



Alaska Department of Environmental Conservation
Office of the State Veterinarian Fish Monitoring Program
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Cadmium in Fish and Shellfish Caught in Alaskan Waters

Fish Samples collected: 2001-2021

Concentration in mg/Kg wet weight

ND = Non-detect in greater than 50% of fish samples

Visit the Fish Monitoring Program webpage for more information:

<http://www.dec.alaska.gov/eh/vet/fish-monitoring-program>

For State of Alaska fish consumption recommendations visit:

<http://www.dhss.alaska.gov/dph/Epi/eph/Pages/fish/default.aspx>

Table 1: Cadmium in Marine Fish

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Alaska Plaice	Fillet	31	12	0.01	0.012	0.002	0.002	0.001	0.025
Arctic Flounder	Whole Body	4	4	ND	NA	NA	ND	0.005	0.005
Arctic Sculpin	Whole Body	1	0	0.018	NA	NA	0.018	0.018	0.018
Arrowtooth Flounder	Fillet	14	14	ND	NA	NA	ND	0.025	0.025
Atka Mackerel	Fillet	4	3	ND	NA	NA	ND	0.005	0.02
Atka Mackerel	Whole Body	5	0	0.062	0.041	0.018	0.048	0.019	0.12
Big Skate	Fillet	112	112	ND	NA	NA	ND	0.005	0.005
Big Skate	Liver	20	0	0.212	0.195	0.044	0.165	0.072	1
Black Rockfish	Fillet	85	75	ND	NA	NA	ND	0.001	0.023
Black Rockfish	Whole Body	7	3	0.06	0.094	0.036	0.03	0.005	0.27
Blue Shark	Fillet	1	0	0.018	NA	NA	0.018	0.018	0.018
Butter Sole	Whole Body	1	0	0.02	NA	NA	0.02	0.02	0.02
China Rockfish	Fillet	1	1	ND	NA	NA	ND	0.005	0.005
Copper Rockfish	Fillet	4	3	ND	NA	NA	ND	0.005	0.033
Dusky Rockfish	Fillet	64	50	ND	NA	NA	ND	0.001	0.051
Dusky Rockfish	Whole Body	20	4	0.108	0.122	0.027	0.055	0.005	0.48
Flathead Sole	Fillet	15	8	ND	NA	NA	ND	0.001	0.025
Fourhorn Sculpin	Whole Body	6	5	ND	NA	NA	ND	0.001	0.025
Fourhorn Sculpin	C-Whole Body	1	0	0.003	NA	NA	0.003	0.003	0.003
Great Sculpin	Whole Body	2	0	0.031	0.013	0.009	0.031	0.022	0.04
Kelp Greenling	Fillet	1	0	0.013	NA	NA	0.013	0.013	0.013
Kelp Greenling	Whole Body	18	6	0.035	0.038	0.009	0.027	0.005	0.16
Lamprey	Whole Body	10	2	0.022	0.016	0.005	0.016	0.005	0.055
Lingcod	Fillet	301	280	ND	NA	NA	ND	0.001	0.052
Longnose Skate	Fillet	114	111	ND	NA	NA	ND	0.005	0.011
Longnose Skate	Liver	20	0	0.291	0.247	0.055	0.23	0.05	0.85
Northernrock Sole	Fillet	20	11	ND	NA	NA	ND	0.001	0.025
Northernrock Sole	Whole Body	18	8	0.022	0.018	0.004	0.019	0.004	0.061
Pacific Cod	Fillet	195	145	ND	NA	NA	ND	0.001	0.041
Pacific Halibut	Fillet	3602	3179	ND	NA	NA	ND	0.001	0.213
Pacific Halibut	Comp	1	1	ND	NA	NA	ND	0.025	0.025
Pacific Ocean Pearch	Fillet	78	69	ND	NA	NA	ND	0.001	0.01
Quillback Rockfish	Fillet	22	20	ND	NA	NA	ND	0.003	0.037
Red Irish Lord	Whole Body	11	1	0.03	0.017	0.005	0.024	0.005	0.056
Rock Greenling	Whole Body	16	5	0.035	0.046	0.011	0.02	0.004	0.19
Rougheye Rockfish	Fillet	72	46	ND	NA	NA	ND	0.001	0.056
Sablefish	Fillet	342	280	ND	NA	NA	ND	0.001	0.073
Sablefish	Whole Body	3	0	0.046	0.019	0.011	0.038	0.032	0.067
Salmon Shark	Fillet	110	41	0.015	0.015	0.001	0.011	0.002	0.093
Shortraker Rockfish	Fillet	8	1	0.02	0.011	0.004	0.021	0.005	0.036
Silvergray Rockfish	Fillet	10	10	ND	NA	NA	ND	0.005	0.005

