has been of interest for decades (ScienceDirect, 2005). Spanish company Nueva Pescanova claims to have completed an in-captivity breeding cycle, and is interested in moving forward with plans that include housing these captives in an industrial facility (NuevaPescanova, 2019). Another Spanish entity, Profand, has recently received approval for permits for an experimental octopus hatchery (UndercurrentNews, 2025). Research is being conducted on eight species in China, with additional studies taking place in Chile, Japan, Greece, Australia, New Zealand, Italy and until closed by public officials in 2023, Hawai'i (KauaiNewsNow, 2023).

Uniquely Intelligent

Octopuses are regarded as the most intelligent invertebrates on Earth. They exhibit complex behavior, have great memory, and individual personalities. They have nine-brains with more than two-thirds of their neurons located in their arms, allowing for independent stimulation, learning, and action. Their evolutionary history spans over 330 million years.

One astounding aspect is that almost half of their genome consists of transposons, or "jumping genes," which can move to different locations and are associated with learning, and suggest similar evolutions of intelligence as humans (LiveScience, 2022). When compared, octopuses are shockingly similar or significantly advanced in genetic expression or other behaviors.

- 1,800 zinc-finger transcription factor genes, which regulate gene expression, compared to only 1,000 in humans (NIH, 2013)
- 168 protocadherin genes, responsible for cell adhesion in the nervous system, which play a crucial role in forming and maintaining the complex connections between neurons and glial cells essential for various developmental processes, including neuron migration, axon guidance, and synapse formation, double the amount in humans. (PubMed, 2002)
- "Octopus vulgaris genome consists of 30 chromosomes with 2.8 billion base pairs" compared to 23 chromosomes and 3.2 billion base pairs in humans (NeuroscienceNews, 2023)
- Over 33,000 protein-coding genes, compared to 20,500 found in humans. (ScienceDirect, 2013)

Research has shown octopuses experiencing nightmares, changing color phases and "inking" while sleeping, (Douglas, n.d.). They are documented using tools, riding animals, and building cities (IFL Science, 2025). They've been filmed using coconut shells as portable shelters (MSN, 2025) and plastic wrappers to surf (Defector, 2024). Octopuses have even been recorded hunting with other species, and coaching unsupportive teammates (NBC, n.d.). When administered MDMA, octopuses express "pro-social" behavior, increased physical contact and social tolerance (PBS, 2018). Multiple observations have recorded intricate city systems built by octopuses with complex social behaviors resembling evictions in human interactions (Guardian, 2017). They have incredible memories and are documented expressing preferential treatment towards familiar, friendly faces.

Additionally, octopuses have a highly evolved chemosensory ability. They can "taste by touch" with their tentacles through their suckers. Highly specialized receptors on the suckers of their arms allow them to detect specific chemical signatures in their environment. These receptors respond strongly to molecules emitted by prey such as crustaceans (ScienceNews, 2023).

These incomprehensible cognitive advancements make the ethical implications of farming octopuses significant and alarming. Under intensive farming conditions, octopuses experience extreme stress, violence, self-mutilation, and cannibalism. Their intelligence and capacity for suffering demand higher ethical standards than aquaculture methods can provide, and are therefore unsuitable for farming (Birch, 2021).

Research performed by the Oregon State University (OSU) and Oregon Department of Fisheries and Wildlife have shown rapid genetic changes in hatchery populations: after only one generation, the offspring of wild fish and hatchery fish varied in more than 700 genes. An octopus research facility, hatchery or farm would quickly accelerate genetic advancements in unpredictable ways.

> *"A fish hatchery is a very artificial environment that causes strong natural selection pressures"* - Michael Blouin, Professor of integrative biology in the OSU College of Science (PHYS, 2016).

In an industrial facility rapidly accelerating their genetic life cycle, they could become more venomous, more aggressive, and more adept to escape as they evolve to survive life in intensive confinement.

Venomous Nature of All Octopuses

All species of octopus are venomous, some more so than others, with documented cases of injury caused to human handlers (Haddad Jr, de Magalhães, 2014). Research shows that their venom includes a neurotoxin they insert in crab eyes or joints to paralyze them and break down their shells and tissue for easier consumption (ScienceDirect, 1977). The venom can also affect other octopuses. Bites from species such as the blue-ringed octopus can be fatally toxic to humans (Asakawa et. al, 2019). If farmed octopuses were to escape or be accidentally

released, this venom would compound the pressures on native crustaceans and other octopuses.

Parasitic Amplification and Transmission Conduits

Farmed octopuses are considered reservoirs for various parasitic infectious pathogens that can spread to wild populations and even humans. With up to 200 tank inhabitants eliminating waste in the same water, these microorganisms can spread rapidly amongst the animals, and further spread through water systems to infect marine populations. Scientists have identified over 200 parasites common to infect cephalopods consisting of helminths (worms), copepods (ocean lice), and protozoans (Marmolejo-Guzmán, et. al, 2025). Recipes including octopus are typically served raw, such as poke or sushi - posing a heightened risk of transmissible parasitic infection to humans. Their lack of immunological response to vaccination further indicates their biological incompatibility with industrialized farming.

> *"Cephalopods do not have acquired immunity and immunological memory; therefore vaccination cannot be used to protect them against infectious diseases"* (Martinez, Gestal, 2013).

