Overview of PFAS Concerns for Alaska Communities

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WHAT ARE PFAS

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PER & POLYFLUOROALKYL SUBSTANCES : large class of fluorine-containing chemicals that confer useful properties to many household, commercial & industrial products *(e.g., PFOS & PFOA)*

Oil

Heat

Water

PFAS IN THE ENVIRONMENT

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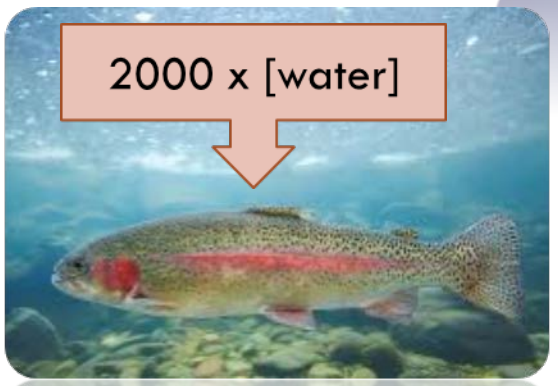
ATMOSPHERIC DEPOSITION

MOVES EASILY THROUGH WATER COLUMN

EXTREMELY STABLE



- ACCUMULATES IN ANIMALS AND PEOPLE
- NEARLY EVERYONE TESTED BY THE CDC HAS PFAS IN THEIR BLOOD **(NHANES SURVEY 1999-2000)**

POTENTIAL HEALTH EFFECTS

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Probable link between exposure to some PFAS & following effects

- GASTROINTESTINAL SYSTEM: Ulcerative colitis
- LIVER: liver damage, abnormal fat metabolism, high cholesterol
- KIDNEY: kidney cancer and chronic kidney disease
- CARDIOVASCULAR SYSTEM: pregnancy-induced hypertension
- IMMUNE SYSTEM: decreased response to vaccines
- REPRODUCTIVE SYSTEM: testicular cancer and decreased fertility
- ENDOCRINE SYSTEM: thyroid disease
- DEVELOPMENT- reduced birth weight

Scientists don't yet know what levels are associated with health effects

PFAS CONTAMINATED SITES IN AK

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Other Possible Sites	
Airports & Military facilities	Firefighter training centers
Wastewater treatment facilities	Anywhere biosolids are applied
Landfills	Industrial sites

ADEC: Confirmed Sites in AK

Eielson/Moose Creek

Regional Fire Training Center (Fairbanks)

North Pole

Utqiagvik

Kenai

Gustavus

Galena

King Salmon

Dillingham

Yakutat

Juneau

SOURCES OF PFAS IN AK…so far

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AFFF (Aqueous Film Forming Foam)

Municipal Biosolids

Golden Heart Utilities suspends compost sales over PFAS contaminant concerns

Erin McGroarty, emcgroarty@newsminer.com May 30, 2019

Processed waste from wastewater treatment plants that are applied as fertilizer to crops

PFAS EXPOSURE: GENERAL POPULATION

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FOOD is the primary exposure source for most people

PFAS EXPOSURE ROUTES IN AK

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CONTAMINATED WATER

HOUSEHOLD PRODUCTS

CONTAMINATED FOOD

WHAT ABOUT SUBSISTENCE FOODS?