Table 1: Cadmium in Marine Fish (*continued*)

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Sleeper Shark	Fillet	1	1	ND	NA	NA	ND	0.005	0.005
Southernrock Sole	Whole Body	1	1	ND	NA	NA	ND	0.005	0.005
Spiny Dogfish	Fillet	69	66	ND	NA	NA	ND	0.002	0.009
Starry Flounder	Fillet	1	1	ND	NA	NA	ND	0.005	0.005
Starry Flounder	Whole Body	1	1	ND	NA	NA	ND	0.005	0.005
Starry Flounder	C-Whole Body	3	1	0.013	0.011	0.006	0.011	0.003	0.025
Tiger Rockfish	Fillet	1	0	0.007	NA	NA	0.007	0.007	0.007
Walleye Pollock	Fillet	259	200	ND	NA	NA	ND	0.001	0.025
Walleye Pollock	Comp	5	5	ND	NA	NA	ND	0.025	0.025
Yellow Irish Lord	Fillet	2	0	0.024	0.015	0.011	0.024	0.013	0.034
Yellow Irish Lord	Whole Body	10	0	0.059	0.048	0.015	0.05	0.01	0.16
Yelloweye Rockfish	Fillet	131	120	ND	NA	NA	ND	0.001	0.025
Yellowfin Sole	Fillet	45	14	0.01	0.01	0.002	0.003	0.001	0.025
Yellowtail Rockfish	Fillet	7	7	ND	NA	NA	ND	0.005	0.005

Note:

n= sample size

ND = non-detect

Mean = arithmetic mean

SD = standard deviation

SEM = standard error

C = Composite of multiple individuals

Reporting limits: As, Cd, Cu, Pb = 0.05 mg/Kg; Se = 0.25 mg/Kg; Hg = 0.01 mg/Kg

Table 2: Cadmium in Salmonids (Salmon, Whitefish, Grayling, Char)