Of the many infectious parasites known to octopuses, several are of special concern:

- Coccidial Parasites - *Aggregata* spp. - are frequently recorded throughout wild and cultured octopus that are transmitted throughout the food web via intermediary crustacean hosts. Research has revealed aquaculture amplifies infection throughout inhabitants of floating cage systems. A study on wild caught Octopus Cyanea found that 41% were infected with Aggregata octopiana, which can cause cysts and lesions that lead to bacterial infections (Msongole and Kimbita, 2020)

  > *"Taking into account the total results from a series of condition analyses carried out on O. vulgaris populations at individual, tissue, cellular, and here molecular level, A. octopiana should be considered to be a dangerous pathogen" (ICES, 2007).*

- Vibrio alginolyticus, an emerging pathogenic bacteria passed to humans through octopus bites. They can infect various marine species and have been linked to seafood-borne illnesses in humans. Runoff from octopus farms can introduce harmful bacteria into surrounding marine ecosystems.

  > *"There is an increasing obvious fact about potentially serious and life-threatening infections due to Vibrio alginolyticus especially in immunocompromised patients" (*Campanelli, A et al, 2008).

- Helminths - Nematode roundworms that infect octopus mouths, digestive systems and muscle tissues. These infections can lead to tissue damage, sores, and impaired nutrient absorption, leading to increased mortality. Anisakiasis, a condition caused by consuming

raw or undercooked octopus infected with *Anisakis* nematodes, leads to human infection featuring abdominal pain, nausea, and vomiting (Butt, et.al, 2004)

Documented History of Escapes and Ecological Risks

Octopuses are known to escape, able to slip through spaces as small as their beaks. They can solve mazes, unscrew lids, and manipulate objects with their tentacles. This has been witnessed repeatedly in aquariums worldwide. Octopuses are the only aquacultured species that can walk on land, able to survive up to ten minutes in air.

- **Seaside Aquarium, Seaside, Oregon** - Eyewitness account of octopus willing to sustain injury during repeated attempts at escape:

  "What I saw was the Octopus constantly swimming itself into the rock wall trying to escape or trying to swim. Its head had large gashes on it due to it consistently hitting itself against the rocks" (TripAdvisor, 2013).

- **Seaside Aquarium, Seaside, Oregon** - Aquarium Manager Keith Chandler states:

  "*Some have tried to escape their tanks more than others*" (Beach Connection, 2015).

- **Massachusetts** Aquarium reports octopus escaping entering lobster tank and eating them (Seacoast, 2021)
- **Seattle Aquarium, Seattle Washington** - An octopus was found halfway out of its tank at the Seattle Aquarium, reportedly crawling towards a drainpipe at night (WGN, 2023).
- **National Aquarium of New Zealand, Napier, New Zealand** - An octopus named Inky escaped through a small opening in his enclosure, traversed the floor, squeezed through a 6-inch drain, and escaped into the sea. (Graham-McLay, 2016).
- **Santa Monica Pier Aquarium, Santa Monica, California** - A "tiny octopus pulled open a control valve, allowing the water to overflow her tank" (NP, 2009).
- **Portobello Aquarium, Dunedin, New Zealand** - "Octopus, known as Sid was freed after trying to escape several times."

  "*He was once caught heading for the door after hiding out in a drain," said Tessa Mills, manager at the New Zealand Marine Studies Centre.*

  "He vanished from his tank late last year, and was missing for five days. He escaped again twice last month, using a drain to seawater tanks outside the aquarium" (New Zealand Herald, 2009).

- **Sea Star Aquarium, Coburg, Germany** - "An octopus has caused havoc in his aquarium by performing juggling tricks using his fellow occupants, smashing rocks against the glass and turning off the power by short circuiting a lamp"

> *"It was a serious matter because it shorted the electricity supply to the whole aquarium that threatened the lives of the other animals when the water pumps ceased to work."* (The Telegraph, 2008).

These are regulated, accredited facilities with **one or two** octopuses at a time. Artificially concentrated farmed stocks of **hundreds of thousands** at any time presents serious ecological danger. This includes parasites and pathogens, outcompeting and interbreeding with wild populations, and massive disruption of local food webs.

In a 2004 report "Interspecific Evaluation of Octopus Escape Behavior" on 25 species of octopuses, **Octopus vulgaris was found to be the most likely to escape, which is the species typically used in research for human consumption**. This highlights an additional ethical concern of exposure to toxic chemicals used to clean industrialized facilities during escape attempts that can contribute to painful, premature death.

FIGURE 1 A 1.3-kg female *Octopus vulgaris* caught in the act of escaping during an experiment on camouflage (photo by James B. Wood).

1.

TABLE 1
Mean Escape Factors Reported From Survey Respondents for Octopuses Kept in Captivity and Seen Leaving the Water in the Wild

Species	*M*	*SD*	*N*
Enteroctopus dofleini	6.3	2.2	12
Octopus vulgaris	8.5	1.2	10
Octopus rubescens	5.1	2.4	9
Octopus bimaculoides	3.0	1.3	6
O. "joubini" (large egged)	5.5	3.1	4
Hapalochlaena lunulata	1.7	0.6	3
Octopus bimaculatus	4.0	1.7	3
Octopus digueti	6.0	4.6	3
Eledone moschata	2.5		2
Octopus californicus	1.0		2
Octopus cyanea	5.5		2
Bathypolypus arcticus	3.0		1
Eledone cirrhosa	4.0		1
Grimpoteuthis sp.	1.0		1
Japetella diaphana	1.0		1
Octopus areolatus	3.0		1
Octopus bocki	4.0		1
Octopus briarieus	8.0		1
Octopus fitchi	7.0		1
Octopus hongkongensis	2.0		1
Octopus macropus	2.0		1
Octopus micropyrsus	7.0		1
Octopus tetricus	5.0		1
Octopus wolfi	6.0		1
Opisthoteuthis californiana	1.0		1

Note. Factors are given on a scale ranging from 1 (*low tendency to escape*) to 10 (*high tendency to escape*).

