

Human health evaluation of contaminants in Puget Sound Dungeness crab (*Metacarcinus magister*) and spot prawn (*Pandalus platyceros*)



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- Puget Sound Dungeness crab and spot prawn were sampled to determine contaminant levels and develop consumption advice.
- Although crab and spot prawn muscle tissue can be safely consumed from most locations, restrictions were developed for crab hepatopancreas and spot prawn heads.

Introduction: Washington State Department of Fish and Wildlife (WDFW) sampled Dungeness crab and spot prawn from Puget Sound during 2011 and 2012 to determine contaminant levels in the two crustacean species.

Contaminants: Concentrations of polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), polycyclic aromatic hydrocarbons (PAHs), and organochlorine pesticides as well as mercury, arsenic, cadmium, copper, lead and zinc were analyzed in crab and prawn tissues.

Sampling: Sampling was conducted in nine WDFW Marine Areas (MA; fishery management areas for marine recreational fishing - WAC 220-56-185) and three urbanized embayments. All crab and prawn met size, sex, and shell hardness criteria set by fishing regulations. Two hundred forty Dungeness crab specimens were collected at 54 stations, generating 56 crab muscle and 19 crab hepatopancreas composited samples. Seven hundred seventy-seven spot prawn specimens were collected at 42 stations, generating 43 spot prawn muscle (tail) and 16 spot prawn head tissue (containing the hepatopancreas) composited samples.

Health Assessment: Washington State Department of Health (Health) evaluated contaminant concentrations in Dungeness crab muscle and hepatopancreas, and spot prawn muscle and head tissues for potential public health concerns. This evaluation compared tissue concentrations with established screening level values based on non-cancer and cancer health end-points. Values exceeding screening levels were further evaluated. Health calculated meal restrictions to ensure seafood consumers do not exceed safe contaminant levels. Meal limits are meant to guide people toward making informed decisions when selecting seafood.

Findings: With the exception of a few metals, all contaminant concentrations in hepatopancreas of Dungeness crab and

head tissue of spot prawn were greater than corresponding muscle tissues. PCBs were detected in Dungeness crab from all marine areas and were highest in samples from urban areas. DDT, PAHs and PBDEs were detected in crab but not at levels to impact human health. DDT was rarely detected in any spot prawn, while PBDEs and PAHs were detected but at low levels. Most metal concentrations were evenly distributed in Dungeness crab from all marine areas and urban bays. Mercury was the only metal that occurred in significantly greater levels in urban compared to non-urban areas in Dungeness crab.

Recommendations (See Table)

Dungeness Crab from Puget Sound: Based on tissue concentrations, frequency of detection, and toxicity, Health concluded that Dungeness crab muscle tissue can be safely consumed at unrestricted rates from most Marine Areas with some exceptions. Consumption guidance for crab hepatopancreas was determined; advice ranges from no consumption to four 8-ounce servings per month.

Spot Prawn from Puget Sound: Health concluded that spot prawn tails can be safely consumed at unrestricted rates from all Marine Areas except:

- No more than eight meals of spot prawn tails per month in Elliott Bay, Sinclair Inlet, and Commencement Bay.
- Elevated levels of PCBs, cadmium, and mercury were found in spot prawn heads leading to a range of restrictions.

Puget Sound meal advisory for Dungeness crab (muscle tissue and hepatopancreas) and spot prawn (muscle tissue and heads).

Recreational Marine Area		Consumption Guidance for Dungeness Crab Muscle Tissue (<u>Spot Prawn Muscle Tissue is Unrestricted for all Marine Areas, with exceptions to the right</u>)	Exceptions for Crab Muscle Tissue	Consumption Guidance for Dungeness Crab Hepatopancreas	Exceptions for Spot Prawn Muscle Tissue	Consumption Guidance for Spot Prawn Heads from Puget Sound
6	East Juan de Fuca Strait	Unrestricted	Port Angeles Harbor: 4 crab per month	MA 6: 4 per month Port Angeles: No hepatopancreas	None	No more than eight meals with heads per month
7	San Juan Islands	Unrestricted	None	4 per month	None	No restrictions
8.1	Deception Pass, Hope Island, and Skagit Bay	Unrestricted	None	4 per month	None	No consumption of heads
8.2	Port Susan and Port Gardner	Unrestricted	None	1 per month	None	No consumption of heads
9	Admiralty Inlet	Unrestricted	None	2 per month	None	No consumption of heads
10	Seattle-Bremerton Area	8 meals per month	Elliott Bay: 2 crab per month Sinclair Inlet: 2 crab per month	No hepatopancreas	Elliott Bay: 8 meals per month Sinclair Inlet: 8 meals per month	No consumption of heads
11	Tacoma-Vashon Area	Unrestricted	Commencement Bay: 4 crab per month	2 per month	Commencement Bay: 8 meals per month	No consumption of heads
12	Hood Canal	Unrestricted	None	2 per month	None	No more than eight meals with heads per month
13	South Puget Sound	Unrestricted	None	1 per month	None	No consumption of heads

NOTE: Meal size equals eight ounces of uncooked shellfish for an average-sized adult (60 kg female and 70 kg male)

RECOMMENDED CITATION

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REFERENCES