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Arctic Char	Fillet	30	30	ND	NA	NA	ND	0.005	0.025
Arctic Char	Whole Body	10	9	ND	NA	NA	ND	0.005	0.076
Arctic Cisco	Fillet	21	21	ND	NA	NA	ND	0.005	0.005
Arctic Cisco	Whole Body	1	1	ND	NA	NA	ND	0.005	0.005
Arctic Grayling	Fillet	120	88	ND	NA	NA	ND	0.001	0.025
Arctic Grayling	Whole Body	4	1	0.009	0.004	0.002	0.008	0.005	0.015
Arctic Grayling	C-Whole Body	11	5	0.011	0.009	0.003	0.005	0.004	0.036
Bering Cisco	Fillet	5	5	ND	NA	NA	ND	0.025	0.025
Broad Whitefish	Fillet	48	46	ND	NA	NA	ND	0.001	0.025
Chum Salmon	Fillet	304	246	ND	NA	NA	ND	0.002	0.026
Chum Salmon	Whole Body	2	0	0.042	0.033	0.024	0.042	0.018	0.065
Coho Salmon	Fillet	321	264	ND	NA	NA	ND	0.001	0.055
Coho Salmon	Whole Body	62	1	0.057	0.042	0.005	0.047	0.005	0.25
Coho Salmon	Eggs	20	5	0.019	0.029	0.007	0.013	0.005	0.14
Cutthroat Trout	Whole Body	7	0	0.01	0.005	0.002	0.007	0.005	0.018
Dolly Varden	Fillet	65	51	ND	NA	NA	ND	0.001	0.05
Dolly Varden	Whole Body	49	3	0.038	0.047	0.007	0.016	0.003	0.17
Humpback Whitefish	Fillet	110	105	ND	NA	NA	ND	0.001	0.1
Humpback Whitefish	Whole Body	24	5	0.021	0.015	0.003	0.016	0.005	0.049
King Salmon	Fillet	252	211	ND	NA	NA	ND	0.001	0.025
King Salmon	Whole Body	20	2	0.099	0.069	0.015	0.1	0.008	0.22
Lake Trout	Fillet	55	53	ND	NA	NA	ND	0.001	0.025
Lake Trout	Whole Body	33	18	ND	NA	NA	ND	0.005	0.035
Least Cisco	Fillet	42	38	ND	NA	NA	ND	0.001	0.025
Least Cisco	Whole Body	1	0	0.011	NA	NA	0.011	0.011	0.011
Pink Salmon	Fillet	206	157	ND	NA	NA	ND	0.001	0.025
Pygmy Whitefish	Whole Body	1	0	0.066	NA	NA	0.066	0.066	0.066
Rainbow Trout	Fillet	137	137	ND	NA	NA	ND	0.001	0.025
Rainbow Trout	Whole Body	11	11	ND	NA	NA	ND	0.005	0.005
Round Whitefish	Fillet	14	14	ND	NA	NA	ND	0.005	0.025
Round Whitefish	Whole Body	1	0	0.017	NA	NA	0.017	0.017	0.017
Sheefish	Fillet	44	43	ND	NA	NA	ND	0.001	0.025
Sheefish	Whole Body	5	5	ND	NA	NA	ND	0.005	0.005
Sheefish	Eggs	1	1	ND	NA	NA	ND	0.005	0.005
Sockeye Salmon	Fillet	341	240	ND	NA	NA	ND	0.001	0.07
Sockeye Salmon	Whole Body	56	0	0.039	0.019	0.003	0.036	0.011	0.12
Sockeye Salmon	Eggs	2	2	ND	NA	NA	ND	0.005	0.005
Sockeye Salmon	C-Whole Body	1	0	0.001	NA	NA	0.001	0.001	0.001

Table 2: Cadmium in Salmonids (Salmon, Whitefish, Grayling, Char) (*continued*)

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max

Note:

n= sample size

ND = non-detect

Mean = arithmetic mean

SD = standard deviation

SEM = standard error

C = Composite of multiple individuals

Reporting limits: As, Cd, Cu, Pb = 0.05 mg/Kg; Se = 0.25 mg/Kg; Hg = 0.01 mg/Kg

Table 3: Cadmium in Marine Forage Fish

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Capelin	C-Whole Body	1	0	0.028	NA	NA	0.028	0.028	0.028
Eulachon	C-Whole Body	7	0	0.023	0.004	0.002	0.024	0.019	0.032
Pacific Herring	Fillet	30	15	ND	NA	NA	ND	0.006	0.08
Pacific Herring	Eggs	1	0	0.008	NA	NA	0.008	0.008	0.008
Pacific Herring	C-Whole Body	16	2	0.028	0.014	0.003	0.024	0.005	0.059
Rainbow Smelt	Whole Body	10	2	0.014	0.006	0.002	0.014	0.005	0.022
Saffron Cod	Whole Body	22	0	0.017	0.007	0.002	0.016	0.008	0.031
Sand Lance	C-Whole Body	1	0	0.058	NA	NA	0.058	0.058	0.058

Note:

n= sample size

ND = non-detect

Mean = arithmetic mean

SD = standard deviation

SEM = standard error

C = Composite of multiple individuals

Reporting limits: As, Cd, Cu, Pb = 0.05 mg/Kg; Se = 0.25 mg/Kg; Hg = 0.01 mg/Kg

Table 4: Cadmium in Marine Invertebrates

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Bairdi Crab	Comp	1	0	0.128	NA	NA	0.128	0.128	0.128
Blue Mussel	Invert Whole Tissue	4	0	0.627	0.512	0.256	0.445	0.24	1.38
Blue Mussel	C-Invert Whole	38	0	0.499	0.174	0.028	0.43	0.26	0.91
Butter Clam	Invert Whole Tissue	5	0	0.08	0.023	0.01	0.082	0.051	0.11
Butter Clam	C-Invert Whole	4	0	0.119	0.095	0.047	0.08	0.056	0.26
Chiton	Invert Whole Tissue	2	0	1.8	0.99	0.7	1.8	1.1	2.5
Cockle	Invert Whole Tissue	5	0	0.068	0.02	0.009	0.066	0.046	0.1
Cockle	C-Invert Whole	16	0	0.219	0.48	0.12	0.051	0.035	1.99
Coonstriped Shrimp	C-Invert Whole	2	0	0.311	0.088	0.062	0.311	0.249	0.373
Decorator Crab	Invert Whole Tissue	1	0	0.55	NA	NA	0.55	0.55	0.55
Dungeness Crab	Invert Whole Tissue	2	0	0.118	0.129	0.092	0.118	0.027	0.21
Golden King Crab	Invert Muscle	2	0	0.196	0.023	0.016	0.196	0.179	0.212
Hairytriton Snail	Invert Whole Tissue	1	0	0.74	NA	NA	0.74	0.74	0.74
Hermit Crab	Invert Whole Tissue	1	0	0.074	NA	NA	0.074	0.074	0.074
Horse Clam	C-Invert Whole	1	0	0.15	NA	NA	0.15	0.15	0.15
Little Neck Clam	Invert Whole Tissue	4	0	0.401	0.047	0.023	0.408	0.346	0.444
Little Neck Clam	C-Invert Whole	2	0	0.2	0.1	0.071	0.2	0.129	0.27
Neptunea hero	Invert Whole Tissue	3	0	0.923	0.914	0.528	0.831	0.059	1.88
Opilio Crab	Comp	1	0	0.093	NA	NA	0.093	0.093	0.093
Opilio Crab	Invert Muscle	27	0	0.104	0.082	0.016	0.084	0.019	0.42
Oysters	Invert Whole Tissue	16	0	2.462	1.107	0.277	2.087	1.077	4.893
Razor Clam	Invert Muscle	2	0	0.074	0.021	0.015	0.074	0.059	0.089
Ribbon Worm	Invert Whole Tissue	2	0	0.305	0.078	0.055	0.305	0.25	0.36
Scallop	Invert Whole Tissue	20	0	3.875	1.383	0.309	3.8	2.1	8.4
Sea Cucumber	Invert Whole Tissue	3	0	0.187	0.076	0.044	0.22	0.1	0.24
Softshell Clam	Invert Whole Tissue	4	0	0.071	0.025	0.012	0.069	0.048	0.098
Softshell Clam	C-Invert Whole	10	0	0.158	0.059	0.019	0.155	0.087	0.25
Squid	C-Invert Whole	5	0	0.208	0.061	0.027	0.18	0.14	0.29

Note:

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SD = standard deviation

SEM = standard error

C = Composite of multiple individuals

Reporting limits: As, Cd, Cu, Pb = 0.05 mg/Kg; Se = 0.25 mg/Kg; Hg = 0.01 mg/Kg

Table 5: Cadmium in Freshwater Fishes

Species	Tissue	n	ND	mg/Kg wet weight					
				Mean	SD	SEM	Median	Min	Max
Alaska Blackfish	Whole Body	3	0	0.014	0.006	0.004	0.012	0.009	0.021
Alaska Blackfish	C-Whole Body	3	0	0.03	0.02	0.011	0.025	0.014	0.052
Burbot	Fillet	58	57	ND	NA	NA	ND	0.001	0.025
Burbot	Liver	5	0	0.065	0.019	0.009	0.062	0.041	0.093
Longnose Sucker	Fillet	3	3	ND	NA	NA	ND	0.005	0.005
Longnose Sucker	Whole Body	2	0	0.01	0.005	0.004	0.01	0.006	0.014
Northern Pike	Fillet	538	519	ND	NA	NA	ND	0.001	0.042
Northern Pike	Whole Body	40	35	ND	NA	NA	ND	0.005	0.016
NS Stickleback	C-Whole Body	13	3	0.029	0.027	0.008	0.024	0.005	0.104
Slimy Sculpin	Whole Body	66	1	0.06	0.043	0.005	0.044	0.005	0.19
Slimy Sculpin	C-Whole Body	15	8	ND	NA	NA	ND	0.005	0.18
TS Stickleback	Whole Body	3	0	0.014	0.002	0.001	0.014	0.013	0.017
TS Stickleback	C-Whole Body	8	4	ND	NA	NA	ND	0.005	0.059