2.

(Wood, Anderson, 2004)

Accidental Releases Are Commonplace

Octopuses do not have a hatching season in which ecosystems are prepared to receive a large influx of viable juveniles surviving to adulthood compared to other aquacultured species like salmon. Octopuses are known to have continuous reproductive cycles every month of the year, and have notably low mortality rates (Wodinsky, 1972). Research facilities are actively working to increase the survivability of these animals, with uncontrollable genetic mutations occurring every generation.

- **Fish Tanker Truck Accident (OR)**: A fish tanker truck transporting over 100,000 spring Chinook smolts from Lookingglass Hatchery overturned near Lookingglass Creek in northeast Oregon. The accident resulted in the loss of about 25,529 smolts, while approximately 77,000 made it into the creek. (OPB, 2024).
- **Fish Tanker Truck Accident (OR)**: A fish tanker truck operated by the Oregon Department of Fish and Wildlife (ODFW) crashed near Walterville on the McKenzie Highway. The accident resulted in the spill and death of about 11,000 Chinook salmon smolts (KVAL, 2014).

- **A Net-Pen Collapse released 250,000 non-native Atlantic salmon into the Salish Sea (WA)**: Ecological disruption and legislative action resulting in a prohibition on net-pen salmon farming (Swinomish Tribal Community, 2022).
- **Fish Hatchery Severely Impacted by Hurricane Helene (NC)**: Trout escaped during the flooding, almost 600,000 fish died (NC Wildlife, 2024).
- **70,000 pounds of trout washed away by Tropical Storm Fred (NC):** (Citizen Times, 2021).

Using a similar scale, if 100,000 octopuses were released, each eating 1-3 crustacean per day, they could decimate a million crabs, shrimp, or lobster in a single week - permanently damaging ecosystems with no possibility of return. Other dangers include the potential fertilized eggs and other biomass entering ecosystems.

This scenario is not hypothetical. The Devon Shellfish industry of Plymouth, England has already faced disaster. Unnaturally large - up to six feet long - *O. Vulgaris* have invaded the territory, coming from an unknown origin, as recently as May 2025. There has been complete devastation of shellfish landings, and a major impact on the community.

> *"The octopus are eating all the crab. They are eating all the lobsters and all the scallops. There isn't going be any crabs - they are going to eat everything. It is going to be a disaster for the crab industry."* - Mike Sharp, Brixham Shelfisher
>
> *"They are causing issues for the inshore fisherman and also for the scallopers - the octopus are incredibly strong. I will consider them one of the apex hunters."* - Mark Bolton, Fisherman, relief mate and skipper from Brixham (Plymouth Herald, 2025)

Warming waters are a natural hypothesis for the influx of the creatures. If escapes had occurred from the three known research facilities in Spain and Greece, it could explain genetic advancements giving way for unnaturally long life and capacity for large growth not normally seen in the wild (BBC, 2025). This alarming impact should be considered very strongly by communities that rely heavily on shellfishing to support balanced life.

Facilities Attract Vandalism

Various motivating factors have led to illegally vandalized aquaculture sites.

- **North Carolina** Armstrong Hatchery fresh water supply diverted, suffocating 150,000 trout (Carolina Sportsman, 2015)
- **Oregon** Vandal Kills 18,000 Salmon at Fish Hatchery (Outdoor Life, 2024)
- **Montana** Hatchery Vandals Kill Fish (HatcheryInt'l, 2019)
- **Alaska** Vandal Kills fish at Sitka aquaculture site (KCAW, 2018)

Accelerated Harmful Algal Blooms Affect on Biodiversity

Concentrated animal feeding operations with seafood-based diets are known to cause hypoxia, eutrophication and excessive persistent organic pollution contamination. Considering the resource intensity required to stimulate growth in farmed octopus, a facility goal of a million pounds would require at least 3 to 5 million pounds of feed, therefore producing millions of pounds of waste (IFLScience, 2024). Farmed animal waste contains high levels of nutrients phosphorus and nitrogen which fertilizes algae and accelerates harmful algal blooms (HABs) (UMCES, 2020).

HABs produce harmful neurotoxins that become concentrated within animal tissues and if consumed, can cause paralytic shellfish poisoning in humans. High levels of domoic acid released by certain algae are responsible for contaminating shellfish beyond safe consumption with public officials rolling back crabbing season for the last several years in a row (ActionNewsNow, 2025). Domoic acid contamination is responsible for massive wildlife die offs (Guardian, 2025).

While bacteria from animal-based agricultural runoff feast on fertilized algae, a thick film is developed above the water barrier that blocks sunlight and prevents photosynthesis for marine plants causing die-off and reducing available dissolved oxygen. Heat released during the metabolic process contributes to marine warming and further reduction of oxygen.

> "Microorganisms, like all cells, produce heat as a by-product of the enzymatic catabolism of substrates and synthesis of cell material. When expressed per unit weight, a microorganism produces more heat than any other organism" (Rosenberg, Rosenberg, 2016).