FISH IN AK

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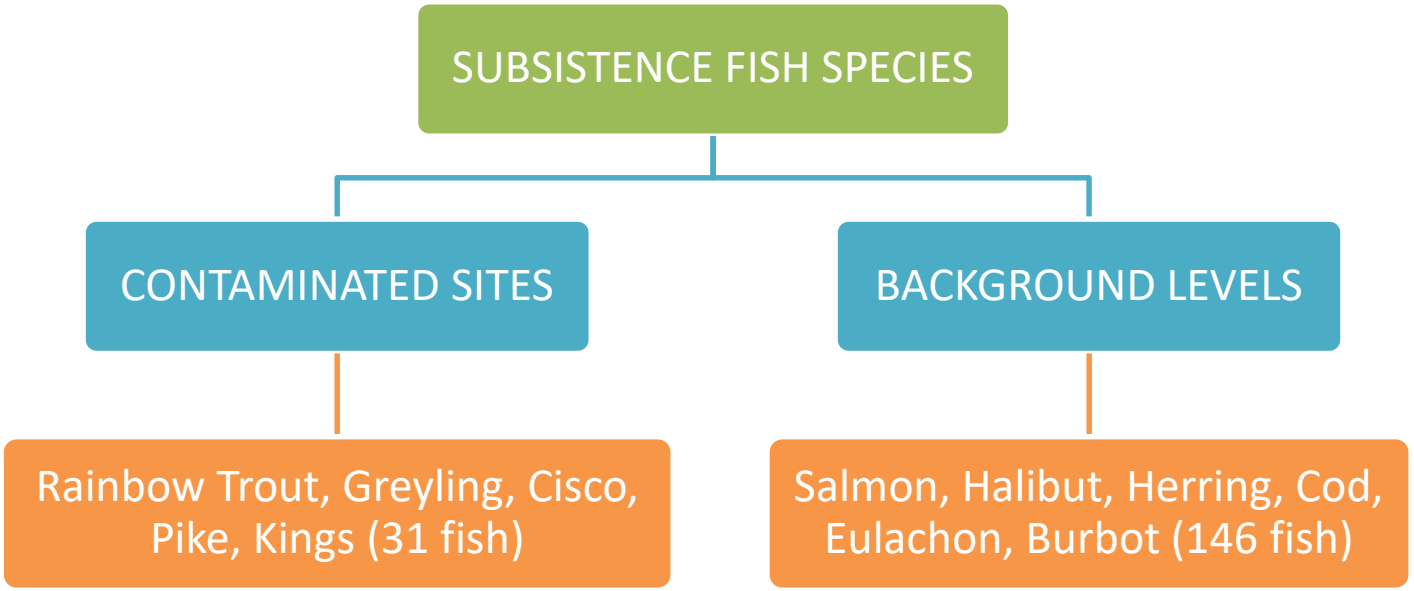

Location	Sum of 5 (ppb)
Kimberly Lake (muscle)	≤ 90 (mostly PFNA)
Polaris Lake (muscle)	≤ 73 (mostly PFOS)
Chatanika River (whole)	≤ 1.5 (mostly PFOS)
Moose Creek (whole)	≤ 129 (mostly PFOS)
Piledriver slough (whole)	≤ 51 (mostly PFOS)
Salcha River (whole)	-

Fish	Sum of 5 (ppb)
Salmon (muscle)	97 salmon = ND 1 Coho ≤ 26.5 1 King ≤ 3.03
Marine (muscle)	-
Burbot (muscle)	≤ 0.4

RISK- fish consumption

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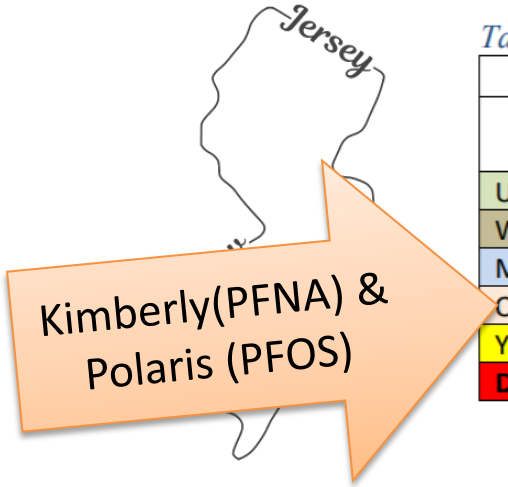

Table 8: DRAFT Preliminary Fish Consumption Advisory Triggers

	General Population			High Risk Population*		
	PFOA (ng/g; ppb)	PFNA (ng/g; ppb)	PFOS (ng/g; ppb)	PFOA (ng/g; ppb)	PFNA (ng/g; ppb)	PFOS (ng/g; ppb)
Unlimited	0.62	0.23	0.56	0.62	0.23	0.56
Weekly	4.3	1.6	3.9	4.3	1.6	3.9
Monthly	18.6	6.9	17	18.6	6.9	17
Once/3 months	57	21	51	N/A	N/A	N/A
Yearly	226	84	204	N/A	N/A	N/A
Do Not Eat	**>226**	**>84**	**>204**	**>18.6**	**>6.9**	**>17**

Overarching Conclusions

- AK fish are generally PFAS free, unless they live at/near or migrate through a contaminated Site
- Nearly all detections have been in freshwater
- Very low chance of exposure with marine and anadromous fish
- PFAS should not deter subsistence fishing (remember fish at the grocery store may have PFAS!)