Note:

n= sample size

ND = non-detect

Mean = arithmetic mean

SD = standard deviation

SEM = standard error

C = Composite of multiple individuals

Reporting limits: As, Cd, Cu, Pb = 0.05 mg/Kg; Se = 0.25 mg/Kg; Hg = 0.01 mg/Kg

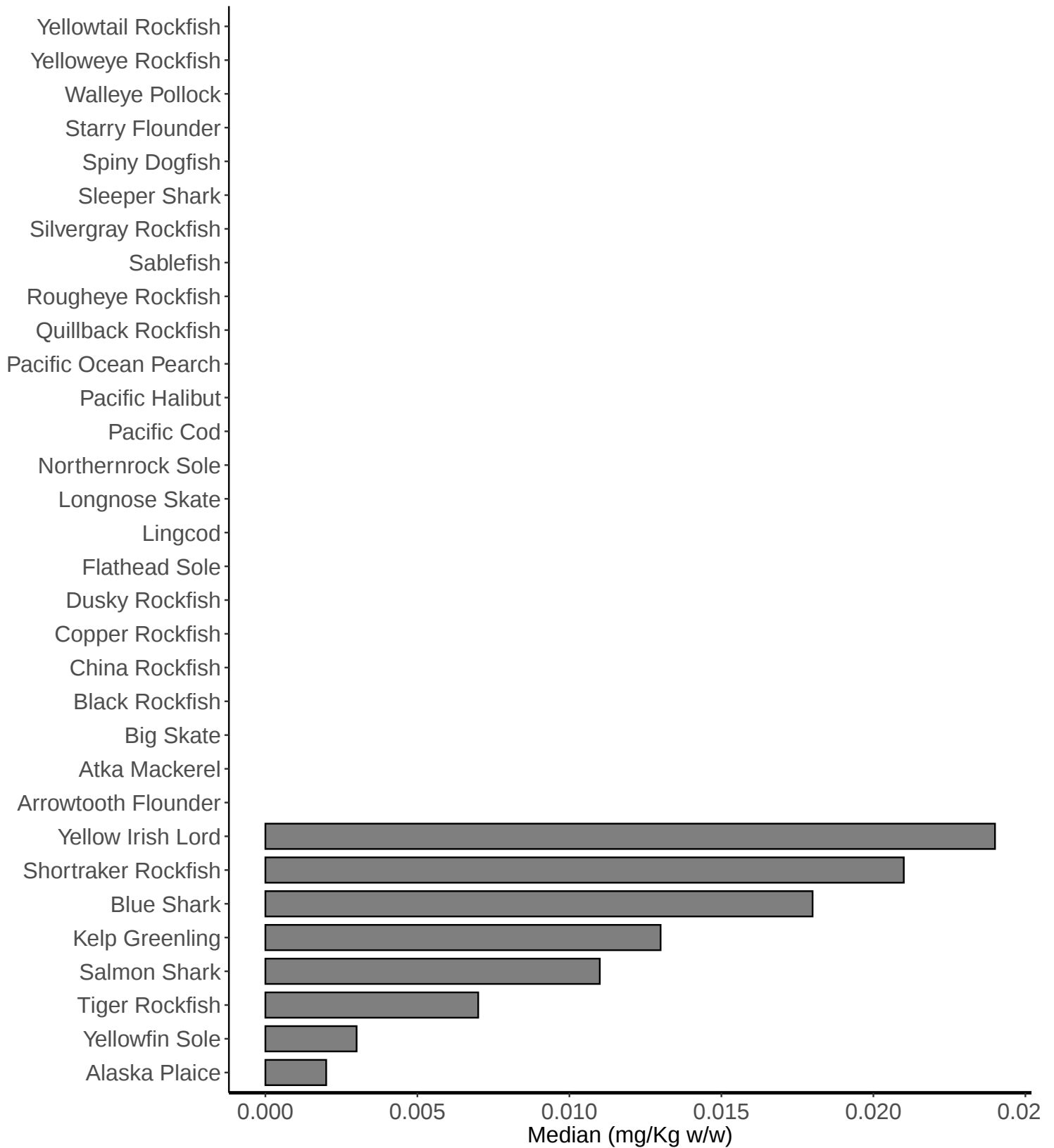