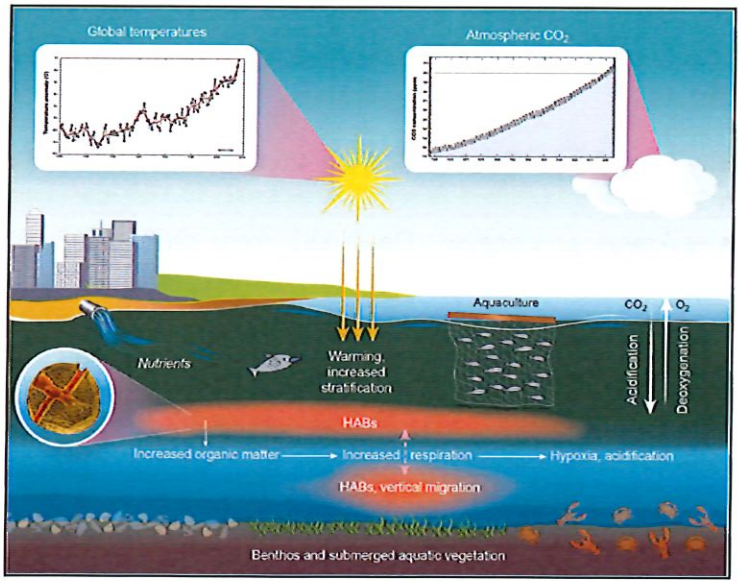


Figure depicts how successive increases in temperature, carbon dioxide, and nutrient loading since the 20th century independently and interactively promote HABs (Griffith, Gobbler, 2020).

Crustacean Population Collapses

Shifts in marine climate, predation, parasites, intensified fishing and toxic algae blooms can all contribute to a crustacean population collapse. Crabs are not efficient in excreting domoic acid or other toxins, so build up occurs within their tissues (Brainfacts, 2015). An industrial octopus farm would intensify all of these factors.

To supply one concentrated animal feeding operation (CAFO) aiming at generating one million pounds of octopus annually, a massive intensification of shellfishing would be required, local or otherwise. There is no scientific evidence that farmed octopuses will eat readily available foods such as discards or bycatch from fisheries or processors (Science, 2024). Financial consequences and devastating chain effects on wildlife have repeatedly occurred in recent history.

- **New York American Lobster Fishery** - After 5 consecutive years of record high fishing the population collapsed and has yet to recover dropping 99% from over 9 million pounds in 1996 to just over 100,000 in 2023 (ASMFC, 2023)
- **Gulf of Maine Chatham Arctic Shrimp Fishery** - Once valued at $10 million, this crustacean fishery collapsed due to increased water temperature, cephalopod predation, and decreased water quality in 2012 and has not rebounded (ASMFC, 2015)
- **Alaska Bering Sea Snow Crab Fishery** - Once valued at 227 million, marine warming in combination with crabbing and starvation lead this fishery to collapse (NOAA, 2024)
- **Alaska Red King Crab** - Once the state's most valuable fishery at $235 million (ADFG, n.d.) now collapsed due to overfishing and climate warming (PEER, 2023)
- **Hawaiian Spiny and Slipper Lobsters** - Once Hawaii's most valuable fishery, overfishing and intentional law changes to allow fishing of pregnant and fertile adults brought this fishery to collapse, and never recovered (DLNR, 2015)

Fisheries At Risk

- **New Jersey Blue Crab** - Down 20% from 4.8 million pounds in 1990 to 3.8 million pounds in 2023
- **New Jersey American Lobster** - Down 88% from 1990: 2,198,867 lbs to 265,598 lbs in 2023 (NOAA, 2025).
- **Massachusetts American Lobster** 17.7 mil pounds in 2016 down to 15.8 million in 2023, constituting a 10% reduction in less than 10 years (GloucesterTimes, 2023).
- **Massachusetts Jonah Crab** - 2017 landings were 11.68 million (GDT, 2019) and are down to 5.3 million pounds in 2024. This is a 54.6% reduction in less than 10 years
    - "*Current conditions closely resemble early stages of the collapse of the Canada Jonah crab fishery in the early 2000s. In the first three years of the crash, Canada landings dropped 58%. Within five years, landings fell 97%, and stock biomass could no longer support a fishery.*" - (ASMFC, 2023)

- **Massachusetts Horseshoe Crab** - Self-imposed catch limits were imposed in 2000 to preserve critical populations
- **Maine American Lobster** - Warming waters are fueling a mass migration of lobsters further north. Maine lobster fishery landings consisted of 111 million pounds in 2021, dropping to 97 in 2023, and reduced to 86 million in 2024. (WDHD, 2025).
- **New York Horseshoe Crab** - Overall New York horseshoe crab have decreased by approximately 45.4% from 2002 to 2024. Generates approximately $260 million annually.
- **Oregon Dungeness** Fishery recently valued at $104 million (FishermansNews, 2024) Catch Down 29% 33.5 million pounds in 2004-5 to 24.6 million at best in 2024 (KLCC, 2025)
- **Alaska Kodiak Tanner Crab** - 122 million catchable pounds in 2000, down 97% to 3.5 million in 2024. Valued at 3 million (KMXT, 2025)
- **Hawaii Spiny Lobster** - 2638 pounds 2023 down 92% since 1999
- **Hawaii Kona Crab** average 3000 pounds per year, valued at $25,000 (NOAA, 2020)
- **Louisiana Gulf of Mexico Shrimp** Fishery 34.7 million pounds in 2023 vs 147.4 million in 2000, 76% decrease (ShrimpAlliance, 2023)
- **Gulf of Mexico Brown and White Shrimp**: In 2023, landings of brown shrimp totaled 63 million pounds and were valued at $80 million, compared to 125.7 million pounds in the year 2000; white shrimp totaled 107 million pounds and were valued at $143 million, compared to 92 million in 2005. (NOAA, 2023), (NOAA)
- **Chesapeake Blue Crab** Valued at $75 million (CBF, 2024)
- **South Carolina Blue Crab** - Valued at $6 million, reported the lowest catch in 50 years in 2023
- **North Carolina Blue Crab**. 2024 4.9 million pounds, compared to 34.6 million pounds in 2002, an 86% decrease (NCDEQ, 2024).
- **Florida Spiny Lobster** - Valued at $40 million, harvest 1.5-2 million pounds per year (FWC, n.d.) 5.7 million in 2023 compared to 12.6 million in 1996 (FAO, 2023) (Muller, 2000)

Competition with Native Species

An artificial concentration of non-native octopuses would be disastrous for indigenous populations. Farmed species would hybridize, increase prey scarcity, and intentionally cannibalize other octopuses. They exhibit extremely territorial behaviors in order to protect their partners or dens including strangulation, cannibalism, and smaller males impersonating females in order to avoid confrontation with larger males (NBC News, 2008).