GAME ANIMALS

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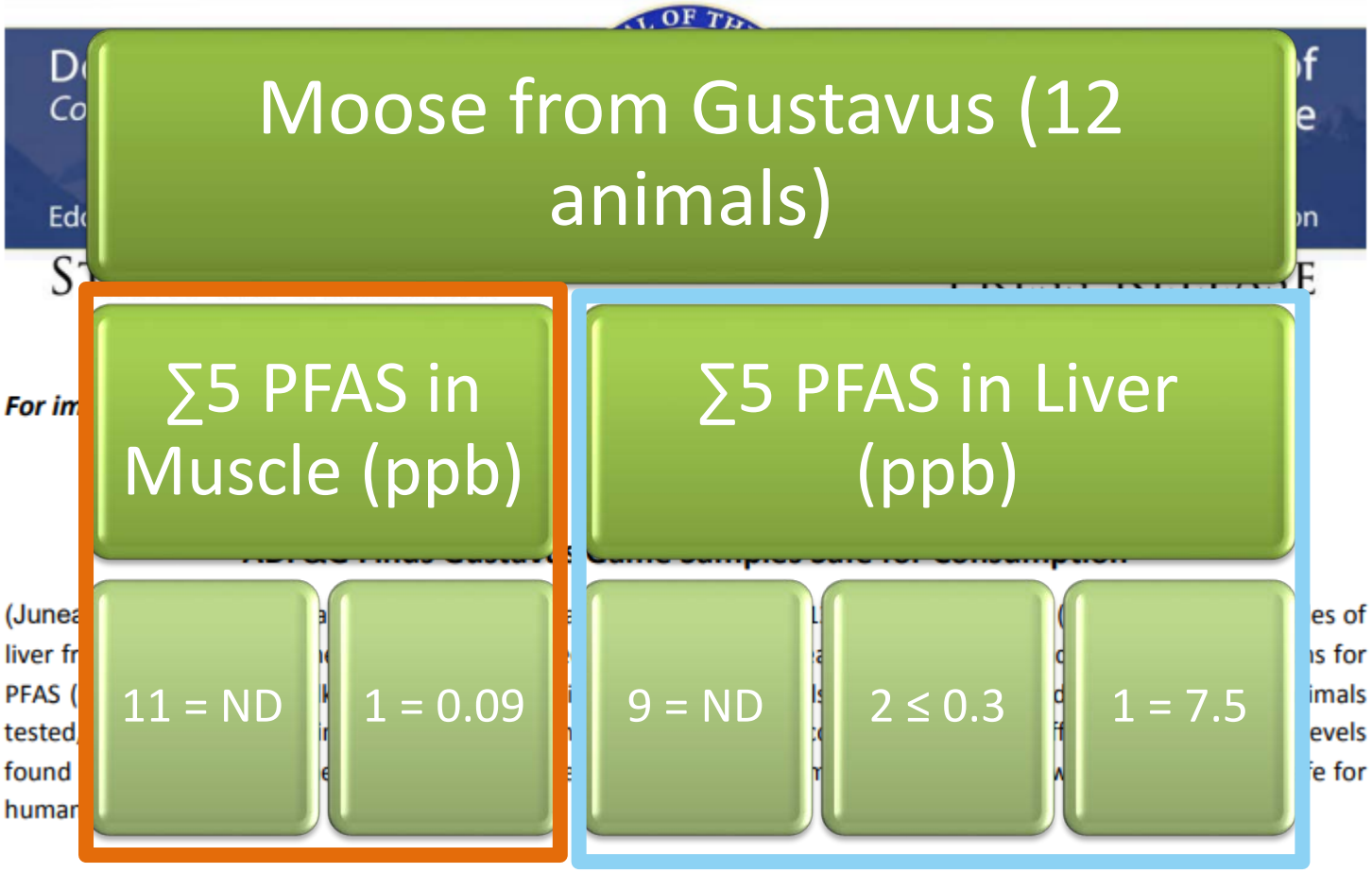