Figure 1: Cadmium in Marine Fish



Figure 2: Cadmium in Salmonids

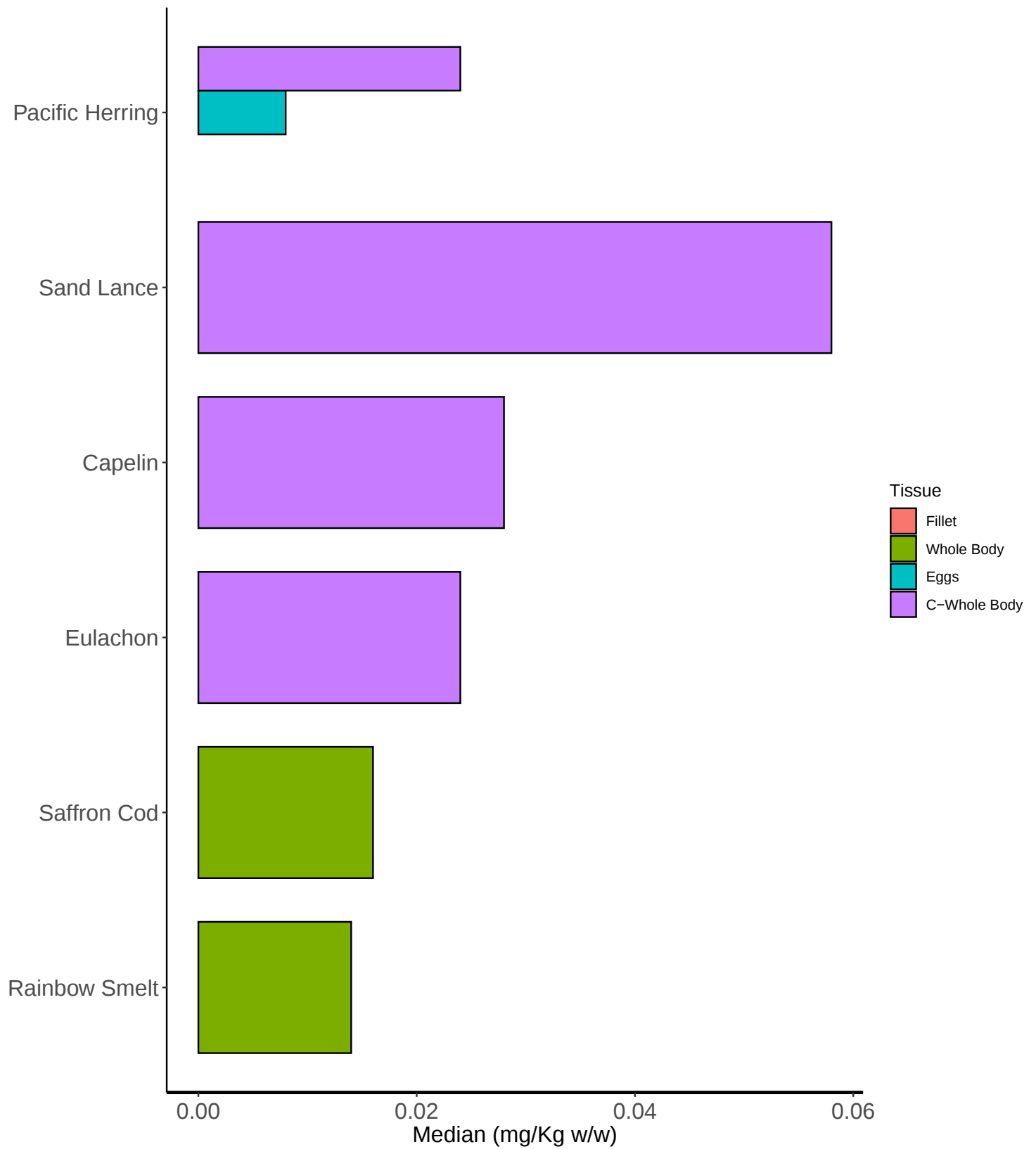


Figure 3: Cadmium in Forage Fish