Species at risk of impact include:

Octopus Species Presence by State

	AL	AK	CA	CT	DE	FL	GA	HI	LA	ME	MD	MA	MS	NH	NJ	NY	NC	OR	RI	SC	TX	VA	WA
Giant Pacific Octopus (Enteroctopus dofleini)		X	X															X					X
Red Octopus (Octopus rubescens)																		X					
Pacific Striped Octopus (Octopus chierchiae)																		X					
Day Octopus (Octopus cyanea)								X															
Hawaiian Octopus (Octopus hawaiiensis)								X															
Night Octopus (Callistoctopus ornatus)								X															
Common Octopus (Octopus vulgaris)				X	X	X	X								X	X	X			X	X	X	
Deep Sea Octopus (Bathypolypus articus)										X		X		X									
Atlantic Longarm Octopus (Macrotritopus defilippi)						X																	
Caribbean Reef Octopus (Octopus briareus)						X																	
Atlantic White-Spotted Octopus (Callistoctopus macropus)						X															X		
Caribbean Two-Spotted Octopus (Octopus hummelinck)																					X		
Mimic Octopus (Thaumoctopus mimicus)																					X		
Atlantic Pygmy Octopus (Octopus joubini)	X					X	X		X				X				X			X	X		
Mexican Four Eyed Octopus (Octopus Maya)	X					X			X				X								X		

Figure depicts native octopus species by state at risk of consequential harms from farmed species. (Reefguide, n.d.)

Financial Consequences

In the United States, the Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP) program exists to reimburse producers for losses from natural disasters, disease outbreaks, and aquatic animal escapes. Disasters like hurricanes, floods, power outages, equipment failures are recurring events, and highly likely to occur again. This means that octopus farming incidents are likely to burden taxpayers (USDA, n.d.).

Increase in Crabbing Means an Increase in Whale Deaths

This would contribute to the whale entanglement crisis affecting both east and west coasts of the United States and elsewhere. Proponents of this industry misconstrue that they would be reducing ocean plunder, but in actuality would be ramping up demand for crustacean and fish based feed, increasing the amount of crabbing ropes and gear that are notorious for an unconscionable amount of deaths of whales, including endangered species (NOAA,

> *"North Atlantic right whales continue to be entangled at levels that could push this critically endangered species to extinction. It is distressing that multiple generations of right whales have been affected by the devastating harm of entanglements, which is resulting in deaths, health declines, and slower reproductive rates.* - Amy Knowlton, Senior Scientist, Anderson Cabot Center for Ocean Life at the New England Aquarium

According to Jacquet et al. (2019) "Octopuses have a food conversion rate of at least 3:1, meaning that the weight of feed necessary to sustain them is about three times the weight of the animal." Fisheries are globally depleted and challenged in providing adequate nutrition to the growing human population. Increased cultivation of carnivorous species like octopuses would be in contradiction to conservation efforts (Octopus Factory Farming: A Recipe for Disaster, 2023). Knowingly creating an industrial operation reliant on crustacean intensive feed would be in violation of the Endangered Species Act in regards to the known danger it poses to the critically endangered North Atlantic right whale and other species (SeafoodSource, 2020).

This Dec. 2, 2021, photo provided by the Georgia Department of Natural Resources shows an endangered North Atlantic right whale entangled in fishing rope being sighted with a newborn calf in waters near Cumberland Island, Ga. (Georgia Department of Natural Resources/NOAA Permit #20556 via AP)