RISK- game consumption

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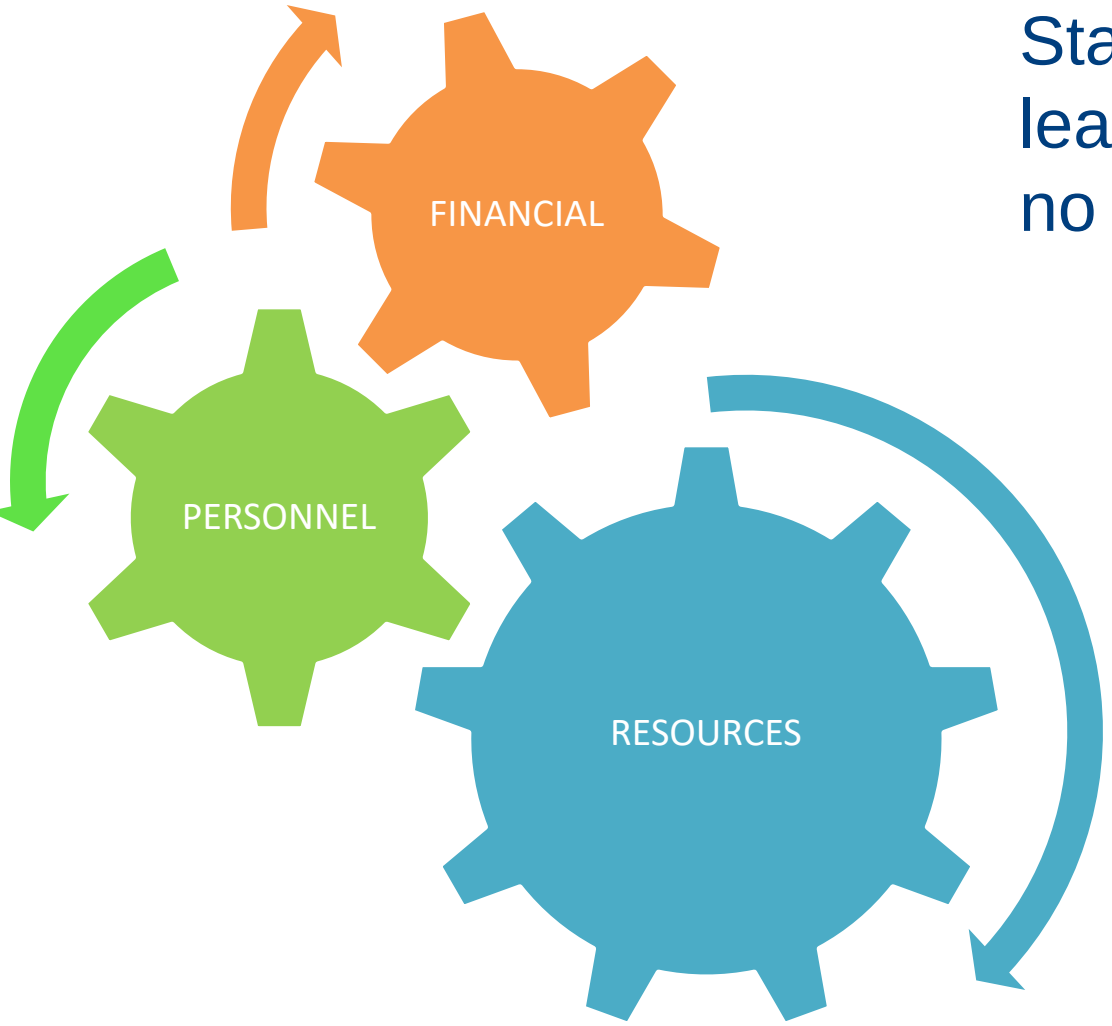
MINNESOTA CONSUMPTION GUIDELINES	
Recommended Frequency	**PFOS**
Unrestricted	< 10 ppb
Once per week	10 to 50 ppb
Once per month	50-200 ppb
Do not eat	> 200 ppb

ALL MOOSE SAMPLES

Overarching Conclusions

- PFAS does not appear to be an issue in moose meat or liver, even near contaminated sites (PFAS accumulates in serum > muscle)
- PFAS should not deter Alaskans from subsistence hunting (remember meat at the grocery store may have PFAS!)