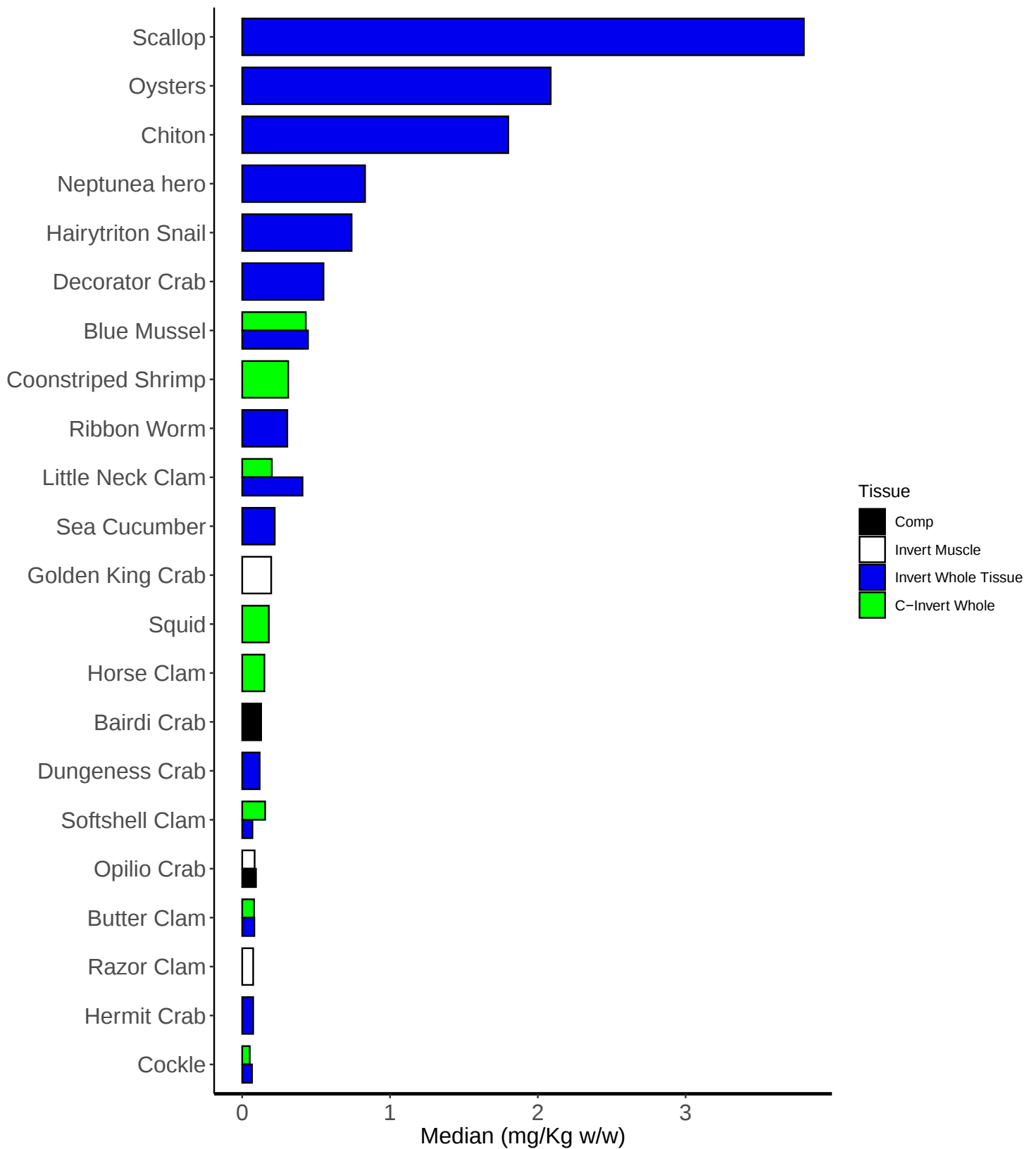


Figure 4: Cadmium in Marine Invertebrates

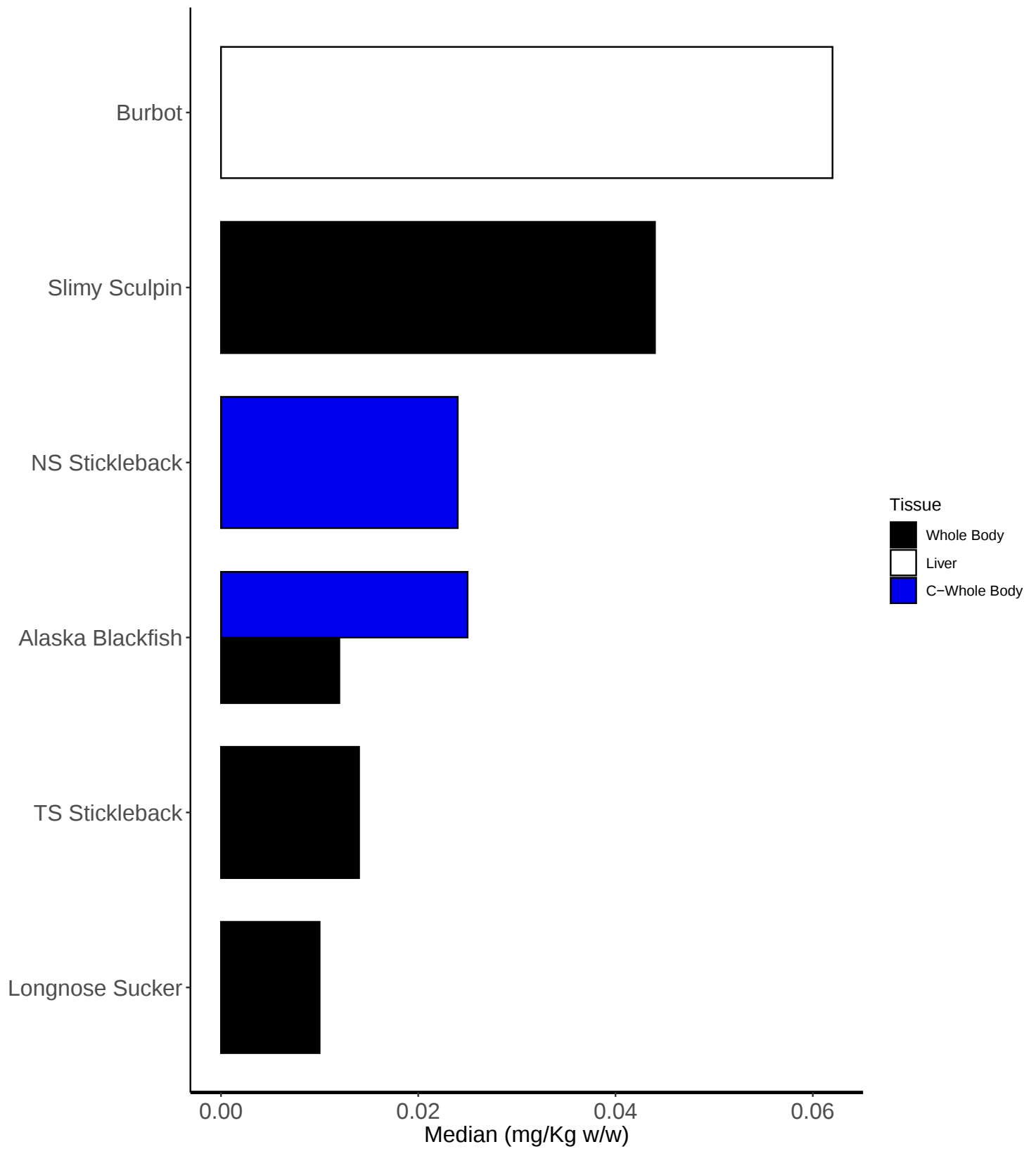


Figure 5: Cadmium in Freshwater Fish