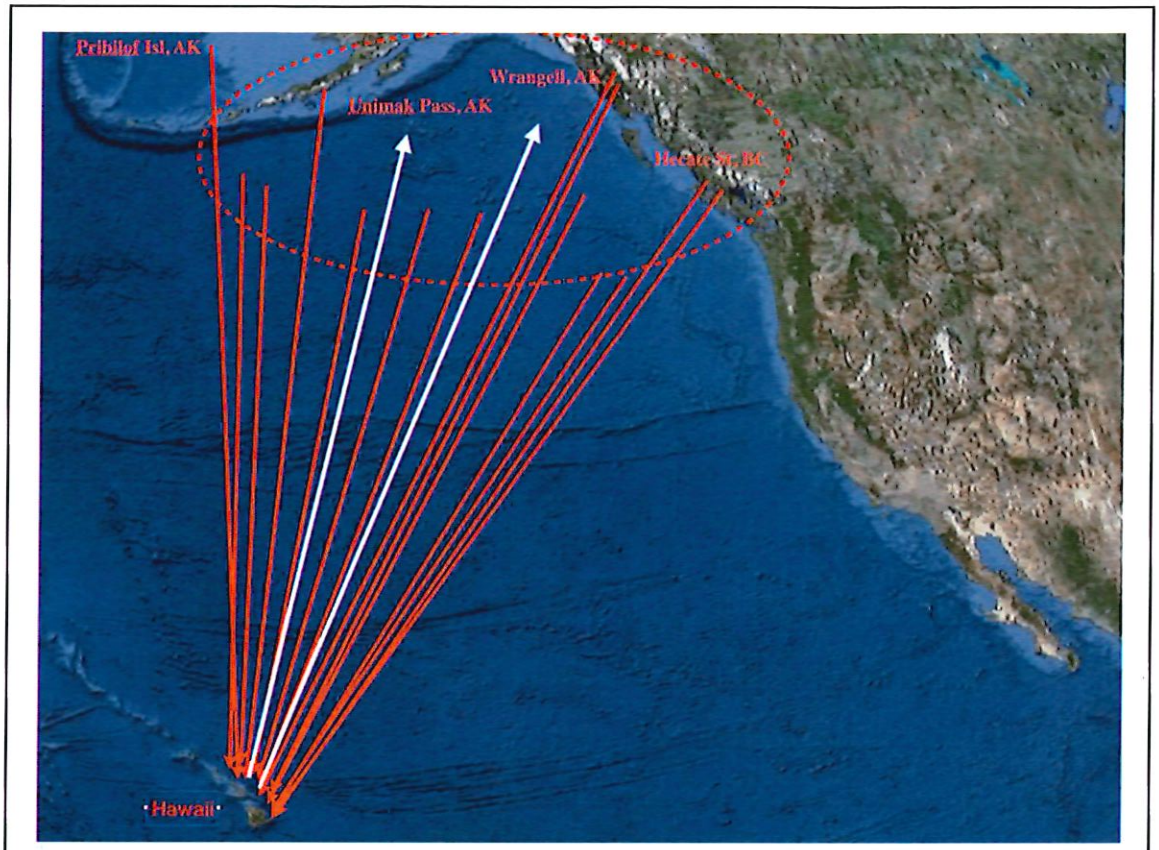
- Oregon "humpback whale was found on the central coast wrapped in numerous sets of commercial crabbing gear" sounds the alarm after a 2024 record high number of deaths (Environment America, 2025).

- Oregon Department of Fish and Wildlife (DFW) issued an advisory to the Dungeness crab fleet due to the entanglement risk their gear poses to whales in the area after 34 found entangled in 2024 (Oceana, 2025).
- North Carolina endangered whale entanglements reported 3 times in one week (ABC News, 2024)
- Massachusetts reports two North Atlantic right whales sighted entangled southeast of Nantucket (New England Aquarium, 2024)
- New York Ambrose Channel reports entangled humpback whale (NOAA, 2020)
- Maine lobster industry rope found in dead North Atlantic right whale (NationalFisherman, 2024)
- New Jersey reports 4-year-old whale found entangled with large lesions, mother also believed dead from entanglement (NewEnglandAquarium, 2020)
- Florida-Based Aerial Crew Spots Endangered Right Whale Entangled With New Calf (CBSNews, 2021).

Considering this issue is documented throughout global waters, intensified crabbing will increasingly contribute to federally endangered whale and other species mortality rates regardless of source (NOAA, n.d.). See Figs

Endangered Whale Species by State

	Sperm Whale	Sei Whale	Blue Whale	Fin Whale	Humpback Whale	North Atlantic Right Whale	North Pacific Right Whale	Gray Whale	Killer Whale	Bowhead Whale	Bryde's Whale	Rice's Whale
New York	X	X	X	X	X	X						
New Jersey				X	X	X						
North Carolina	X	X	X	X	X	X						
Oregon	X	X	X	X	X		X	X	X			
California	X	X	X	X	X	X	X	X	X		X	
Washington	X	X	X	X	X		X	X	X			
Massachusetts	X	X	X	X	X	X						
Connecticut						X						
Hawaii	X				X							
Alaska	X	X	X	X	X		X			X		
Alabama	X											X
Delaware	X	X	X	X	X	X						
Florida	X	X	X	X		X						
Georgia	X	X	X	X		X						
Louisiana	X											X
Maine	X	X	X	X		X						
Maryland	X	X	X	X	X	X						
Mississippi	X	X	X	X	X	X						
New Hampshire	X	X	X	X		X						
Rhode Island						X						
South Carolina	X	X	X	X	X	X						
Texas	X	X	X	X		X					X	
Virginia	X	X	X	X	X	X						
American Samoa	X	X	X	X	X							
Virgin Islands	X											
Puerto Rico	X											



Each red line/arrow represents gear from an entangled whale in Hawai'i that was traced back to Alaska and British Columbia; white lines represent gear from Hawai'i traced back to Alaska. Image: NOAA

Species of Special Concern Violated by Octopus Farming Requirements

Industrialized octopus farming would be consequential to other threatened species, including West Indian Manatees and Hawaiian Monk Seals. Manatees are already suffering from HABs and starvation, and monk seals from overfishing and prey scarcity (CascadiaTimes, n.d.). Octopus farms' demands for feed and waste-intrusive output would accelerate the development of HABs and intensify overfishing needs, potentiating these problems and running directly in opposition to state and federal conservation efforts.

HABs like Red Tide significantly impact Florida's and other states' manatee populations and contribute to their risk of extinction. Manatees inhale neurotoxins produced by HAB when surfacing or ingest them when feeding on contaminated seagrass leading to weakened immune system, disorientation, seizures, and drowning. Because HABs block sunlight, seagrass beds die off, rapidly reducing availability of manatees' primary food source (Environment Hawaii, 2000).