REGULATORY STATUS



State regulators are leading the way, but there's no consensus, because:

- No federal advice related to PFAS in food
- No federally enforceable guidelines for PFAS in DW
- Conflicting advice from different federal agencies

WAYS TO REDUCE EXPOSURE

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FOOD

- DON'T use non-stick pans (unless PFAS-free), avoid prepackaged foods, don't fish near contaminated sites, don't fertilize with contaminated biosolids

WATER

- DON'T drink PFAS contaminated water unless you've filtered it with GAC or RO

CONSUMER PRODUCTS

- Keep rain/outdoor gear in garage or away from main living space, wet dust and vacuum (more during winter), look for PFAS-free personal care products

Questions??

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AK VS OTHER STATES: Water

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State	Year First Listed	Standard / Guidance	Type	PFOA	PFOS	PFNA	PFBA	PFBS	PFHxS	PFHpA	Gen-X
Minnesota (MN)	2017/2019	short-term HBV	DW/GW	0.035	0.015		7	3	0.047		
Minnesota (MN)	2017/2019	subchronic HBV	DW/GW	0.035	0.015		7	3	0.047		
Minnesota (MN)	2017/2019	chronic HBV	DW/GW	0.035	0.015		7	2	0.047		
Michigan (MI)	2019	Screening Levels	DW	0.009	0.008	0.009		1	0.084		
New Jersey (NJ)	2019	ISGWQC	GW	0.01	0.01						
California (CA)	2018	NL	DW	0.014	0.013						
Massachusetts (MA)	2018	Guidance Values	DW	0.070	0.070	0.070		2	0.070	0.070	
New Jersey (NJ)	2018	MCL	DW			0.013					
New Jersey (NJ)	2018	MCL	DW		0.013						
Michigan (MI)	2018	GCC	DW/GW	0.070	0.070						
Vermont (VT)	2018	HA	DW/GW	0.020	0.020	0.020			0.020	0.020	
Alaska (AK)	2018	Action Level	DW/GW/SW	0.070	0.070						
Colorado (CO)	2018	GQS	GW	0.070	0.070						
Maine (ME)	2018	RAG	GW	0.400	0.400			400			
New Jersey (NJ)	2018	GWQS	GW			0.013					
New Jersey (NJ)	2017	MCL	DW	0.014							
North Carolina (NC)	2017	Health Goal	DW								0.140
Rhode Island	2017	Groundwater Quality Standard	DW/GW	0.070	0.070						
Maine (ME)	2016	Health-based MEG	DW	0.070	0.070						
Connecticut (CT)	2016	AL	DW/GW	0.070	0.070	0.070			0.070	0.070	
Alaska (AK)	2016	CL	GW	0.400	0.400						
Delaware (DE)	2016	RL	GW	0.070	0.070						
Delaware (DE)	2016	SL	GW	0.070	0.070			38			
Maine (ME)	2016	Screening Level	GW	0.120	0.120			140			
New Hampshire (NH)	2016	AGQS	GW	0.070	0.070						
Pennsylvania (PA)	2016	MSC	GW	0.070	0.070						
Texas (TX)	2016	Tier 1 PCL	GW	0.290	0.560	0.290	71	34	0.093	0.560	
Vermont (VT)	2016	PAL	GW	0.010	0.010	0.010			0.010	0.010	
Iowa (IA)	2016		Non-protected GW		1						
Iowa (IA)	2016	Statewide Standards	Protected GW	0.070	0.070						
Maine (ME)	2016	Screening Level	SW/RW	0.170	0.300			7,914			
Nevada (NV)	2015	BCL	DW	0.667	0.667			667			
Michigan (MI)	2015	HNV	SW	0.420	0.011						
Oregon (OR)	2011	IL	SW	24	300	1				300	
North Carolina (NC)	2006	IMAC	GW	2							