- 1255 Manatees dead from December 2020 through April 2022 (FWC, n.d.)
- 128 Manatees Dead in Spring 2023 Due to Red Tide (FWC, 2023)

- Yearlong bloom kills almost 200 Manatees (NPR, 2013)

State	Manatee Presence	Monk Seal Presence
Florida	X	
Virginia	X	
Georgia	X	
South Carolina	X	
North Carolina	X	
Alabama	X	
Mississippi	X	
Louisiana	X	
Texas	X	
Virgin Islands	X	
Puerto Rico	X	
Hawai'i		X

The Hawaiian monk seal is one of the world's most endangered marine mammals. They've been pushed to critical endangerment by prey scarcity driven due to overfishing of slipper and spiny lobsters. Malnutrition contributing to low birth rates and entanglements in aquaculture sites are factors in the population loss (DLNR, 2017). An increase in crabbing would decimate their primary food source and drive them to extinction.

Ethical Concerns and Behavioral Abnormalities

Octopuses are not only highly intelligent, but they are psychologically capable of comprehending suffering (Birch, 2021). Slaughter methods proposed by researchers are recognized as inflicting cruel, slow, stressful, painful deaths. Octopuses are also known cannibals, and farming involves intensively confining many per tank. Because of their unique biology, there is no other type of animal farming that experiences similar mortality rates.

Research indicates octopuses' primary heart actually stops beating while swimming, showcasing that they can not spend a long time evading predatory tank mates. They are evolutionarily designed for low stress, solitary lifestyles - the exact opposite of proposed intensive confinement operations (Douglas, n.d.). Facilities report housing up to 200 octopuses per tank, exposing them to constant aggression and altercation (Gestal, et al, 2007)

Producers use an ice slurry as a method of slaughter for these cognitively advanced creatures. Ice slurry is known to cause incredible suffering, even for aquatic animals. Frostbite results in the formation of ice crystals inside body tissues, which pierce and rupture cells, causing immense pain. These ice shards also block blood flow, leading to oxygen deprivation and further tissue damage. (Better Health Channel, 2023) Because octopuses have complex nervous systems and demonstrate pain awareness, subjecting them to this would result in extreme sensory trauma. Recognizing the unavoidable and immense suffering, companies like Waitrose have committed to ending the practice (Seafood Source, 2025).

Octopuses are semelparous, meaning they reproduce once and then die. After laying eggs, females experience a shift in cholesterol production and undergo a self-destruction phase, often starving themselves or self-mutilating (Wang, et.al., 2022). In many octopus species, males often die soon after mating, and in some cases, the female is accustomed to eating the male. Octopuses are physiologically incompatible with mass reproduction. Forced breeding cycles in farms equate to mass mortality, chronic stress, suffering and death of the contributing pair.

The maximum survival of hatchings is extraordinarily low. Researchers only report up to 50% survival rates within industrial facilities, which is not comparable to existing systems of animal agriculture. Requiring the death of the biological parents and over 50% of the offspring indicates clear unsuitability for industrial production. If a similar model were applied to pigs - one that required the death of the breeding sow, the boar, and 6 out of 12 piglets - it would never be considered ethical or sustainable.

Requires Removing Animals

Nueva Pescanova and other researchers have been removing fertile octopuses from the wild for decades (NuevaPescanova, 2019). No similar system exists in successful agricultural rearing of animals.

Power Outages and Risk of Mass Die-Offs

Any electrical outage could trigger a massive depopulation or escape. Unlike land-based livestock, octopuses are vulnerable to climate and captivity, and cannot survive for long without tightly controlled aquatic systems that maintain oxygen levels, water temperature, salinity, and circulation. Octopus blood uses haemocyanin, which is less efficient than our hemoglobin at carrying oxygen and is designed for cold water. This makes them exceptionally vulnerable to power outages, which can rapidly compromise entire tank systems. Electronically controlled locking mechanisms could also be compromised.

- Washington power outage at Minter Creek Hatchery killed 1,000,000 Chinook salmon fry (WDFW, 2024)
- Washington power outage killed 6.2 million chinook salmon fry during windstorm (WDFW, 2018)
- New York power outage at Adirondack hatchery kills 250,000 salmon (New York Update, 2018)

Octopus farms that utilize on-land tanks are entirely dependent on uninterrupted electricity for filtration, oxygenation, lighting, and feeding systems. In the event of common and unpredictable outages, mass die-offs are inevitable.

Financial Consequences

Escapes, parasitic infection, power outages, natural disasters, and accidental releases all pose an immense risk for financial loss, which would likely be paid through emergency programs like ELAP. Knowingly initiating this dangerous and experimental farming would unfairly burden taxpayers (USDA, n.d.).

Conclusion

Octopus farming represents a clear, dangerous convergence of ecological irresponsibility, ethical failure, and economic risk. Despite the allure of novelty and commercial potential, the evidence overwhelmingly points to this practice as incompatible with sustainable and humane food systems. Industrial octopus farms threaten to accelerate the collapse of already strained crustacean fisheries, intensify harmful algal blooms, introduce parasitic and pathogenic risks to marine ecosystems and human health, and burden public resources through inevitable disaster response costs.

The exceptional intelligence and behavioral complexity of octopuses demand ethical considerations far beyond those currently provided in industrial farming models. Their well-documented capacity for suffering, problem-solving, and social behavior renders intensive confinement and mass slaughter ethically indefensible. Their biological traits such as having a venomous nature, high escape capability, and fast genetic mutation rates present unprecedented, uncontainable risks to native wildlife and habitats.

Recommendation

As climate change, biodiversity loss, and marine ecosystem degradation already press global food systems to the brink, we cannot afford to invest in ventures that exacerbate these crises. The path toward global food security is not in the further exploitation of sentient marine species, but in innovation that respects the limits of nature. Based on these findings, we recommend proactively rejecting aquaculture models that accelerate ecological imbalance, specifically octopus farming.

Appendix: Co-Investigators

The following individuals are listed as co-investigators on this project:

- **Amanda Chavira:** Texas Tech University
- **Angela Catalano**: State University of New York College at Geneseo
- **Kerrie Espuga:** Gettysburg College
- **Liza Levith**: North Carolina State University
- **Max Postnov**: Oregon State University
- **Kacey Fifield**: Columbia University
- **Sage Vermont**: St. Louis Community College
- **Joi Karra**: San Jose State University

rom: rvrotterpa@aol.com <rvrotterpa@aol.com>
Sent: Thursday, June 12, 2025 1:41 PM
To: ODFW Commission * ODFW <ODFW.COMMISSION@odfw.oregon.gov>
Subject: revision to Importation, Possession, Confinement, Transportation and Sale of Nonnative Wildlife Rules

(re: otter on the prohibited classification draft)

Hello

I am sending an email in general support of the draft amendments as proposed:

EXHIBIT D: IMPORTATION, POSSESSION, CONFINEMENT, TRANSPORTATION AND SALE OF NONNATIVE WILDLIFE DIVISION 56 RULE AMENDMENTS.

I wish to request a correction in particular to Asian Small-clawed Otter "(iv)" listed as "Prohibited" below, so that the "Lutrinae" is removed and the remaining the scientific name reflect current citations, including that of the IUCN.

(iv) Asian Small-clawed Otter — Mustelidae — ~~Lutrinae Aonyx cinerea~~ Aonyx cinereus.

Obviously this is a minor "technicality" among the general purpose of the draft amendments, but as I noticed several similar corrections elsewhere in the draft, I thought to chime up to point out a curious part of the species name that has had my attention ever since the listed genera had been inserted.

I figure this is a good opportunity to get that corrected when these amendments are adopted.

Some citations also refer Lontra canadensis lataxina as "Southeastern River Otter".

I was the person who originally requested an "uncontrolled" classification for Lontra canadensis lataxina and Aonyx cinerea (cinereus), until I was convinced that the "prohibited" classification was the only logical option for listing during that time, instead of withdrawing. Due to the persistent popularity of people keeping otters in other states, in some cases without any oversight, I'd rather have these species remain on the Prohibited list, which still provides the opportunity for individuals and facilities to be permitted (after inspection) and maximizes ODFW's effort to prevent these animals becoming another potential exotic animal problem when abandoned, escaped, or neglected. It is still very difficult to keep these animals in captivity properly, of which is beyond most interested people are willing to successfully expend and tolerate for an otter's entire lifespan.

In short, I appreciate the work that the department is currently doing with everything, considering the many pressures and policy challenges that ODFW is dealing with.

Thank You.

William Ahlquist (Bill, otter pop)

Exhibit D_Attachment 3_Draft Oregon Administrative Rules

635-056-0050 Prohibited Species
(1)

(a) Prohibited Mammals: Common Name — Family — Genus/species:

(B) Order Carnivora:

(iii) North American Otter, Eastern subspecies — Mustelidae — Lontra canadensis lataxina.
(iv) Asian Small-clawed Otter — Mustelidae — Lutrinae Aonyx cinerea.

Change to:

(iv) Asian Small-clawed Otter — Mustelidae — ~~Lutrinae Aonyx cinerea~~ Aonyx cinereus.

6/12/25

FROM: Josh Diamond, Joshd55.ari@gmail.com

I want to strongly encourage the Commission to include octopuses on the Prohibited Species list for aquaculture during the August meeting scheduled in Salem. Oregon has a chance, like fellow west coast states California and Washington, to preemptively prohibit a terribly cruel, ecological and public health-threatening, farming practice before any jobs are lost and economic interests are entrenched. Unfortunately, octopus farming is a burgeoning and global industry, with research facilities and commercial operations planned from New Zealand to Spain, China to Greece, and beyond. Here are just a few reasons the Commission should prohibit octopuses for aquaculture use this year:

•As various Oregon crustacean fisheries have declined dramatically in the last few decades, octopuses that require huge amounts of live prey for their diets (3:1 ratio of prey to body weight roughly) would further decimate the needed crab, etc populations in Oregon to feed these animals. Dead prey or processed pellets and the like have not been shown to be adequate for farmed octopus diets, thus making octopuses a unique burden on wild animal populations in the aquaculture world.

•O. Maya and O. Vulgaris, the species used in farming research thus far, are not native to the Pacific NW. Their brilliant minds and countless escapes/attempts from aquariums and other facilities globally, as well as abilities to spray water to decimate electrical systems and the like, threaten mass release of non-native creatures into Oregon waters, posing a risk of substantial havoc on wild animal populations and food webs.

•Assuredly substantial amounts of waste (perhaps 6000 tons or more annually) would be produced from octopus farms, which can easily help create huge algal blooms and dead zones in OR waters. This would compound ongoing nitrogen and phosphorus release issues, as well as the enormous challenges posed by our rapidly heating waters as a result of the effects of global climate change. As you all know, Oregon experienced the 2018 Salem water crisis and the 2014-2016 'Blob', the massive stretch of overly heated waters up the west coast of North America where a wide variety of species experienced mass die offs. We don't need octopus farms to layer on top of these kinds of threats!

*Octopuses cannot be vaccinated against bacterial or viral infections and research from Oregon State University has shown that captive octopuses can develop hundreds of genetic mutations unseen in wild octopuses, posing all kinds of potential threats. As well, octopuses can transmit harmful anisakid nematodes, cholera, and several more harmful pathogens to humans. When you consider plans for the world's first commercial farm in the Canary Islands call for a million octopuses a year to be farmed, that's a staggering number of vectors available to make humans ill.

For all these reasons and more, please add octopuses to the Prohibited Species list.